SCHEME & SYLLABUS

ACADEMIC SESSION 2019-20

B. TECH.			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BSC-101	Physics	3	1	0	4
2	BSC-103	Mathematics-I	3	1	0	4
3	ESC-101	Basic Electrical Engineering	3	1	0	4
4	ESC-103	Introduction To Computer Systems & Internet Basics	3	0	0	3
5	ESC-153	Engineering Graphics & Design	0	0	6	3
6	HSS-101	English	2	0	0	2
7	BSC-151	Physics Lab	0	0	2	1
8	ESC-151	Basic Electrical Engineering Lab	0	0	2	1
9	HSS-151	English Lab	0	0	2	1
10	MC-101	Environmental Science	2	0	0	0
11	PDP-101	Induction and Nurturing Hobbies	0	0	2	1
		Total	**16**	**3**	**14**	**24**

SCHEME FOR B. TECH. (ECE)

B. TECH.			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BSC 102	Chemistry	3	1	0	4
2	BSC-104	Mathematics-II	3	1	0	4
3	ESC-102	Programming for problem solving	3	0	0	3
4	HSS-102	Effective Technical Communication	3	0	0	3
5	ESC-154	Workshop/Manufacturing Practice	0	0	4	2
6	BSC 152	Chemistry Lab	0	0	2	1
7	ESC-152	Programming for problem solving Lab	0	0	4	2
8	PDP-102	People Connect	0	0	2	1
9	MC-102	Constitution of India	2	0	0	0
		TOTAL	**14**	**2**	**12**	**20**

B. TECH.			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	EC-201C	Electronics Devices	3	1	0	4
2	EC-203C	Digital Electronics	3	0	0	3
3	CS-201C	Data Structure & Algorithms	3	1	0	4
4	CS-205C	Object Oriented Programming	3	0	0	3
5	BSC-	Mathematics-III	3	1	0	4

	201					
6	HSS-201	Engineering Economics & Management	3	0	0	3
7	EC-251C	Electronics Devices Lab	0	0	2	1
8	EC-253C	Digital Electronics Lab	0	0	2	1
9	CS-251C	Data Structure Algorithms Lab	0	0	2	1
10	CS-255C	Object Oriented Programming Lab	0	0	2	1
11	EC-257C	MATLAB	0	0	2	1
12	PDP-201	Personality Development & Grooming	0	0	2	1
		TOTAL	**18**	**3**	**12**	**27**

B. TECH.			**Semester**			**IV**
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	EC-202C	Analog & Digital Communication	3	0	0	3
2	EC-204C	Analog Electronics Circuits	3	1	0	4
3	CS-206C	Data Base Management System	3	0	0	3
4	CS-204C	Computer Architecture & Organization	3	0	0	3
5	EC-206C	Signals and Systems	3	1	0	4
6	EC-208C	Digital System Design	3	0	0	3
7	EC-252C	Analog & Digital Communication Lab	0	0	2	1
8	EC-254C	Analog Electronics Circuits Lab	0	0	2	1
9	CS-256C	Data Base Management System Lab	0	0	2	1
10	EC-258C	Digital System Design Lab	0	0	2	1
11	ECEW-202C	Electronics Workshop-I	0	0	4	2
12	PDP-202	Life Skills	0	0	2	1
		TOTAL	**18**	**2**	**14**	**27**

B. TECH.			Semester			V
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	EC-301C	Microprocessors & Microcontroller	3	0	0	3
2	EC-303C	Network Theory	3	1	0	4
3	EC-305C	Digital Signal Processing	3	1	0	4
4	EC-307C	Electromagnetic Waves	3	1	0	4
5	ECEL-301C	CMOS Design	3	0	0	3
6	CS-301C	Computer Network	3	0	0	3
7	EC-351C	Microprocessors & Microcontroller Lab	0	0	2	1
8	EC-353C	Network Theory Lab	0	0	2	1
9	EC-355C	Digital Signal Processing Lab	0	0	2	1
10	ECEW-301C	Electronics Workshop-II	0	0	4	2
11	ECEL-351	CMOS Design Lab	0	0	2	1
12	PDP-301	Leadership & Entrepreneurship Development	0	0	2	1
		TOTAL	**18**	**3**	**14**	**28**

5	**Programme Elective Course - I (PEC-I)**	**S.No.**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credit**
		i	**ECEL-301C**	**CMOS Design**	**3**	**0**	**0**	**3**
		ii	**EC -311C**	**Antenna and Wave Propagation**	**3**	**0**	**0**	**3**
		iii	**EC -313C**	**Microwave Theory & Techniques**	**3**	**0**	**0**	**3**
		iv	**EC -315C**	**Introduction to MEMS**	**3**	**0**	**0**	**3**
11	**Programme Elective Course Lab - I (PEC Lab-I)**	**S.No.**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credit**
		i	**ECEL-301C**	**CMOS Design Lab**	**0**	**0**	**2**	**1**
		ii	**EC -311C**	**Antenna and Wave Propagation Lab**	**0**	**0**	**2**	**1**
		iii	**EC -313C**	**Microwave Theory & Techniques Lab**	**0**	**0**	**2**	**1**
		iv	**EC -315C**	**Introduction to MEMS lab**	**0**	**0**	**2**	**1**

B. TECH.			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	EC-302C	Control System	3	0	0	3
2	EC-304C	Probability Theory and Stochastic Process	3	0	0	3
3	EC-306 C	Broadband Network	3	0	0	3
4	EC-312C	Internet of Things (IoT)	3	0	0	3
5	EC-316C	Wireless and Cellular Communication	3	0	0	3
6	EC-322C	VLSI Design	3	0	0	3
7	EC-352C	Control System Lab	0	0	2	1
8	EC-362C	Internet of Things(IOT)Lab	0	0	2	1
9	EC-372C	VLSI Design Lab	0	0	2	1
10	ECP-302C	Minor Project	0	0	4	2
11	PDP-302	Problem Solving Skills	0	0	2	1
		TOTAL	**18**	**0**	**12**	**24**

4	**Programme Elective Course –II (PEC-II)**	**S. No**	**Subject Code**	**Subject Name**	**L**	**T**	**P**	**Credit**
		i	**EC-308C**	**Data Communication**	**3**	**0**	**0**	**3**
		ii	**EC-310C**	**Embedded System Design**	**3**	**0**	**0**	**3**
		iii	**EC-312C**	**Internet of Things(IOT)**	**3**	**0**	**0**	**3**
8	**Programme Elective Course Lab –II (PEC Lab-II)**	**S. No**	**Subject Code**	**Subject Name**	**L**	**T**	**P**	**Credit**
		i	**EC-358C**	**Data Communication Lab**	**0**	**0**	**2**	**1**
		ii	**EC-360C**	**Embedded System Design Lab**	**0**	**0**	**2**	**1**
		iii	**EC-362C**	**Internet of Things(IOT) Lab**	**0**	**0**	**2**	**1**
5	**Programme Elective Course –III (PEC-III)**	**S. No**	**Subject Code**	**Subject Name**	**L**	**T**	**P**	**Credit**
		i	**EC-314C**	**High Performance Computer Network**	**3**	**0**	**0**	**3**
		ii	**EC-316C**	**Wireless & Cellular System**	**3**	**0**	**0**	**3**
6	**Programme Elective Course –IV (PEC-IV)**	**S. No**	**Subject Code**	**Subject**	**L**	**T**	**P**	**Credit**
		i	**EC-318C**	**Fiber Optical Communication**	**3**	**0**	**0**	**3**
		ii	**EC-320C**	**Real time System**	**3**	**0**	**0**	**3**
		iii	**EC-322C**	**VLSI Design**	**3**	**0**	**0**	**3**
9	**Programme Elective Course Lab–IV (PEC Lab-IV)**	**S. No**	**Subject Code**	**Subject**	**L**	**T**	**P**	**Credit**
		i	**EC-368C**	**Fiber Optical Communication Lab**	**0**	**0**	**2**	**1**
		ii	**EC-370C**	**Real time System Lab**	**0**	**0**	**2**	**1**
		iii	**EC-372C**	**VLSI Design Lab**	**0**	**0**	**2**	**1**

B. TECH.			Semester			VII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	EC-401C	Smart Grid Technology	3	0	0	3
2	EC-403C	Electronics System Design	3	0	0	3
3	EC-417C	Energy Harvesting Technologies & Power Management for IOT Devices	3	1	0	4
4	EC-423C	IOT Using RFID and Microcontroller	3	1	0	4
5	EC-425C	Satellite communication	3	0	0	3
6	EC-453C	Electronics System Design Lab	0	0	2	1
7	EC-473C	IOT Using RFID and microcontroller Lab	0	0	2	1
8	EC-475C	Satellite communication Lab	0	0	2	1
9	CS-303C	Artificial Intelligence	3	0	0	3
10	EC-491C	Major Project	0	0	4	2
11	PDP-401	Campus to Corporate	0	0	2	1
		TOTAL	**18**	**2**	**12**	**26**

2	**Programme Elective Course –V (PEC-V)**	**S. No**	**Subject Code**	**Course Name**	**L**	**T**	**P**	**Credit**
		i	**EC-403C**	**Electronics System Design**	**3**	**0**	**0**	**3**
		ii	**EC-405C**	**ALTE**	**3**	**0**	**0**	**3**
		iii	**EC-407C**	**Artificial Neural Network**	**3**	**0**	**0**	**3**
		iv	**EC-409C**	**High Performance Computer Network**	**3**	**0**	**0**	**3**
6	**Programme Elective Course Lab–V (PEC Lab-V)**	**S. No**	**Subject Code**	**Course Name**	**L**	**T**	**P**	**Credit**
		i	**EC-453C**	**Electronics System Design Lab**	**0**	**0**	**2**	**1**
		ii	**EC-455C**	**ALTE Lab**	**0**	**0**	**2**	**1**
		iii	**EC-457C**	**Artificial Neural Network Lab**	**0**	**0**	**2**	**1**
		iv	**EC-459C**	**High Performance Computer Network Lab**	**0**	**0**	**2**	**1**
3	**Programme Elective Course –VI (PEC-VI)**	**S. No**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credit**
		i	**EC-411C**	**Cloud Computing**	**3**	**1**	**0**	**4**
		ii	**EC-413C**	**Network Embedded Applications**	**3**	**1**	**0**	**4**
		iii	**EC-415C**	**Industry & Automotive Network**	**3**	**1**	**0**	**4**
		iv	**EC-417C**	**Energy Harvesting Technologies & Power Management for IOT devices**	**3**	**1**	**0**	**4**
4	**Programme Elective Course –VII (PEC-VII)**	**S. No**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credit**
		i	**EC-419C**	**SDN & NFV**	**3**	**1**	**0**	**4**
		ii	**EC-421C**	**Fault Tolerance System Design**	**3**	**1**	**0**	**4**
		iii	**EC-423C**	**IOT Using RFID and microcontroller**	**3**	**1**	**0**	**4**

7	**Programme Elective Course Lab–VII (PEC Lab-VII)**	**S. No**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credit**
		i	**EC-469C**	**SDN & NFV Lab**	**0**	**0**	**2**	**1**
		ii	**EC-471C**	**Fault Tolerance System Design Lab**	**0**	**0**	**2**	**1**
		iii	**EC-473C**	**IOT Using RFID and microcontroller Lab**	**0**	**0**	**2**	**1**
5	**Programme Elective Course –VIII (PEC-VIII)**	**S. No**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credit**
		i	**EC-425C**	**Satellite communication**	**3**	**0**	**0**	**3**
		ii	**EC-427C**	**Embedded Control System**	**3**	**0**	**0**	**3**
		iii	**EC-429C**	**5G Technology & Applications**	**3**	**0**	**0**	**3**
8	**Programme Elective Course Lab –VIII (PEC Lab-VIII)**	**S. No**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credit**
		i	**EC-475C**	**Satellite communication Lab**	**0**	**0**	**2**	**1**
		ii	**EC-477C**	**Embedded Control System Lab**	**0**	**0**	**2**	**1**
		iii	**EC-479C**	**5G Technology & Applications Lab**	**0**	**0**	**2**	**1**

3	Programme Elective Course –IX (PEC-IX)	S. No	Subject Code	Course Name	L	T	P	Credit
		i	EC-402C	Crptography & Network Security	3	0	0	3
		ii	EC-404C	Telecommunication Switching Method	3	0	0	3
		iii	EC-406C	Big Data Analysis	3	0	0	3
		iv	EC-408C	INDUSTRY 4.0 and INDUSTRIAL INTERNET OF THINGS	3	0	0	3
		v	EC-410C	Deep Learning	3	0	0	3
		vi	EC-412C	Wireless Sensor Network	3	0	0	3
		vii	EC-413C	Massive Open Online Courses (**MOOCs**)	3	0	0	3

B. TECH.			Semester			VIII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	EC-483C	Internship /Dissertation Phase	0	0	32	16
2	EC-484C	Seminar based on Internship	0	0	2	1
3	EC-408C	Industry 4.0 and Industrial Internet of Things	3	0	0	3
		Total	**3**	**0**	**34**	**20**

B.TECH 1st YEAR SYLLABUS
SEMESTER –I

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
1	BSC	BSC-101	Physics	3	1	0	4

Detailed contents:

Unit I: Electrostatics and Magnetostatics (12 lectures)
Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential, Boundary conditions of electric field and electrostatic potential; method of images; energy of a charge distribution and its expression in terms of electric field.
Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for given current densities.

Unit II: Mechanics (8 lectures)
Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction; Extension to cylindrical and spherical Coordinates

Unit III: Quantum Mechanics (8 lectures)
Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle.

Unit IV: Wave optics (10 lectures)
Huygens' principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Mach-Zehnder interferometer.
Fraunhauffer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

Unit V: Lasers (8 lectures)
Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO2), solid-state lasers (ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine.

Suggested Text/Reference Books

(i) David Griffiths, Introduction to Electrodynamics.
(ii) W. H. Hayt and J. A. Buck. Engineering Electromagnetics.
(iii) Engineering Mechanics, 2nd ed. — MK Harbola.
(iv) Introduction to Mechanics — MK Verma
(v) Eisberg and Resnick, Introduction to Quantum Physics
(vi) D. J. Griffiths, Quantum mechanics.
(vii) A. Ghatak, Optics
(viii) O. Svelto, Principles of Lasers

Course Outcomes

Physics is one of the foundation subjects to all engineering disciplines and the study in engineering physics is aimed at blending a strong physics component with relevant engineering backgrounds. The core objective is to provide a coherent foundation of physics for all majors that are usually necessary to work in areas such as computer science, electronic industry, mechanical domains and communication technologies. The contents are based on the static and dynamic state of elementary physics resulting in the field theory and wave mechanics the matter.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2	BSC	**BSC 103**	**Mathematics I (*Calculus and Linear Algebra)***	3	1	0	4

Mathematics-I Calculus and Linear Algebra
Detailed contents:

Unit I: Matrices (10 lectures)
Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, Skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Unit II: Sequences and series: (12 lectures)
Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit III: Calculus: (8 lectures)
Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit IV: Calculus: (8 lectures)
Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule; Maxima and minima.

Unit V: Multivariable Calculus (Differentiation): (10 lectures)
Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

Suggested Text/Reference Books
(i) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
(ii) Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
(iii) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
(iv) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
(v) D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
(vi) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
(vii) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Course Outcomes

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

The students will learn:

- To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
- The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
- The tool of power series and Fourier series for learning advanced Engineering Mathematics.
- To deal with functions of several variables that are essential in most branches of engineering.
- The essential tool of matrices and linear algebra in a comprehensive manner.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3	ESC	ESC 101	Basic Electrical Engineering	3	1	0	4

Learning Objectives:

- To understand and analyze basic electric and magnetic circuits
- To study the working principles of electrical machines and power converters.
- To introduce the components of low voltage electrical installations.

Detailed contents:

Unit 1: DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin, Norton and maximum power transfer Theorems.

Unit 2: AC Circuits (8 hours)

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three phase
balanced circuits, voltage and current relations in star and delta connections.

Unit 3: Transformers (8 hours)

Construction, working principle of transformer, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and its comparison with ordinary transformer.

Unit 4: Electrical Machines (8 hours)

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of dc motor. Construction and working of synchronous generators.

Unit 5: Power Converters & Electrical Installations (8 hours)

DC-DC converters and AC-DC converters, Switches, Fuses, MCBs, Earthing and its types, Important Characteristics for Batteries and battery backup. Elementary calculations for energy consumption, power factor improvement.

Suggested Text / Reference Books

(i) D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
(ii) D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.
(iii)L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
(iv) E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
(v) V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.

Course Outcomes

- Students are able to understand and analyze basic electric and magnetic circuits
- Students are able to understand the working principles of electrical machines and power converters.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4	ESC	**ESC 103**	**Introduction To Computer System And Internet Basics**	3	0	0	3

Objective: To give basic knowledge of Computer Hardware, Software systems & internets

Unit 1. Computer Systems

Overview of Computer Systems, Evolution of Computer Systems, Generations of computers, Characteristics of Computer: speed, storage, Accuracy, Categories of computer: Micro Computers, Mini Computers, Main Frames, Super Computers, Computer Organization: Central processing unit, Arithmetic and Logic Unit, Control Unit, Memory System: Primary memory, secondary memory and Data Representation in a Computer System. Number system : decimal, Binary, Octal, Hexadecimal representation and conversion

Unit 2. Programming Languages & Operating System basics

Software Basics: Application software, System Software, Utility Software, Programming languages: Low level languages, Machine language, Assembly language, Limitations of Low level languages, High Level languages, Translator, Assembler, Interpreter, Compiler, Operating System: Need of Operating System, Function of Operating System, Types of Operating System

Unit 3. Network Systems, Internet & Web

Introduction to networking, Local and Wide Area Networks, communication media: wired and wireless, Network Topologies: Star, Ring, Bus, Networking devices: Switch, Hub, Bridge, Internet overview, Internet Architecture, The idea of hypertext and hyper media; how the browser works: MIME types, plug-ins and helper applications; XML, XHTML, XSLT and the W3C, Hosting and Domains:

Unit 4: **Hypertext Markup Language:** The anatomy of an HTML document; marking up for structure and style: ordered and unordered lists, Structuring content with HTML using natural divisions, Marquee, Anchor Tag, Email Link; embedding images and controlling appearance, table creation: Frames and Nesting, iframes, forms, Semantic elements of HTML5, HTML5 Form elements, Media tags in HTML5, HTML5 Data Storage

Unit 5. Computer Security

Security Threats: Intruders, Password Cracking, Different types of malicious Software: Virus, Worms, Trojan Horse, Prevention from malicious Software: Antivirus (Introduction)

Text Books:

1. Computer Fundamentals: P. K. Sinha, BPB pub.
2. Fundamentals of Computer Science and Programming with C: A. K. Sharma, Dhanpat Rai Pub.
3. Uttam K. Roy, "Web Technology", Oxford Publication

Reference Books:

1. Computing Fundamentals & C Programming: E. Balaguruswamy, TMH.
2. Fundamentals of Computers: V Rajaraman, PHI

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5	ESC	**ESC 153**	**Engineering Graphics and Design**	0	0	6	3

Learning Outcomes:

Engineering drawing is an effective language of engineers. It is the foundation block which strengthens the engineering and technological structure. Moreover, it's the transmitting link between ideas and realization. After learning the course the students should be able to understand conventions and the methods of engineering drawing and interpret engineering drawings, using fundamental technical mathematics, construct basic and intermediate geometric improve their visualization skills so that they can apply these skills in developing new projects improve their technical communication skill in the form of communicative drawings, comprehend the theory of projections and acquire basic knowledge of computer aided drafting.

Module 1: Introduction to Engineering Drawing

Principles of Engineering Graphics and their significance, usage of drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Dimensioning

Module 2: Orthographic Projections

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes;

Module 3: Projections of Solids

Projections of planes inclined Planes - Auxiliary Planes; Projection of Regular Solids covering those inclined to both the planes, Auxiliary Views; Section of such solids and the true shape of the section.

Module 4: Sections and Sectional Views of Right Angular Solids

Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; objects from industry and dwellings (foundation to slab only) Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids Conversion of Isometric Views to Orthographic Views and Vice-versa

Module 5: Overview of Computer Graphics,

Introduction to Computer Aided Drafting and CAD software [such as: The Menu System, Toolbars (Standard,Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

Suggested Text/Reference Books:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech
5. Publishers (Corresponding set of) CAD Software Theory and User Manuals

Course Outcomes

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software. This course is designed to address:

- to prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- to prepare you to communicate effectively
- to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

The student will learn :

Introduction to engineering design and its place in society

- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards

Exposure to solid modelling

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
6	HSSM	HSS 101	ENGLISH	2	0	0	2

Detailed contents

1. Vocabulary Building

1.1 The concept of Word Formation
1.2 Root words from foreign languages and their use in English
1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
1.4 Synonyms, antonyms and standard abbreviations.

2. Basic Writing Skills

2.1 Sentence Structures
2.2 Use of phrases and clauses in sentences
2.3 Importance of proper punctuation
2.4 Creating coherence
2.5 Organizing principles of paragraphs in documents
2.6 Techniques for writing precisely
2.7 Jane Austen: *Pride and Prejudice(novel)*

3. Identifying Common Errors in Writing

3.1 Subject-verb agreement
3.2 Noun-pronoun agreement
3.3 Misplaced modifiers
3.4 Articles
3.5 Prepositions
3.6 Redundancies
3.7 Clichés

4. Nature and Style of sensible Writing

4.1 Describing
4.2 Defining
4.3 Classifying
4.4 Providing examples or evidence
4.5 Writing introduction and conclusion

5. Writing Practices

5.1 Comprehension
5.2 Précis Writing
5.3 Essay Writing
5.4 Charles Dickens : *Oliver Twist*(novel)

6. Oral Communication

(This unit involves interactive practice sessions in Language Lab)
Listening Comprehension
Pronunciation, Intonation, Stress and Rhythm
Common Everyday Situations: Conversations and Dialogues
communication at Workplace
Interviews

Formal Presentations

Suggested Readings:

(i) *Practical English Usage.* Michael Swan. OUP. 1995. (ii) *Remedial English Grammar.* F.T. Wood. Macmillan.2007 (iii) *On Writing Well.* William Zinsser. Harper Resource Book. 2001
(iv) *Study Writing.* Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
(v) *Communication Skills.* Sanjay Kumar and PushpLata. Oxford University Press. 2011.
(vi) *Exercises in Spoken English.* Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
7	BSC	**BSC 151**	**Physics Lab**	0	0	2	1

1) To study response curve of a series LCR circuit.
2) To determine the Planck's constant using LEDs.
3) To determine the Rydberg's constant of Hydrogen atom.
4) To find the refractive index and Cauchy's constants of a prism.
5) To find the wavelength of light by Newton's rings experiment.
6) To determine the thickness of a thin wire by interference.
7) To determine the wavelength of LASER using diffraction grating.
8) To determine the resolving power of a telescope.
9) To find the numerical aperture of an optical fiber cable.
10) To find the wavelength of light using Michelson's interferometer.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
8	ESC	**ESC 151**	**Basic Electrical Engineering Lab**	0	0	2	1

List of experiments / demonstrations:

- Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi – meter, oscilloscope. Resistors, capacitors and inductors.
- Demonstration of cut – out sections of machines :
- Torque speed characteristic of dc motor.
- Parallel operation of single phase Transformer.
- Open circuit & short circuit test on single phase transformer.
- To verify the Thevenin's & Norton's theorem.
- To verify the Superposition theorem.
- To study frequency response of series & parallel RLC Circuit.

- Load test on D.C. Shunt generator
- Torque – speed characteristics of three phase Induction motor & direction reversal by change of phase sequence of connection.
- To plot field current Vs Armature voltage characteristics of synchronous generator.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
11	MC	**ESC 101**	**ENVIRONMENTAL SCIENCE**	2	0	0	-

1. **THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:** Basic definitions related to environment; Scope, vis-à-vis environmental science and environmental engineering; a uses of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principals involved in environmental education, environmental awareness, Environmental ethics, environmental organization and their involvement.

2. **NATURAL RESOURCES:** Renewable and non-renewable resources; forest resources, over-exploitation, and deforestation / afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; Food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non-renewable energy sources, solar energy, wind energy, hydro energy, biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.

3. **ECOSYSTEMS:** Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids; characteristic features, structure and function of the following ecosystem -forest ecosystem, grassland ecosystem desert ecosystem and aquatic ecosystems.

4. **BIODIVERSITY AND ITS CONSERVATION:** Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

5. **ENVIRONMENTAL POLLUTION:** Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution; solid waste management, e-waste management; disaster management –floods, earthquake, cyclone and landslides.

6. **SOCIAL ISSUES AND THE ENVIRONMENT:** Water conservation, rain water harvesting, watershed management; climate change, global warming, acid rain, ozone layer depletion; Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act.

7. **HUMAN POPULATION AND THE ENVIRONMENT:** Population growth, population

explosion –family welfare programmes; role of information technology in environment and human health; case studies, Chipko movement, Sardar Sarovar dam, mining and quarrying in Udaipur, salinity and water logging in Punjab, Haryana and Rajasthan, Bhopal gas tragedy, Chernobyl nuclear disaster, arsenic pollution in ground water.

TEXT BOOK

Kaushik, Anubha, and Kaushik, C.P., "Perspectives in Environmental Studies", 4th Edition, New Age International Publishers, 2004

REFERENCE BOOKS

1. Agarwal, K.C., "Environmental Biology", 2nd Edition, Nidhi Publ. Ltd., Bikaner, 2001.
2. Bharucha Erach, "The Biodiversity of India", 2nd Edition, Mapin Publishing Pvt. Ltd., 2006.
3. Brunner R. C., "Hazardous Waste Incineration", 1st Edition McGraw Hill Inc., 1989.
4. Clark R.S., "Marine Pollution", 1st Edition Clanderson Press Oxford,1989
5. .Cunningham, W.P., Cooper, T.H. Gorhani, E. & Hepworth, M.T., Environmental Encyclopedia", 2nd Edition, Jaico Publ. House, 2001.
6. De, A. K., "Environmental Chemistry", 2nd Edition, Wiley Eastern, 1989
7. Jadhav, H. and Bhosale, V.M ., "Environmental Protection and Laws", 1st Edition, Himalaya Pub. House, Delhi, 1995.
8. Mckinney, M.L. and Schocl. R.M., "Environmental Science Systems & Solutions", 2nd Edition, Web enhanced edition, 1996.
9. Rao M.N. and Datta, A.K.,"Waste Water Treatment", 2nd Edition, Oxford & IBH Publ.Co., 1987.
10. Sharma B.K., "Environmental Chemistry", 2nd Edition, Goel Publ. House, Meerut, 2001
11. Trivedi R.K. and Goel, P.K., "Introduction to Air Pollution", 2nd Edition, Techno-science Publications, 1996

SEMESTER –II

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
1	BSC	**BSC-102**	**Chemistry**	3	1	0	4

Unit-I PHASE RULE

Terminology, Definition of phase rule, Derivation of phase rule equation, One component system (H_2O system and CO_2 system), two components system, Simple eutectic system (Pb – Ag), Pattinson's Process, congruent system (Zn–Mg), incongruent system(Na-K system), Merits and demerits of phase rule.

UNIT-II THERMODYNAMICS

Second law of thermodynamics, entropy change for reversible & irreversible processes, Entropy change for ideal gas, variation of free energy with temperature & pressure, Gibbs-Helmholtz equation, Clapeyron- Clausius equation & it's integrated form Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.

UNIT-III CORROSION AND ITS PREVENTION

Definition, Types of corrosion: Dry, wet corrosion (rusting of iron), galvanic corrosion, differential aeration corrosion, stress corrosion. Factors affecting corrosion, preventive measures (proper design, Cathodic and Anodic protection, sacrificial protection and barrier protection), Soil Corrosion.

UNIT-IV SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Part-A:Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterisation techniques.

UNIT-V INTERMOLECULAR FORCES AND POTENTIAL ENERGY SURFACES

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena, Potential energy surfaces of H_3, H_2F and HCN and trajectories on these surfaces.

UNIT-VI ORGANIC REACTIONS AND SYNTHESIS OF A DRUG MOLECULE

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule.

UNIT-VII STEREOCHEMISTRY

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal

compounds

Suggested Text Books :

(i)University chemistry, by B. H. Mahan
(ii)Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
(iii)Fundamentals of Molecular Spectroscopy, by C. N. Banwell
(iv)Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
(v)Physical Chemistry, by P. W. Atkins
(vi)Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2	BSC	**BSC-104**	**Mathematics-II** ***(Probability, Statistics, Complex Variable & Ordinary Differential Equation)***	3	1	0	4

Detailed contents

Unit I: Basic Probability: (12 lectures)
Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

Unit II: Continuous Probability Distributions: (6 lectures)
Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Unit III: Complex Variable – Differentiation: (14 lectures)
Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof).

Unit IV: First order ordinary differential equations: (8 lectures)
Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Unit V: Ordinary differential equations of higher orders: (10 lectures)
Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Suggested Text/Reference Books
(i) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
(ii) P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
(iii)S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
(iv) W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.

(v) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
(vi) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
(vii)E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
(viii) E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.

Course Outcomes

The objective of this course is to familiarize the students with statistical techniques. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.

The students will learn:

- The mathematical tools needed in evaluating multiple integrals and their usage.
- The effective mathematical tools for the solutions of differential equations that model physical processes.
- The ideas of probability and random variables and various discrete and
- Continuous probability distributions and their properties.
- The statistical methods of studying data samples.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3	ESC	**ESC-102**	**Programming For Problem Solving**	3	0	0	3

Unit-1: BASICS OF PROGRAMMING AND OVERVIEW OF C PROGRAMMING: Programming Fundamental, Problem definition, Idea of Algorithm, steps to solve logical and numerical problems, Representation of Algorithms: Flow charts/ Pseudocode with example, Types of programming languages, Translators, From algorithms to programs; source code, variables and memory location, Introduction to C, Structure of C program, C character set, Identifier and Keywords, Data types, constants, variables, Declaration, Arithmetic expressions & precedence , statements, Symbolic constants, type conversion, Types of operators, Input and output functions in C, header files, common programming errors, Control Statements, Sequencing, Selection, Condition and iteration.

Unit-2: ARRAYS AND STRING: Declaring, Referencing and initializing arrays, array subscript, using for loop for sequential access, multi-dimensional array, String basics string library functions, assignment and substring, concatenation, string comparison.

Unit-3: FUNCTIONS AND POINTERS: Definition of function, function prototype, Purpose of main function, passing parameters, Scope of function, recursion, Call by value and reference, Types of storage classes, Scope of variable: Global and local, static variables, Recursion.. Pointer variables, initializing pointers, pointer operators, pointer expressions, pointers and arrays, pointer and functions,

Unit-4: STRUCTURES, UNIONS & RECURSION

Defining a structure, Declaring structure variables, Structure initialization, Copying and Comparing Structure variables, Array of structures, Arrays within structure, nested structures, Unions. Recursion as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

Unit-5: DYNAMIC MEMORY ALLOCATION AND FILE PROCESSING: C's dynamic allocation functions. Streams and file types, opening and closing a data file, input and output operations, text mode versus binary mode, formatted input output operations with files, random access to files.

Reference Books:-

1. Programming in C by Schaum Series, McGraw Hills Publishers, New Delhi.
2. Let Us C by YashwantKanetkar; BPB Publication, New Delhi.
3. Exploring C by YashwantKanetkar; BPB Publications, New Delhi.
4. Application Programming in C by RS Salaria, Khanna Book Publishing Co. (P) Ltd.
5. Programming in C by R Subburaj, Vikas Publishing House Pvt. Ltd., Jangpura, New Delhi.
6. Programming with C Language by C Balaguruswami, Tata McGraw Hill, New Delhi.
7. Programming in C by BP Mahapatra, Khanna Publishers, New Delhi

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4	HSS	**HSS 102**	**Effective Technical Communication**	3	0	0	3

Module 1:

Information Design and Development- Different kinds of technical documents, Information development life cycle, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media.

Module 2:

Technical Writing, Grammar and Editing- Technical writing process, forms of discourse, Writing drafts and revising, Collaborative writing, creating indexes, technical writing style and language. Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication, Usability, Hunan factors, Managing technical communication projects, time estimation, Single sourcing,ocalization.

Module 3:

Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity

Module 4:

Communication and Technical Writing- Public speaking, Group discussion, Oral presentation, Interviews, Graphic presentation, Presentation aids, Personality Development. Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, event report.

Module 5:

Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity.

Text/Reference Books:

1.David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004

2.Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)

3.Shiv Khera, You Can Win, Macmillan Books, New York, 2003.

4.Raman Sharma, Technical Communications, Oxford Publication, London, 2004.

5.Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN:07828357-4)

6.Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.

7.Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5	HSS	ESC 154	Workshop/Manufacturing Practice	0	0	4	2

Course Objectives:

- To teach students the practices of workshop management and maintenance.
- To familiarize students with workshop machinery like drills, lathes, weldingtorches, files, saws, hammers, etc.
- To teach students the need to economize materials when managing aworkshop.
- To teach students the safety measures needed in a workshop and how to dealwith accidents at work.
- To teach student welding and manufacture of selected items.
- To teach students the practice of plumbing.
- To teach students the basics of electrical installations.

Course Outcomes: Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. Upon completion of this course, the students will gain knowledge of the different manufacturing processes and day to day industrial as well domestic life which are commonly employed in the industry, to fabricate components using different materials.

(A) Fitting Trade:

1. Preparation of T-Shape Work piece as per the given specifications.
2. Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.

(B) Machine shop: Study of machine tools in particular Lathe machine (different parts, different operations, study of cutting tools)

1. To obtain required diameters (steps) on a cylinder work piece with the given lengths.
2. To obtain the required diameters (taper) on a cylinder work piece with the given dimensions.

(C) Carpentry: Study of Carpentry Tools, Equipment and different joints

1. To make a dovetail lap joint.
2. To make a cross half lap joint.

(D) Foundry Trade: Introduction to foundry, Patterns, pattern allowances, ingredients of molding sand and melting furnaces. Foundry tools and their purposes

1. To prepare a sand mold, using the given single piece pattern.
2. To prepare a sand mold, using the given split piece pattern.

(E) Welding: Introduction, Study of Tools and welding Equipment (Gas and Arc welding)

1. To make a single v-butt joint, using the given mild steel pieces and by arc welding.
2. To make a T-joint using the given mild steel pieces and by arc welding.

(F) Electrical and Electronics: Introduction to House wiring, different types of cables. Types of power supply, types of motors, Starters, distribution of power supply, types of bulbs, parts of tube light, Electrical wiring symbols.

1. Two lamps connected in series - measure and check the voltage and current using multimeter.
2. Two lamps connected in parallel - measure and check the voltage and current using multimeter.

(G) CNC Machining: To study the working principle of CNC machining.

Reference Books:

1. Mechanical Workshop Practice by K C John, PHI Learning
2. Workshop Technology Vol. 1 and 2 by Raghuvanshi B.S. DhanpatRai& Sons 1998
3. Workshop Technology by Chapman W.A. J and Arnold E. Viva low priced student edition, 1998

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
6	BSC	**BSC 152**	**Chemistry Lab**	0	0	2	1

Chemistry Laboratory

Choice of 10-12 experiments from the following:

♣Determination of surface tension and viscosity
♣Thin layer chromatography
♣Ion exchange column for removal of hardness of water
♣Determination of chloride content of water
♣Colligative properties using freezing point depression
♣Determination of the rate constant of a reaction
♣Determination of cell constant and conductance of solutions
♣Potentiometry - determination of redox potentials and emfs
♣Synthesis of a polymer/drug
♣Saponification/acid value of oil
♣Chemical analysis of a salt
♣Lattice structures and packing of spheres
♣Models of potential energy surfaces
♣Chemical oscillations- Iodine clock reaction
♣Determination of the partition coefficient of a substance between two immiscible liquids
♣Adsorption of acetic acid by charcoal
♣Use of the capillary viscosimeters to the demonstrate of the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg.

Laboratory Outcomes

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:
- Estimate rate constants of reactions from concentration of reactants/products as a function of time
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
- Synthesize a small drug molecule and analyses a salt sample

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
7	ESC	ESC 152	Programming For Problem Solving Lab	0	0	4	2

LIST OF EXPERIMENTS

(Students have to do at 3-4 programs from each section)

SEQUENTIAL CONTROL STATEMENTS

1 Write a program to Print HELLO
2 Write a program to add two numbers
3 Write a program to calculate simple interest
4 Write a program to calculate average of three numbers
5 Write a program to swap two numbers
6 Write a program to illustrate mixed data types
7 Write a program to calculate area and circumference of circle
8 Write a program to evaluate a polynomial expression
9 Write a program to add digits of a four digit number
10 Write a program to check whether the person if eligible for voting or not

CONDITIONAL CONTROL STATEMENTS

11 Write a program to find greatest of two numbers
12 Write a program to find out which type of triangle it is
13 Write a program to find out greatest of three numbers
14 Write a program to evaluate performance of the student
15 Write a program to make a basic calculator

LOOP CONTROL STATEMENTS

16 Write a program to print Fibonacci up-to the given limit
17 Write a program to find the sum of digits of a number
18 Write a program to find factorial of a number
19 Write a program to print table of any number
20 Write program for printing different pyramid pattern

ARRAYS AND STRINGS

21 Write a program to enter the elements in a one dimensional array
22 Write a program to find the sum and average of five numbers
23 Write a program to sort the array elements
24 Write a program to enter the marks of 50 students an calculate the average
25 Write a program to add 2 matrix
26 Write a program to multiply 2 matrices
27 Write a program to calculate the length of string
28 Write a program to concatenate 2 strings
29 Write a program to reverse the string
30 Write a program to count the numbers of characters in a string
31 Write a program that converts lower case characters to upper case
32 Write a program without using predefined functions to check whether the string is palindrome or not

FUNCTIONS & POINTERS

33 Write a program using function to find the largest of three numbers
34 Write a program using function to sum the digits of a number
35 Write a program to calculate factorial of a number using recursive function
36 Write a program to print first n Fibonacci using recursive function
37 Write a program to illustrate the concept of chain of pointers
38 Write a program using function to swap two numbers using call by reference
39 Write a program to calculate the area and perimeter of circle using pointers
40 Write a program to copy the contents of one array into another in the reverse order using pointers

STRUCTURES

41 Write a program to read an employee record using structure and print it
42 Write a program to prepare salary chart of employee using array of structures
43 Write a program to print the name and percentage of 20 students (array of structures and arrays within structures).
44 Write a program to demonstrate structure within structure.

FILE HANDLING

45 Write a program to create, open, and close files.
46 Write a program to demonstrate the purpose of different file opening modes.
47 Write a program to count the number of characters, spaces, tabs, new line characters in a file.
48 Write a program to receive strings from keyboard and write them to a file.
49 Write a program to copy a file to another.
50 Write a program to read strings from a file and display them on screen.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
8	MC	**MC 102**	**Constitution Of India**	2	0	0	1

Objective: Constitution of India is the lengthiest written Constitution in the world. Came into existence as a result of the independence, the Constitution strikes a perfect balance between the State (allocation of powers) and a citizen within his/her individual capacity (providing the rights). This paper will emphasize on some of the important provisions of the Constitution, giving an insight about the functioning of the State and its essential pillars.

UNIT – 1

- Making and Basic structure of the Constitution
- Salient features of the Constitution
- Citizenship

UNIT – 2

- Fundamental Rights of a citizen
- Fundamental Duties of a citizen
- Directives principles of State policy

UNIT – 3

- Union and the Executive (President, Vice-President, Judiciary)

UNIT – 4

- Emergency Provisions

UNIT – 5

- State Liability

Syllabus
B.Tech – 2nd Year, 3rd Semester

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
1	PCC	EC-201C	Electronics Devices	3	1	0	4

Course Objective The purpose of this course is to
1. To give exposure to students about Semiconductor Physics.
2. To give the exposure about characteristics of semiconductor devices.
3. To introduce the working of different semiconductor electronics devices.
4. To introduce about the fabrication technologies of semiconductor electronics devices.

Course Outcome
CO1: Understand and utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems
CO2: Ability to analyze PN junctions in semiconductor devices under various conditions.
CO3: Ability to design and analysis simple rectifiers and voltage regulators using diodes.
CO4: Ability to design and analyses simple BJT and MOSFET circuits.
CO5: Understand various semiconductor, fabrication process

Unit 1: Introduction to Semiconductor Physics: Review of Quantum Mechanics, Electrons in periodic Lattices, E-k diagrams. Energy bands in intrinsic and extrinsic silicon: Carrier transport: diffusion current, drift current, mobility and resistivity, sheet resistance, design of resistors

Unit 2: Generation and recombination of carriers, Poisson and continuity equation P-N junction characteristics, I-V characteristics, and small signal switching models: Avalanche breakdown, Zener diode, Schottky diode

Unit 3: Bipolar Junction Transistor, I-V characteristics, various configurations of BJT such as CE, CB, CC and their features, Ebers-Moll Model, LED, photodiode and solar cell.

Unit 4: MOS capacitor, C-V characteristics, MOSFET, I-V characteristics, configurations of BJT such as CS, CG, CD and their features and small signal models of MOS transistor.

Unit 5: Integrated circuit fabrication process: oxidation, diffusion, ion implantation, photolithography, etching, chemical vapor deposition, sputtering, twin-tub CMOS process.

Text Book
1. G. Streetman, and S. K. Banerjee, “Solid State Electronic Devices,” 7th edition, Pearson,2014. 2. D. Neamen, D. Biswas "Semiconductor Physics and Devices," McGraw-Hill Education.

Reference Books

3. S. M. Sze and K. N. Kwok, "Physics of Semiconductor Devices," 3rd edition, John Wiley &Sons, 2006.
4. C.T. Sah, "Fundamentals of solid state electronics," World Scientific Publishing Co. Inc, 1991.
5. Y. Tsividis and M. Colin, "Operation and Modeling of the MOS Transistor," Oxford Univ.Press, 2011.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2	PCC	EC-203C	Digital Electronics	3	0	0	3

Objective:
Modern world deals with digital conditioning of various signals. Digitally manipulating signals or using digital circuits have a lot of advantages in terms of accuracy etc. This subject introduces concept of basic digital electronics: gates; combinational and sequential circuits and their designing

Course Outcomes: After studying this course the students would gain enough knowledge
CO1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
CO2. To understand and examine the structure of various number systems and its application in digital design.
CO3. The ability to understand, analyze and design various combinational and sequential circuits.
CO4. Ability to identify basic requirements for a design application and propose a cost effective solution.
CO5. The ability to identify and prevent various hazards and timing problems in a digital design.

Unit-1 INTRODUCTION OF GATES, COMBINATIONAL DESIGN BY USING GATES AND SIMPLIFICATION
Digital signal; logic gates: AND; OR; NOT; NAND; NOR; EX-OR; EX-NOR; Boolean algebra. Review of Number systems. Binary codes: BCD; Excess- 3; Gray; EBCDIC; ASCII; Error detection and correction codes; Design using gates; Karnaugh map and Quine Mcluskey methods of simplification.

Unit-2 COMBINATIONAL DESIGN USING MSI DEVICES:
Multiplexers and Demultiplexers and their use as logic elements; Decoders; Adders/Subtractors; BCD arithmetic circuits; Encoders; Decoders/Drivers for display devices.

Unit-3 SEQUENTIAL CIRCUITS: Flip Flops : S-R; J-K; T; D; master-slave; edge triggered; shift registers; sequence generators; Counters; Asynchronous and Synchronous Ring counters and Johnson Counter; Design of Synchronous and Asynchronous sequential circuits.

Unit-4 DIGITAL LOGIC Families: Bipolar logic families: RTL; DTL; DCTL; HTL; TTL; ECL; MOS; and CMOS logic families. Tristate logic; Interfacing of CMOS and TTL families.

Unit-5 A/D AND D/A CONVERTERS & PLD:
Sample and hold circuit; weighted resistor and R -2 R ladder D/A Converters; specifications for D/A converters. A/D converters: successive approximation; counting type;ROM; PLA; PAL; FPGA and CPLDs.

TEXT BOOK

Jain, R.P., "Modern Digital Electronics", 4th Ed.; Tata McGraw Hill, 2003

REFERENCE BOOKS

1. Taub and Schilling, "Digital Integrated Electronics" Tata McGraw Hill,1997
2. Malvino and Leach; "Digital Principles and Applications", 6th Edition, Tata McGraw Hill, 2006
3. Mano, Morris, "Digital Design", 3rd Edition, Prentice Hall of India,1994
4. Gupta and Singhal, "Digital Electronics", 2nd Edition, Dhanpat Rai and Sons, 2000.
5. Wakerly, John F, "Digital Design Principles and Practices", 4th Edition, Prentice Hall of India,2005

Objective: To relay the theoretical and practical fundamental knowledge of most commonly used algorithms.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3	ESC	CS-201C	Data Structure & Algorithms	3	1	0	4

Course Outcomes:
CO1. Ability to analyze algorithms and algorithm correctness.
CO2. Ability to summarize searching and sorting techniques
CO3. Ability to describe stack, queue and linked list operation.
CO4. Ability to have knowledge of tree and graphs concepts.
CO5. Learn to manage large amounts of data efficiently for uses such as large databases and internet indexing services

Unit-1 INTRODUCTION TO DATA STRUCTURES AND RUNNING TIME: Definition of data structures and abstract data types; linear vs. non-linear data structure; primitive vs. non-primitive data structure; static and dynamic implementations; arrays, 1,2-dimensional arrays, insertion & deletion in 1-D array; examples and real life applications. Time complexity; Big Oh notation; running times; best case, worst case, average case; factors depends on running time; introduction to recursion.

Unit-2 STACKS AND QUEUES: Stacks: definition, array based implementation of stacks,; examples: infix, postfix, prefix representation; conversions, applications; definition of queues, circular queue; array based implementation of queues.

Unit-3 LINKED LISTS: Lists; different type oflinked Lists; implementation of singly linked list, linked list implementation of stacks and queues; implementation of circular linked list; applications.

Unit-4 TREES AND GRAPHS: Definition of trees and binary trees; properties of binary trees and implementation; binary traversal pre-order, post-order, in-order traversal; binary search trees: searching, insertion & deletion. Definition of undirected and directed graphs; array based implementation of graphs; adjacency matrix; path matrix implementation; linked list representation of graphs; graph traversal: breadth first traversal, depth first traversal; implementations and applications.

Unit-5 SORTING AND SEARCHING ALGORITHMS: Introduction, selection, insertions, bubble sort, efficiency of above algorithms; merge sort, merging of sorted arrays and algorithms; quick sort algorithm analysis, heap sort, searching algorithms: straight sequential search, binary search (recursive & non–recursive algorithms)

TEXT BOOK

1. A.K. Sharma – Data structure Using C, 2nd edition pearson 2013

2. Langsam, Augentem M.J. and Tenenbaum A. M., ―Data Structures using C & C++‖, Prentice Hall of India, 2009.

REFERENCE BOOKS

1. Aho A. V., Hopcroft J. E. and Ullman T. D., ―Data Structures and Algorithms‖, Original Edition, Addison-Wesley, Low Priced Edition, 1983.
2. Horowitz Ellis and S ahni S artaj, ―Fundamentals of Data Structures‖, Addison-Wesley Pub, 1984.
3. Horowitz, S ahni and Rajasekaran, ―Fundamentals of Computer Algorithms‖ 2007.
4. Kruse Robert, ―Data Structures and Program Design in C‖, Prentice Hall of India, 1994
5. Lipschetz Jr. Seymour, ―Theory & Problems of Data Structures‖, S chaum ‘s Outline, Tata McGraw Hill
6. Weiss Mark Allen, ―Data Structures and Algorithms Analysis in C‖, Pearson Education, 2000
7. Corm en T . H . et al., ―Introduction to Algorithms‖, 2nd Edition, Prentice Hall of India, 2001.
8. Dasgupta Sanjay, Christos P. and Vazirani Umesh, ―Algorithms‖, Tata McGraw Hill, 2008

WEB REFERENCES

http://www.cs.auckland.ac.nz/software/AlgAnim/ds _ToC.html

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4	ESC	CS-205C	Object Oriented Programming	3	0	0	3

OBJECTIVE: Providing a sound conceptual understanding of the fundamental concepts of computing hardware, software, networking and services; build programming logic and thereby developing skills in problem solving using C++ programming language; Introduce the concept of object orientation and on how to handle data in different forms; Emphasize the concepts and constructs rather than on language features.

CO1 Describe the Object Oriented Programming paradigm with the concept of objects and classes.
CO2 Explain the memory management techniques using constructors, destructors and pointers.
CO3 Classify and demonstrate the various Inheritance techniques.
CO4 Understand how to apply polymorphism techniques on the object oriented problem.
CO5 Summarize the exception handling mechanism, file handling techniques and Use of generic programming in Object oriented programming

Unit-1. OBJECT ORIENTED CONCEPTS& INTRODUCTION TO C++: Introduction to objects and object oriented programming, difference between procedure oriented & Object oriented programming; main feature of Object oriented programming: Class, Object, encapsulation (information hiding); Polymorphism: overloading, inheritance, overriding methods, abstract classes, access modifiers: controlling access to a class; method, or variable (public, protected, private, package); other modifiers; Basics of C++,Simple C++ Programs, pre¬processors directives, Namespace, Memory management operators in C++, Inline function, default arguments, & reference types

Unit-2. CLASSES AND DATA ABSTRACTION: Introduction; structure definitions; accessing members of structures; class scope and accessing class members; separating interface from implementation; controlling access function and utility functions, initializing class objects: constructors, using default arguments with constructors; using destructors; classes : const(constant) object and const member functions, object as member of classes, friend function and friend classes; using this pointer, dynamic memory allocation with new and delete; static class members& function; container classes and integrators;.

Unit-3. OPERATOR OVERLOADING, TEMPLATE &EXCETION HANDLING: Introduction; fundamentals of operator overloading; restrictions on operators overloading; operator functions as class members vs. as friend functions; overloading, <<; >> overloading unary operators; overloading binary operators. Function templates; overloading template functions; class template; class templates and non- type parameters; basics of C++ exception handling: try, throw, catch, throwing an exception, catching an exception, re-throwing an exception

Unit-4. INHERITANCE, VIRTUAL FUNCTIONS AND POLYMORPHISM: Introduction, inheritance: base classes and derived classes, protected members; casting base-class pointers to derived-class pointers; using member functions; overriding base–class members in a derived class; public, protected and private inheritance; using constructors and destructors in derived classes; implicit derived–class object to base-class object conversion; composition vs. inheritance; virtual functions; abstract base classes and concrete classes; polymorphism; new classes and dynamic binding; virtual destructors; polymorphism; dynamic binding.

Unit-5. FILES AND I/O STREAMS: Files and streams; creating a sequential access file; reading data from a sequential access file; updating sequential access files, random access files; creating a random access file; writing data randomly to a random access file; reading data sequentially from a random access file; stream input/output classes and objects; stream output; stream input; unformatted I/O (with read and write); stream manipulators; stream format states; stream error states.

TEXT BOOK

1. Balagurusam y , E., ―Object Oriented Programming with C++ Prentice Hall of India, 2008.
2. Scheldt, Herbert ―C++: The Complete Reference, Tata McGraw Hill, 3rd Ed, 2008.

REFERENCE BOOKS

1. Kamthane, ―Object Oriented Programming with ANSI and Turbo C++, Pearson Education.
2. Lafore, Robert, ―Object Oriented Programming in Turbo C++ The WAITE Group Press, 1994.
3. Balagurusam y , E., ―Object Oriented Programming with C++, Prentice Hall of India, 2008.
4. Bhave, ―Object Oriented Programming with C++‖, Pearson Education.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5	BSC	BSC-201	Numerical and Statistical Methods	3	1	0	4

Course Outcome

CO1 Learn Newton's Forward and backward
CO2 Learn Numerical Differentiation, Numerical integration
CO3 Learn application of differential equation
CO4 Learn Taylo's Series method
CO5 Learn Partial difference equation

Unit-1 Solution of polynomial and transcendental equations – Bisection method, Newton-Raphson method and Regula-Falsi method. Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae.

Unit-2 Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae. Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.
Unit-3 Ordinary differential equations: Taylor's series, Euler and modified Euler's methods. Runge-Kutta method of fourth order for solving first and second order equations. Milne's and Adam's predicator corrector methods.

Unit-4 Partial differential equations: Finite difference solution two dimensional Laplace equation and Poission equation, Implicit and explicit methods for one dimensional heat equation (Bender-Schmidt and Crank-Nicholson methods), Finite difference explicit method for wave equation.

Textbooks

1. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.

References:

1. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5	HSMC	HSS-201	Engineering Economics & Management	3	0	0	3

OBJECTIVE The purpose of this course is to

- Acquaint the students in the basic economic concepts and their operational significance
- Stimulate him to think systematically and objectively about contemporary economic problems.

Course Outcomes:

CO1. Explain the transaction approach and cash balance approach of quantity theory of money

CO2. Describe the process of credit creation of a commercial bank, describe the balance sheet of a commercial bank, explain the functions of commercial bank

CO3. Explain the various functions of central bank

CO4. Describe the various phases of business cycle, explain the Hawtrey'stheory of trade cycle

CO5. Explain the main objective of monetary policy in under developed countries

Course Outcome

- The course is intended to provide basic understanding of Economics and Management to engineering students with following aspects:
- To impart knowledge, with respect to concepts, principles and practical applications of Economics, which govern the functioning of a firm/organization under different market conditions?
- To help the students to understand the fundamental concepts and principles of management; the basic roles, skills, functions of management, various organizational structures and basic knowledge of marketing.

Unit- 1: Introduction to Economics:

Definitions, Nature, Scope, Difference between Microeconomics & Macroeconomics Theory of Demand & Supply; meaning, determinants, law of demand, law of supply, equilibrium between demand & supply Elasticity; elasticity of demand, price elasticity, income elasticity, cross elasticity.

Unit-2: Theory of Production

production function, meaning, factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur), Law of variable proportions & law of returns to scale Cost; meaning, short run & long run cost, fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis; meaning, explanation, numerical

Unit- 3: Macro-Economic Indicators

Macro-Economic Indicators, Changes in the Gross Domestic Product (GDP), Gross National Product (GNP), Inflation, Employment & Unemployment Indicators, Currency Strength, Interest rates, Corporate Profits, Balance of Trade, Agricultural Production, Current Account balance, Foreign exchange, Foreign Trade, Industrial Production Index, Wholesale Price Index (WPI), Retail Price Index (RPI), Consumer Price Index (CPI),

Unit-4: Introduction to Management

Definitions, Nature, scope Management & administration, skill, types and roles of managers Management Principles; Scientific principles, Administrative principles, Maslow's Hierarchy of needs theory.

Functions to Management : Planning, Organizing, Staffing, Directing, Controlling (meaning, nature and importance) Organizational Structures; meaning, principles of organization, types-formal and informal, line, line & staff, matrix, hybrid (explanation with merits and demerits), span of control, departmentalization.

Unit-5: Introduction to Marketing & Production Management

Marketing Mix, concepts of marketing, demand forecasting and methods, market segmentation Introduction to Finance Management; meaning, scope, sources, functions

Production Management: Definitions, objectives, functions, plant layout-types & factors affecting it, plant location- factors affecting it. Introduction to Human Resource Management; definitions, objectives of manpower planning, process, sources of recruitment, process of selection

Reference Books:

1. Engineering Economics, R.Paneerselvam, PHI publication.
2. Fundamentals of Management: Essential Concepts and Applications, Pearson Education, Robbins S.P. and Decenzo David A.
3. Economics: Principles of Economics, N Gregory Mankiw, Cengage Learning.
4. Principles and Practices of Management by L.M.Prasad.
5. Principles of Management by Tripathy and Reddy.
6. Modern Economic Theory, By Dr. K. K. Dewett & M. H. Navalur, S. Chand Publications.
7. Samuelson, Nordhaus: Economics (2009).
8. N. Gregory Mankiew (2007): Macroeconomics, Sixth edition.
9. Bock Gyula (2001): Makroökonómia feladatok, Tri-Mester.

Actual economic articles from the printed media or from the internet.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
6	PCC	EC-251C	Electronics Devices Lab	0	0	2	1

Course Outcome
CO1 Understand and Know the characteristics of various components and their Applications
CO2 Analyze the Bipolar Junction Transistor characteristics and the biasing techniques
CO3 Analyze the Field Effect Transistor characteristics and its applications
CO4 Design and analyze the Small Signal BJT Amplifiers
CO5 Design and analyze the Small Signal MOS and FET Amplifiers

LIST OF EXPERIMENTS

1. To study V-I characteristics of diode, and its use as a capacitance.
2. To study the V-I characteristics of Zener Diode.
3. To study the V-I characteristics of LED.
4. Study of the characteristics of transistor in Common Base configuration.
5. Study of the characteristics of transistor in Common Emitter configuration.
6. Study of the characteristics of transistor in Common Collector configuration.
7. Study of V-I characteristics of a photo-voltaic cell.
8. Study of characteristics of JFET in CS configuration.
9. Study of characteristics of MOSFET in CS configuration.
10. Study of photo-resist in metal pattern for planar technology.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
7	PCC	EC-253C	Digital Electronics Lab	0	0	2	1

Course Objective Practical application of digital Ics

Course Outcome

CO1 Realize different number systems and number base conversions and Boolean functions using universal gates.

CO2 Utilize the postulates of the Boolean Algebra to minimize the Combinational circuits.

CO3 Design and Analyze Combinational circuits and verify the functionality.

CO4 Design and Analyze Sequential circuits and Finite State Machines.

CO5 Realize the logic gates and Boolean functions using different Logic families and verify the functionality

LIST OF EXPERIMENTS

1. Study of TTL gates – AND; OR; NOT; NAND; NOR; EX-OR; EX-NOR.
2. Design and realize a given function using K-maps and verify its performance.
3. To verify the operation of multiplexer and Demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R; J-K; T and D type flip flops.
6. To verify the operation of bi-directional shift register.
7. To design and verify the operation of 3-bit synchronous counter.
8. To design and verify the operation of synchronous UP/DOWN decade counter using J K flip-flops and drive a seven-segment display using the same.
9. To design and verify the operation of asynchronous UP/DOWN decade counter using J K flip-flops and drive a seven-segment display using the same.
10. To design and realize a sequence generator for a given sequence using J-K flip-flops.
11. Study of CMOS NAND and NOR gates and interfacing between TTL and CMOS gates.
12. Design a 4-bit shift-register and verify its operation. Verify the operation of a ring counter and a Johnson counter.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
8	ESC	CS-251C	Data Structure Algorithms Lab	0	0	2	1

CO1 understand the concept of array storage and examine the concept of row-major and column-major order.
CO2 List and Illustrate the implementation of basic data structure using an array.
CO3 Compare various searching techniques using arrays
CO4 Use linear and non-linear data structures like stacks, queues, linked list, tree, etc.
CO5 Design and Formulate different sorting algorithms

LIST OF EXPERIMENTS

ARRAY OPERATIONS

1. Write a program to insert an element at given position in linear array
2. Write a program to insert an element in sorted array.
3. Write a program to delete an element from given position in linear array
4. Perform following operations on matrices using functions only
   a) Addition b) Subtraction c) Multiplication d) Transpose

SEARCHING

5. Search an element in a linear array using linear search.
6. Using iteration and recursion concepts write programs for finding the element in the array using Binary Search Method

RECURSION

7. Write a program to compute factorial of given number using recursion
8. Write as program to solve Tower of Hanoi problem using recursion
9. Write a program to find power of given number using recursion

STACK & QUEUE

10. Write a program for static implementation of stack
11. Write a program for dynamic implementation of queue
12. Write a program for static implementation of circular queue
13. Write a program for dynamic implementation of queue
14. Write a program to evaluate a postfix operation

LINKED LIST

15. Create a linear linked list & perform operations such as insert, delete at end, at beg & reverse the link list
16. Create a circular linked list & perform search, insertion & delete operation
17. Create a doubly linked list & perform search, insertion & delete operation

TREE & GRAPH

18. Write program to implement binary search tree. (Insertion and Deletion in Binary Search Tree)
19. Write program to simulates the various tree traversal algorithms
20. Write program to simulate various graph traversing algorithms.

SORTING ALGORITHMS

21. Write program to implement Bubble, Insertion & selection sort.

22. Write program to implement quick sort
23. Write program to implement merge sort
24. Write a program to implement heap sort

TEXT BOOK

1. A.K. Sharma – Data structure Using C, 2nd edition pearson 2013
2. Langsam, Augentem M.J. and Tenenbaum A. M., ―Data Structures using C & C++, Prentice Hall of India, 2009.

REFERENCE BOOKS

1. R. S. Salaria -Data Structure Using C
2. Kruse Robert, ―Data Structures and Program Design in C‖, Prentice Hall of India, 1994
3. Lipschitz Jr. Seymour, ―Theory & Problems of Data Structures‖, Schaum's Outline, 2nd Edition, Tata McGraw Hill.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
9	ESC	CS-255	Object Oriented Programming Lab	0	0	2	1

Program Objectives:

- To strengthen problem solving ability by using the characteristics of an object-oriented approach.
- To design applications using object oriented features
- To handle Exceptions in programs.
- To teach the student to implement object oriented concepts

List of experiments

1. Basic C++ Programs
2. a) Write a C++ program to find the sum of individual digits of a positive integer.
   b) Write a C++ program to generate the first n terms of the sequence.
3. a) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
   b) Write a C++ program to find both the largest and smallest number in a list of integers.
4. a) Write a C++ program to sort a list of numbers in ascending order
   b) Write a Program to illustrate New and Delete Keywords for dynamic memory allocation
5. a) Write a program Illustrating Class Declarations, Definition, and Accessing Class Members. b) Program to illustrate default constructor, parameterized constructor and copy constructors c) Write a Program to Implement a Class STUDENT having Following Members:

Member	Description
Data Members	
Sname	Name of the student
Marks array	Marks of the student
Total	Total marks obtained
Tmax	Total maximum marks
Member Functions	
Member	Description
assign()	Assign Initial Values
compute()	to Compute Total, Average
display()	to Display the Data

6. a) Write a Program to Demonstrate the i) Operator Overloading. ii) Function Overloading.
   b) Write a Program to Demonstrate Friend Function and Friend Class.
7. a) Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.
   b) Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.
8. Write a C++ program to implement the matrix ADT using a class. The operations

supported by this ADT are:

a) Reading a matrix. b) Addition of matrices. c) Printing a matrix. d) Subtraction of matrices. e) Multiplication of matrices

9. Write C++ programs that illustrate how the following forms of inheritance are supported: a) Single inheritance b) Multiple inheritance c) Multi level inheritance d) Hierarchical inheritance

10. a.)Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.

b) Write a Program to Invoking Derived Class Member Through Base Class Pointer.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
10	PCC	EC-257C	MATLAB	0	0	2	1

Course Objectives:
1. To know about fundamentals of MATLAB tool .
2. To provide an overview to program curve fitting & solve Linear and Nonlinear Equations.
3. To understand the concept and importance of Fourier transforms.
4. To gain knowledge about MATLAB Simulink & solve Electrical engineering problems.

Course Outcomes:
CO1: Able to implement loops, branching, control instruction and functions in MATLAB programming environment.
CO2: Able to program curve fitting, numerical differentiation and integration, solution of linear equations in MATLAB and solve electrical engineering problems.
CO3: Able to understand implementation of ODE using ode 45 and execute Solutions of nonlinear equations and DFT in MATLAB.
CO4: Able to simulate MATLAB Simulink examples

1. BASIC STRUCTURE and FEATURES OF MATLAB: Command window; figure window; editor window and help window; arithmetic operations with scalars, order of precedence; using MATLAB as a calculator; display formats; elementary math built-in functions; scalar variables, assignment operator; predefined variables; useful commands for managing variables; applications in problem solving.
2. CREATING ARRAYS – one dimensional, two dimensional; array addressing; built-in functions for handling arrays; mathematical operations with matrices; strings and strings as variables; generation of random numbers; examples of MATLAB applications.

3. SCRIPT FILES: Creating and saving a script file, current directory; output commands.

4. TWO – DIMENSIONAL PLOTS: Plot command; line specifier's plot of a given data; plot of a function; plotting multiple graphs in the same plot.

5. FUNCTIONS AND FUNCTION FILES: Creating a function file; input and output arguments; function body; comment lines; saving a function files; using a function file; programming in MATLAB.

TEXT BOOK

1.Gilat Amos, “MATLAB: An Introduction with Applications”, John Wiley & Sons, Inc (Wiley Student Edition), 2008

REFERENCE BOOK

2.Herniter, E. Marc, “Programming in MATLAB”, Brooks/Cole, Thomson Learning

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
11	HSMC	PDP-201	Personality Development & Grooming	0	0	2	1

On completion of this course, the students will be able to

CO1. Introspect & develop a planned approach towards profession and life in general.

CO2. Effectively set goals/target, self-motivate and practice creative thinking

CO3. Apply professional skills in order to function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.

CO4. Demonstrate right attitudinal and behavioural aspects for overall success in personal and professional life.

CO5 Assessment it can be combination of written evaluation and presentations, including simulations, case studies, projects, dossier-making activities and business plan.

Module Outline

Module 1: Meaning of Personality – 02 hours

Definition & Determinants

Personality Traits

Theories of Personality & Importance of Personality Development.

Perception – Definition, Perceptual Process

Module 2: Self-Awareness & Self-Esteem – 06 hours

Meaning, Benefits of Self- Awareness, Developing Self- Awareness.

Self-Assessment, Self-Appraisal & Self-Development, Identifying Strength & Limitations; Habits, Will-Power and Drives

Developing Self-Esteem and Building Self Confidence, Significance of Self-Discipline

Module3: Self-Assessment & Monitoring – 10 hours

Meaning, High self- monitor versus low self- monitor

Advantages and Disadvantages of self-monitor

Self–monitoring and job performance.

SWOT Analysis: o Meaning, Importance, Application, Components.

Transactional Analysis o Meaning – EGO States

Types of Transactions

Johari Window- Life Positions.

Emotional Intelligence o Meaning – Components of Emotional Intelligence

Significance of managing Emotional intelligence

How to develop Emotional Quotient.

Meaning & Formation of attitude

Types of attitudes

Measurement of Attitudes

Barriers to attitude change – Methods to attitude change

Carl Jung's contribution to personality development theory

Meaning – Assertiveness in Communication

Assertiveness Techniques

Benefits of being Assertive

Improving Assertiveness

Module 5: Attitude – 06 hours

• Assertiveness:

Meaning – Assertiveness in Communication

Assertiveness Techniques

Benefits of being Assertive

Improving Assertiveness

SYLLABUS
B.Tech – 2nd Year, 4th Semester

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
1	PCC	EC-202C	Analog & Digital Communication	3	0	0	3

Course Objective: To learn the modulation techniques
Course Outcomes: At the end of this course students will demonstrate the ability to
CO1: Analyze and compare different analog modulation schemes for their efficiency and bandwidth
CO2: Analyze the behavior of a communication system in presence of noise
CO3: Investigate pulsed modulation system and analyze their system performance
CO4: Analyze different digital modulation schemes and can compute the bit error performance.
CO5: Able to apply concept of random variables in communication. CO1: Analyze and compare different analog modulation schemes for their efficiency and bandwidth

Unit 1: Review of signals and systems, Frequency domain representation of signals, Principles of Amplitude Modulation Systems- DSB, SSB and VSB modulations. Angle Modulation, Representation of FM and PM signals, Spectral characteristics of angle modulated signals.

Unit 2: Review of probability and random process. Gaussian and white noise characteristics, Noise in amplitude modulation systems, Noise in Frequency modulation systems. Pre-emphasis and De-emphasis, Threshold effect in angle modulation.

Unit 3: Pulse modulation. Sampling process. Pulse Amplitude and Pulse code modulation (PCM), Differential pulse code modulation. Delta modulation, Noise considerations in PCM, Time Division multiplexing, Digital Multiplexers.

Unit 4: Elements of Detection Theory, Optimum detection of signals in noise, Coherent communication with waveforms- Probability of Error evaluations. Baseband Pulse Transmission- Inter symbol Interference and Nyquist criterion. Pass band Digital Modulation schemes- Phase Shift Keying, Frequency Shift Keying, Quadrature Amplitude Modulation, Continuous Phase Modulation and Minimum Shift Keying.

Unit 5: Digital Modulation tradeoffs. Optimum demodulation of digital signals over band-limited channels Maximum likelihood sequence detection (Viterbi receiver). Equalization Techniques. Synchronization and Carrier Recovery for Digital modulation.

Text/Reference Books:
1. Haykin S., "Communications Systems", John Wiley and Sons, 2001.
2. Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education,

2002.
3. Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill, 2001.
4. Wozencraft J. M. and Jacobs I. M., ``Principles of Communication Engineering' 'John Wiley, 1965.
5. Barry J. R., Lee E. A. and Messerschmitt D. G., ``Digital Communication", Kluwer Academic Publishers, 2004.
6. Proakis J.G., ``Digital Communications", 4th Edition, McGraw Hill, 2000.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2	PCC	EC-204	Analog Electronics Circuits	3	1	0	4

OBJECTIVE: To show the students the physical picture of the internal behavior of semiconductor diode and its different type of circuit. Among these are rectifier; clipper; clamper; and filter also gives knowledge of internal behavior of transistor; FET and its application. This subject deals with the study of circuits designed using Transistors/FETs. It also aims to impart knowledge to the students about Operational Amplifiers and their various linear and nonlinear applications.

At the end of this course students will demonstrate the ability to
CO1: Understand the characteristics of diodes and transistors
CO2: Design and analyze various rectifier and amplifier circuits
CO3: Design sinusoidal and non-sinusoidal oscillators
CO4: Understand the functioning of OP-AMP and design OP-AMP based circuits
CO5: Design ADC and DAC

Unit-1. SEMICONDUCTOR DIODE & TRANSISTOR CIRCUITS : Diode as a rectifier; switching characteristics of diode; Half-wave and full wave rectifiers; clipping circuits; clamping circuits; voltage doublers and voltage multiplier circuits. Bipolar junction transistor : V-I characteristics; Ebers-moll model of transistor; hybrid model; h-parameters; emitter follower; Miller's Theorem; frequency response of R-C coupled amplifier; Multi stage CE Amplifier.
TRANSISTOR BIASING: Operating point; bias stability; collector to base bias; self-bias; emitter bias; bias compensation; thermistor and sensistor compensation; thermal runaway.

Unit-2. FIELD EFFECT TRANSISTORS: Junction field effect transistor; MOSFET Enhancement and Depletion mode; V-MOSFET; Common source amplifier; source follower; biasing of FET; applications of FET as a voltage variable resistor (V V R).

Unit-3. FEEDBACK AMPLIFIERS: Feedback concept; transfer gain with feedback; general characteristics of negative feedback amplifiers; Feedback Topologies: voltage series feedback; current series feedback; current shunt feedback; voltage shunt feedback and their impact on input and output resistance.
OSCILLATORS: Sinusoidal oscillators; Barkhausen criteria; R-C phase shift oscillator; wien-bridge oscillator; crystal oscillator; General form of Oscillator Circuit; Hartley and Colpitt Oscillator.

Unit-4. POWER AMPLIFIERS: Classification of Amplifiers; Distortions in Amplifiers; Class A large signal amplifiers; higher order harmonic distortion; efficiency; transformer coupled power amplifier; class B amplifier : efficiency and distortion; class A and class B push-pull amplifiers; Introduction to Class C and Class D power amplifiers.

Unit-5. OPERATIONAL AMPLIFIERS: Introduction; Ideal and practical operational amplifiers; inverting and non-inverting and differential configuration; Emitter coupled differential amplifier; Integrator; differentiator; Comparators; Logarithmic/anti-log

amplifier; multivibrators; Monolithic Timer – NE555.
FILTERS: Active RC Filters: Idealistic and Realistic response of filters (LP; BP; and HP); Butter worth and Chebyshev filter functions all pass; Notch Filter

TEXT BOOK

MillmanHalkias, ‖Integrated Electronics‖, 6th Edition, Tata McGraw Hill, 2008

REFERENCE BOOKS

1. Neamen, D.A., —Electronic Circuit Analysis and Design‖, 2nd Edition, Tata McGraw Hill, 2004.
2. Malvino, —Electronics Principles‖, 6th Edition McGraw Hill, 2003.
3. Schilling, Donald L. and Boylestad, Charles Belove and Nashelsky, —Electronics Circuits‖, 8th Edition, McGrawHill, 2005.
4 Bell, David A., —Electronic Devices and Circuits‖, 3rd Edition, Prentice Hall of India, 2007.5 Motorstad, ‖Electronics Devices and Circuits‖, 2nd Edition, Prentice Hall of India, 2004.
5. Sedra and Smith, ‖Microelectronic Circuits‖, 2nd Edition, Oxford, 2004.
6. Gaekwad, ‖Operational Amplifier‖, 8th Edition, Prentice Hall of India, 2009.
7. Neamen, Donald A., ‖Electronic Circuit Analysis and Design‖, 2nd Edition, Tata McGraw Hill, 2002.
8. Franco, Sergio, ‖Design with Operational Amplifiers and Analog Integrated Circuit‖, 3rd Edition, Tata McGraw Hill, 2001

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3	ESC	CS-206C	Data Base Management System	3	0	0	3

OBJECTIVE
To provide knowledge about various organizations and management information systems, keeping in view the aspects of share ability, availability, evaluability and integrity
PRE-REQUISITES
Knowledge of data structures, discrete mathematical structures

CO1: Understand database concepts and structures and query language
CO2: Understand the E R model and relational model
CO3: Understand Functional Dependency and Functional Decomposition.
CO4: Understand query processing and techniques involved in query optimization.
CO5: Understand the principles of storage structure and recovery management.

OBJECTIVE
To provide knowledge about various organizations and management information systems, keeping in view the aspects of share ability, availability, evaluability and integrity
PRE-REQUISITES
Knowledge of data structures, discrete mathematical structures

CO1: Understand database concepts and structures and query language
CO2: Understand the E R model and relational model
CO3: Understand Functional Dependency and Functional Decomposition.
CO4: Understand query processing and techniques involved in query optimization.
CO5: Understand the principles of storage structure and recovery management.

TEXT BOOK
1. Silberschatz A., Korth H. F. and Sudarshan S., "Database System Concepts",6th edition, McGraw-Hill, International Edition,2010
2. Steven Feuerstein, Bill Pribyl , "Oracle PL/SQL", O'Reilly Media , 4th Edition, 2005

REFERENCE BOOKS:
1. Desai Bipin, "Introduction to Database Management System", Galgotia Publications, 1991
2. Elmasri R. and Navathe S. B., "Fundamentals of Database Systems", 6th edition, Addison-Wesley, Low Priced Edition, 2010
3. Date C. J., "An Introduction to Database Systems", 8th edition, Addison-Wesley, Low Priced Edition, 2003
4. Date C. J. and Darwen H., "A Guide to the SQL Standard", 4th edition, Addison-Wesley, 2003
5. Hansen G. W. and Hansen J. V., "Database Management and Design", 2nd edition, Prentice- Hall of India, Eastern Economy Edition, 1999
6. Majumdar A. K. and Bhattacharyya P., "Database Management Systems", 5th edition, Tata

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4	ESC	CS-204C	Computer Architecture & Organization	3	0	0	3

OBJECTIVE: To provide basic knowledge of internals of computer, its architecture, components, terminologies, etc. at minute level and ultimately about the working of a digital computer hardware as a whole
PRE-REQUISITES: Knowledge of data structures, microprocessors and interfacing
Objectives:
To introduce students, the concept and theory of signals and systems needed in electronics and telecommunication engineering fields.
To introduce students to the basic idea of signal and system analysis and its characterization in time and frequency domain

Course Outcomes:
CO1. Understand about various types of signals and systems, classify them, analyze them, and perform various operations on them,
CO2. Understand use of transforms in analysis of signals and system in continuous and discrete time domain.
CO3. Observe the effect of various properties and operations of signals and systems.
CO4. Evaluate the time and frequency response of Continuous and Discrete time systems which are useful to understand the behavior of electronic
CO5.Learn waveform equations of various deterministic a non-deterministic signals.
Unit -1 Introduction to signals Signals: Definition, types of signals and their representations: continuous-time/discrete-time, periodic/non-periodic, even/odd, energy/power, deterministic/ random, one-dimensional/multi-dimensional; commonly used signals (in continuous-time as well as in discrete-time): unit impulse, unit step, unit ramp (and their inter-relationships), exponential, rectangular pulse, sinusoidal; operations on continuous-time and discrete-time signals (including transformations of independent variables).

Unit- 2 Fourier Transform Fourier Transforms (FT): (i) Definition, conditions of existence of FT, proper ties, magnitude and phase spectra, some important FT theorems, Parseval's theorem, Inverse FT

Unit – 3 Introductions to Sytems Impulse response characterization and convolution integral for CT LTI system, signal responses to CT - LTI system, properties of convolution, LTI system response properties from impulse response. Discrete time Fourier transform (DTFT), inverse DTFT, convergence, properties and theorems, Comparison between continuous time FT and DTFT

Unit -4- Laplace Transform Laplace-Transform (LT): (i) One-sided LT of some common signals, important theorems and properties of LT, inverse LT, solutions of differential equations using LT, Bilateral LT, Regions of convergence (ROC) (ii) One sided and Bilateral Z-Transforms, ZT of some common signals, ROC, Properties and theorems, solution of difference equations using one-sided ZT, s- to z-plane mapping .

Unit – 5 Z- Transform

Z-transform (ZT): Regions of convergence (ROC) (ii) One sided and Bilateral Z-transforms, ZT of some common signals, ROC, Properties and theorems, solution of difference equations using One-sided ZT, s- to z-plane mapping.

Text Books:

Signal and Systems' I J NAGRATH, R. RANJAN & Sharan, 2009 Edn., TMH, New Delhi

Reference Books:

1. V. Oppenheim, A.S. Willsky and S. Hamid Nawab,'Signals & System',PEARSON Education, Second Edition, 2003.
2. Schaume Series on Signals & Systems, HSU & RANJAN, TMH,India
3. DSP –A Practical Approach –Emmanuel C. Ifeacher, Barrie. W. Jervis, 2ndEd., Pearson Education.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5	PCC	EC-206C	Signals and Systems	3	1	0	4

Objectives:
To introduce students, the concept and theory of signals and systems needed in electronics and telecommunication engineering fields.
To introduce students to the basic idea of signal and system analysis and its characterization in time and frequency domain

Course Outcomes:
CO1. Understand about various types of signals and systems, classify them, analyze them, and perform various operations on them,
CO2. Understand use of transforms in analysis of signals and system in continuous and discrete time domain.
CO3. Observe the effect of various properties and operations of signals and systems.
CO4. Evaluate the time and frequency response of Continuous and Discrete time systems which are useful to understand the behaviour of electronic
CO5.Learn waveform equations of various deterministic a non-deterministic signals.

Unit -1 Introduction to signals: Definition, types of signals and their representations: continuous-time/discrete-time, periodic/non-periodic, even/odd, energy/power, deterministic/ random, one-dimensional/multi-dimensional; commonly used signals (in continuous-time as well as in discrete-time): unit impulse, unit step, unit ramp (and their inter-relationships), exponential, rectangular pulse, sinusoidal; operations on continuous-time and discrete-time signals (including transformations of independent variables).

Unit- 2 Fourier Transform Fourier Transforms (FT): (i) Definition, conditions of existence of FT, proper ties, magnitude and phase spectra, some important FT theorems, Parseval's theorem, Inverse FT

Unit -3 Introductions to System Impulse response characterization and convolution integral for CT LTI system, signal responses to CT - LTI system, properties of convolution, LTI system response properties from impulse response. Discrete time Fourier transform (DTFT), inverse DTFT, convergence, properties and theorems, Comparison between continuous time FT and DTFT

Unit -4- Laplace Transform Laplace-Transform (LT): (i) One-sided LT of some common signals, important theorems and properties of LT, inverse LT, solutions of differential equations using LT, Bilateral LT, Regions of convergence (ROC) (ii) One sided and Bilateral Z-Transforms, ZT of some common signals, ROC, Properties and theorems, solution of difference equations using one-sided ZT, s- to z-plane mapping .

Unit – 5 Z- Transform ,Z-transform (ZT): Regions of convergence (ROC) (ii) One sided and Bilateral Z-transforms, ZT of some common signals, ROC, Properties and theorems, solution

of difference equations using One-sided ZT, s- to z-plane mapping.

Text Books:

Signal and Systems' I J NAGRATH, R. RANJAN & Sharan, 2009 Edn., TMH, New Delhi

Reference Books:

1. V. Oppenheim, A.S. Willsky and S. Hamid Nawab,'Signals & System',PEARSON Education, Second Edition, 2003.
2. Schaume Series on Signals & Systems, HSU & RANJAN, TMH,India
3. DSP –A Practical Approach –Emmanuel C. Ifeacher, Barrie. W. Jervis, 2ndEd., Pearson Education.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
6	PCC	EC-208C	Digital System Design	3	0	0	3

OBJECTIVE This course provide student with a foundation in digital system. The course will explore the essential topic related to the design of modern digital circuit and to go about designing complex, high speed digital system and implement such design using programmable logic.

Course outcomes: At the end of this course students will demonstrate the ability to

CO1. Design and analyze combinational logic circuits

CO2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder

CO3. Design & analyze synchronous sequential logic circuits

CO4. Use HDL & appropriate EDA tools for digital logic design and simulation.

CO5. Learn the concept, application & designing of Programmable logic devices technology

Unit-1. INTRODUCTION: Introduction to Computer-aided design tools for digital systems. Hardware description languages; introduction to VHDL; data objects; classes and data types; Operators; Overloading; logical operators. Types of delays Entity and Architecture declaration. Introduction to behavioral; dataflow and structural models.

Unit-2. VHDL STATEMENTS: Assignment statements; sequential statements and process; conditional statements; Generate statement; case statement Array and loops; resolution functions; concurrent statements, Packages and Libraries; Subprograms: Application of Functions and Procedures; Structural Modelling; component declaration; structural layout and generics; Configuration Statements

Unit-3. COMBINATIONAL AND SEQUENTIAL CIRCUIT DESIGN: VHDL Models and Simulation of combinational circuits such as Multiplexers; Demultiplexers; encoders; decoders; code converters; comparators; implementation of Boolean functions etc.

VHDL Models and Simulation of Sequential Circuits Flip Flops; Shift Registers; Counters etc.

Unit-4. FINITE STATE MACHINES: Introduction to FSM; Mealy and Moore Machines, Test Benches; ALIAS; Generate statement.

Unit-5. PROGRAMMABLE LOGIC DEVICES: PAL, PLA, CPLD & FPGA.

TEXT BOOK

Brown and Vranesic, ”Fundamentals of Digital Logic with VHDL Design”, Tata McGraw Hill, 2nd Edition, 2000

REFERENCE BOOKS

1. IEEE Standard VHDL Language Reference Manual, 1993.
2. Chang, K.C., "Digital Design and Modelling with VHDL and Synthesis", 1st Edition, Wiley-IEEE Computer Society Press., 1999
3. Bhasker, "A VHDL Primmer", 2nd Edition, Star Galaxy, 1998.
4. Roth, Charles. H., "Digital System Design Using VHDL", PWS, 1998.
5. Navabi, Z, "VHDL-Analysis and Modelling of Digital Systems", 2nd Edition, McGraw Hill, 1998.
6. Douglas, Perry L., "VHDL" IV Edition, Tata McGraw Hill, 2008
7. Ercegovac, Lang and Moreno, "Introduction to Digital Systems", PWS, 2000.
8. Jain, R.P., "Modern Digital Electronics", 3rd Edition, Tata McGraw Hill, 2003.

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SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
7	PCC	EC-252C	Analog & Digital Communication Lab	0	0	2	1

CO1 Design and test rectifiers with filters
CO2 Design, construct and test amplifier circuits and interpret the results.
CO3 Utilize the postulates of the Boolean algebra to minimize the Combinational circuits.
CO4 Design and Analyze Combinational and Sequential circuits and verify the functionality.
CO5 Realize the logic gates using different Logic families and verify the functionality

LIST OF EXPERIMENTS

1. Study of Amplitude Modulation and determination of Modulation index.
2. Study of Frequency Modulation and determination of Modulation index.
3. Study of Phase Modulation.
4. Study of Pulse Amplitude Modulation.
5. Study of Pulse Width Modulation.
6. Study of Pulse Frequency Modulation.
7. Study of Pulse Code Modulation.
8. Study of frequency Shift Keying.
9. Study of ASK and QASK.
10. Study of PSK and QPSK.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
8	PCC	EC-254C	Analog Electronics Circuits Lab	0	0	2	1

CO1 Differentiate various components and devices with characteristics.
CO2 Analyze and design various transistor amplifiers using BJTs and FETs.
CO3 Utilize the postulates of the op amp.
CO4 Design and Analyze active filters.
CO5 Design adder and subtractor circuits

LIST OF EXPERIMENTS

1. Study the effect of voltage series; current series; voltage shunt; and current shunt feed-back on amplifier using discrete components.
2. Design and realize inverting amplifier; non-inverting and buffer amplifier using 741 Op Amp.
3. Verify the operation of a differentiator (ideal and practical) circuit using 741 op amp and show that it acts as a high pass filter.
4. Verify the operation of a integrator circuit (ideal and practical) using 741 op amp and show that it acts as a low pass filter.
5. Design and verify the operations of op amp adder and subtractor circuits.
6. Plot frequency response of AC coupled amplifier using op amp 741 and study the effect of negative feedback on the bandwidth and gain of the amplifier.
7. Design and realize using op amp 741; Sine wave oscillator.
8. To design and realize using op amp 741; triangular wave generator.
9. To design and realize using op amp 741; logarithmic amplifier and VCCS.
10. Study of Timer circuit using NE555 and configuration for monostable and astble multivibrator.
11. Realization of a V-to-I and I-to-V converter using Op-Amps.

To Study and construct class-A and class-B Power amplifier

13. To study and construct Active filters using Op amps

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
9	ESC	CS-256C	Data Base Management system Lab	0	0	2	1

CO1 Able to choose appropriate database schema for a given problem
CO2 Able to design an E-R model for real world problem
CO3 Able to develop relational model for schema refinement
CO4 Able to build a database for roadway travels and formulate quires using DDL, DML, DCL commands
CO5 Able to create triggers, cursors for given problem

1. Introduction to PL/SQL
2. Write a program to carry out

a. Creation of table
b. Insertion of data into table
c. Viewing of data into table: All rows and all columns, Selected columns and all rows, Selected rows and all columns, Selected rows and selected columns, Elimination of duplicates from selected statements, Sorting of data into a table.
d. Deletion of data from given table: Removal of all rows, Removal of selected rows
e. Updating of table contents: Updating all rows, Updating of record conditionally
f. Modifying the structure of table: Adding new column, Modifying existing column
g. Renaming tables
h. Destroying tables
i. Examining objects created by user: Finding tables created by user, Finding column details of table created
j. Computation on table data: Arithmetic operators, Logical operators (AND, OR, NOT), Range searching (BETWEEN, NOT BETWEEN), Pattern matching (LIKE, IN, NOT IN)

3. Oracle set functions (Scalar, Group & Pattern Matching Operator): AVG, SUM, MIN, MAX, COUNT, COUNT(*), ABS, ROUND, LENGTH, SUBSTR, POWER, SQRT, LOWER, UPPER, LPAD, RPAD, LTRIM, RTRIM
4. Data constraints at column level and at table level: NULL value concept, UNIQUE constraints, Primary key constraint, Foreign key constraint, Check constraint.
5. VIEWS: Creation of views, Renaming of columns in view, Selection, Updation, Destroy
6. Grouping Data from tables in SQL
7. INDEXES
8. SEQUENCES
9. Granting and Revoking Permissions in SQL
10. CURSORS & its Applications
11. Create Function and use Cursor in Function
12. TRIGGERS
13. Hands on Exercises

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
10	ESC	EC-258C	Digital System Design Lab	0	0	2	1

The following programs on different topic are to be done in this lab.

1. Sample Program
   (a) Write a Java program to print "Hello Java"
2. Operators and Expressions
   (a) Write a java program to find the area of a rectangle.
   (b) To write a java program to find the result of the following expressions
      (i) (a<<2) +(b>>2)
      (ii) (b>0)
      (iii) (a+b*100)/10
      (iv) a & b
      Assume a=10, b=5
   (c) To write a java program to print the individual digits of a 3 digit number using Command line arguments.
3. Decision making statements
   (a) Write a java program to read two integers and print the larger number. followed by the words "is larger". If the numbers are equal print the message "These numbers are equal"
   (b) Write a java program to read an integer and find whether the number is odd or even.
   (c) Write a java program to find the number of and sum of all integers greater than 100 and less than 200 that are divisible by 7.
4. Looping Statements
   (a) Write a Java program to find the sum of digits of a given number.
   (b) Write a java program to find the first 15 terms of Fibonacci sequence.
   (c) Write a java program to print the Armstrong numbers.
   (d) Given a number, write a program using while loop to reverse the digits of the number.
      For example, the number
      12345
      should be written as 54321.
5. Array & Strings
   (a) Write a java program to find the largest and smallest number in an array.
   (b) Write a java program to multiply two matrices.
   (c) Write a java program to sort the following numbers in descending order.
      {55, 40, 80, 65, 71}
   (d) Write a java program that creates a string object and initializes it with your name and performs the following operations
      (i) To find the length of the string object using appropriate String method.
      (ii) To find whether the character 'a' is present in the string. If yes find the number of times 'a' appear in the name and the location where it appears.
   (e) Write a java program to arrange the following word in alphabetical order
      {Madras, Delhi, Ahmadabad, Calcutta, Bombay}

(f) Write a java program to create a StringBuffer object and illustrate how to append characters and to display the capacity and length of the StringBuffer.

6. Classes & Objects
   (a) Write a java program to display total marks of 5 students using student class. Given the following attributes: Regno(int), Name(string), Marks in subjects(Integer Array), Total (int).
   (b) Write a java program to find the area of a room using constructor.
   (c) Write a java program to implement method overloading.
   (d) Write a java program to show the use of "static" members.
   (e) Write a java program to implement the nesting of methods.

7. Inheritance
   (a) Write a java program to implement single inheritance using "super" keyword.
   (b) Write a java program to implement method overriding.
   (c) Write a java program to implement multiple inheritances.

8. Package & Multithreading
   (a) Write a program to create your own package and use that package in another program to print " Hello package".
   (b) Write a program to implement multithreading using the system function like yield(), stop(), sleep().
9. Exception Handling and Applet programming
   (a) Write a java program to implement multiple try/catch statements.
   (b) Write a java program to print " Hello applets" using applets.
10. File handling
   (a) Write a program to copy the content of one file into another using character stream classes.
   (b) Write a program to copy the content of one file into another using byte stream classes.

TEXT BOOK Herbert Schildt , "The Complete Reference Java 2 fifth edition, McGraw Hill.

REFERENCE BOOKS

1. Balaguruswamy , E., ""Programming with Java", Tata Mcgraw Hill.
2. Horetmann Cay and Cornell Gary, "Core Java Volume – I", Pearson Education.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
11	PCC	ECEW-202C	Electronic Workshop-I	0	0	4	1

CO1 Able to build and Simulate Core Electronic Circuits based on syllabus.
CO2. Able to design and implement different Applications on Software.
CO3. Able to analyze the circuit and troubleshoot errors if any.
CO4. Build core hardware projects.
CO5. Learn to handle AC and DC operated home appliances

1. Study of CRO, DMM & Function Generator
2. Identification of Active & Passive Components
3. Winding shop: Step down transformer winding of less than 5VA.
4. Soldering shop: Fabrication of DC regulated power supply
5. PCB Lab: (a) Artwork & printing of a simple PCB. (b) Etching & drilling of PCB.
6. Wiring & fitting shop: Fitting of power supply along with a meter in cabinet.
7. Testing of regulated power supply fabricated

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
12	HSMC	PDP-202	Life Skills	0	0	2	1

COURSE OUTCOMES: Students will be able to:

- CO1: Develop and exhibit and accurate sense of self.
- CO2: Assess and analyze the symptoms, causes and effects of personal and academic stressors in order to implement appropriate stress management techniques.
- CO3: Analyze time management techniques
- CO4: Assess Self and become better decision makers
- CO5: Build stronger relationships and achieve career and personal goals.

Unit Wise Syllabus:

UNIT 1 – Personality Development & TA– Concept of PD- Significance of PD. The 4 OK States & PAC Concept
SWOT Analysis, Success & Failure, Dimensions of Personality – Theories of Freud & Erickson, Transactional Analysis – Dr. Eric Berne

UNIT 2 – Stress Management – Meaning of Stress, Effects of Stress on Body & Mind. How to overcome stress

UNIT 3 – Time Management – Concept of TM, Time Matrix, 24 hr Time tracker. How to manage time effectively?

UNIT 4 - Self -Awareness & Self - Esteem – What is SA & SE? Importance of Self Awareness, Emotional Intelligence – Definition and significance

UNIT 5 – Art of Conversation – Conversational Skills - How to start, sustain and conclude conversation?

UNIT 6 - Motivation – Meaning, Internal & External Motivation, How to stay motivated? Self-Motivation

SYLLABUS
B.TECH – 3nd Year, 5th Semester

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
1	PCC	EC-301C	Microprocessors & Microcontroller	3	0	0	3

Objective: This subject introduces the concept of Microprocessors to the students. It covers 8 bit (8085) and 16-bit (8086) Microprocessors: their architecture, assembly language programming and interfacing with peripheral devices

Course Outcomes:

CO1. Demonstrate the various features of microprocessor, memory and I/O devices including concepts of system bus.
CO2. Identify the hardware elements of 8085/8086 microprocessor including architecture and pin functions and programming model including registers, instruction set and addressing modes.
CO3. Select appropriate 8085/8086 instructions based on size and functions to write a given assembly language program.
CO4. Design a given interfacing system using concepts of memory and I/O interfacing.
CO5. Demonstrate the features of advance microprocessors.

UNIT-1 THE 8085 PROCESSOR: Introduction to microprocessor; 8085 microprocessor: Architecture; Pin Diagram; instruction set; interrupt structure; Addressing modes and assembly language programming.
UNIT-2 THE 8086 MICROPROCESSOR ARCHITECTURE: Architecture; block diagram of 8086 with details of sub-blocks; memory segmentation and physical address computations; program relocation; addressing modes; pin diagram and description of various signals; Interrupt Structure.
UNIT-3 INSTRUCTION SET OF 8086: Data transfer instructions; arithmetic instructions; branch instructions; looping instructions; NOP and HLT instructions; flag manipulation instructions; logical instructions; shift and rotate instructions; directives; programming examples.
UNIT-4 INTERFACING DEVICE: The 8255 PPI chip: Architecture; control words and modes; interfacing and programming with 8085.
DMA: Introduction to DMA process; 8257 pin diagram; architecture; operation; command words; interfacing and programming with 8085.
PROGRAMMABLE INTERRUPT CONTROLLER: 8259 pin diagram; architecture; initialization command words; operational command wards.
PROGRAMMABLE INTERVAL TIMER: 8253 pin diagram; architecture; modes.

UNIT-5 8051 Interrupts. 8051 Assembly language programming to generate an external interrupt using a 73 switch, 8051 C programming to generate a square waveform on a port pin using a Timer interrupt. Interfacing 8051 to ADC-0804, LCD and Stepper motor and their

TEXT BOOK

1.Gaonkar, Ramesh S., ―Microprocessor Architecture: Programming and Applications with 8085‖, 5th Edition, Prentice Hall of India, 1995

REFERENCE BOOKS

1. Brey,‖The Intel Microprocessors 8086- Pentium Processor‖, 4th Edition, 2005
2. Hall, ―Microprocessors and interfacing‖, Tata McGraw Hill, 3nd Edition, 2003
3. Liu Yu-Chang and Gibson Glenn A., ―Microcomputer Systems: The 8086/8088 Family: Architecture, Programming and Design‖, Prentice Hall of India, 2003
4. Ray A. K. and Burchandi, ―Advanced Microprocessors and Peripherals Architectures, Programming and Interfacing‖, Tata McGraw Hill, 2002
5. Rafiquzzman, ―Microprocessor based System Design UBS‖ Wiley-Interscience, 5th Edition, 2005

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2	PCC	EC-303C	Network Theory	3	1	0	4

Course Outcomes: At the end of this course students will demonstrate the ability to
CO1: Understand basics electrical circuits with nodal and mesh analysis.
CO2: apply electrical network theorems.
CO3: Apply Laplace Transform for steady state and transient analysis.
CO4: Determine different network functions.
CO5: learn the frequency-time domain techniques.

Unit 1: Node and Mesh Analysis, matrix approach of network containing voltage and current sources, and reactance, source transformation and duality. Network theorems: Superposition, reciprocity, Thevenin's, Norton's, Maximum power Transfer, compensation and Tallegen's theorem as applied to AC. circuits.

Unit 2: Trigonometric and exponential Fourier series: Discrete spectra and symmetry of waveform, steady state response of a network to non-sinusoidal periodic inputs, power factor, effective values, Fourier transform and continuous spectra, three phase unbalanced circuit and power calculation.

Unit 3: Laplace transforms and properties: Partial fractions, singularity functions, waveform synthesis, analysis of RC, RL, and RLC networks with and without initial conditions with Laplace transforms evaluation of initial conditions.

Unit 4: Transient behavior, concept of complex frequency, Driving points and transfer functions poles and zeros of immittance function, their properties, sinusoidal response from pole-zero locations, convolution theorem and Two four port network and interconnections.

Unit 5: Behaviors of series and parallel resonant circuits, Introduction to band pass, low pass, high pass and band reject filters.

Text/Reference Books:

1.Van, Valkenburg.; "Network analysis"; Prentice hall of India, 2000
2. Sudhakar, A., Shyammohan, S. P.; "Circuits and Network"; Tata McGraw-Hill New Delhi, 1994
3. A William Hayt, "Engineering Circuit Analysis" 8th Edition, McGraw-Hill Education.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3	PCC	EC-305C	Digital Signal Processing	3	1	0	4

Objective To induce a thorough understanding of theory of DSP. To get in-depth knowledge of various applications- Filters, MultiMate DSP, DSP to speech & Radar, Transforms etc.
Course Outcomes:
CO1. Able to obtain different Continuous and Discrete time signals.
CO2. Able to calculate Z-transforms for discrete time signals and system functions.
CO3. Ability to calculate discrete time domain and frequency domain of signals using discrete Fourier series and Fourier transform.
CO4. Ability to develop Fast Fourier Transform (FFT) algorithms for faster realization of signals and systems.
CO5. Able to design Digital IIR/FIR filters from Analog filters using various techniques (Butterworth and Chebyshev).
1. DISCRETE-TIME SIGNALS AND SYSTEMS: Signal classifications; frequency domain representation; time domain representation; representation of sequences by Fourier transform; properties of Fourier transform; discrete time random signals; energy and power theorems. System Classification; properties; time invariant system
3. BASICS OF DIGITAL FILTERS: Fundamentals of digital filtering; various types of digital filters; design techniques of digital filters: window technique for FIR, bi-linear transformation and backward difference methods for IIR filter design, analysis of finite word length effects in DSP; DSP algorithm implementation consideration. Applications of DSP.
4. ERRORS IN DIGITAL FILTERING: Errors resulting from rounding and truncation, round-off effects in digital filters. Finite word length effects in digital filter.
5. MULTIRATE DIGITAL SIGNAL PROCESSING: Introduction to multirate digital signal processing; sampling rate conversion; filter structures; multistage decimator and interpolators; digital filter banks.
TEXT BOOKS:
1.Digital Signal Processing: Principles, Algorithms & Applications J.G.Proakis & D. G.Manolakis, 4thEd., PHI
2.Discrete Time Signal Processing Alan V Oppenheim & R. W Schaffer, PHI.
3.DSP –A Practical Approach –Emmanuel C. Ifeacher, Barrie. W. Jervis, 2nd Ed., Pearson Education.
REFERENCE BOOKS:
1.Modern Spectral Estimation: Theory & Application –S. M .Kay, 1988, PHI.
2.Multi Rate Systems and Filter Banks –P.P.Vaidyanathan –Pearson Education.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4	PCC	EC-307	Electromagnetic Waves	3	1	0	4

Course Objective: Analyze wave propagation on metallic waveguides in modal form. Understand principle of radiation and radiation characteristics of an antenna

Course Outcome

CO1 Understand characteristics and wave propagation on high frequency transmission lines

CO2 Carryout impedance transformation on TL

CO3 Use sections of transmission line sections for realizing circuit elements

CO4 Characterize uniform plane wave

CO5 Calculate reflection and transmission of waves at media interface

Unit 1: Transmission Lines- Equations of Voltage and Current on TX line, Propagation constant and characteristic impedance, and reflection coefficient and VSWR, Impedance Transformation on Loss- less and Low loss Transmission line, Power transfer on TX line, Smith Chart, Admittance Smith Chart, Applications of transmission lines: Impedance Matching, use transmission line sections as circuit elements,

Unit 2: Maxwell's Equations- Basics of Vectors, Vector calculus, Basic laws of Electromagnetics, Maxwell's Equations, Boundary conditions at Media Interface. Uniform Plane Wave- Uniform plane wave, Propagation of wave, Wave polarization, Poincare's Sphere, Wave propagation in conducting medium, phase and group velocity, Power flow and Poynting vector, Surface current and power loss in a conductor.

Unit 3: Plane Waves at a Media Interface- Plane wave in arbitrary direction, Reflection and refraction at dielectric interface, Total internal reflection, wave polarization at media interface, Reflection from a conducting boundary.

Unit 4: Wave propagation in parallel plane waveguide, Analysis of waveguide general approach, Rectangular waveguide, Modal propagation in rectangular waveguide, Surface currents on the waveguide walls, Field visualization, Attenuation in waveguide.

Unit 5: Radiation: Solution for potential function, Radiation from the Hertz dipole, Power radiated by hertz dipole, Radiation Parameters of antenna, receiving antenna, Monopole and Dipole antenna.

Text/Reference Books:

1. R.K. Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill India, 2005
2. E.C. Jordan & K.G. Balmain, Electromagnetic waves & Radiating Systems, Prentice Hall, India
3. Narayana Rao, N: Engineering Electromagnetics, 3rd ed., Prentice Hall, 1997.
4. David Cheng, Electromagnetics, Prentice Hall

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5 i	PEC-I	ECEL-301C	CMOS Design	3	0	0	3

Course Objective

CO1 Model digital circuit with, simulate, synthesis in Micro wind.

CO2 Understand chip level issues and need of testability.

CO3 Design digital CMOS circuits for specified applications

CO4 Learning IC fabrication process

CO5 learning estimation of circuits

Unit 1. FUNDAMENTALS OF MOS TECHNOLOGY: Introduction to IC technology; MOS Transistor - Enhancement and Depletion mode operations; Introduction to Fabrication; CMOS and BiCMOS Devices. Equivalent circuit for MOSFET.

Unit 2. MOS TRANSISTOR THEORY: MOS Device Design Equations; MOS Transistor; Evaluation aspects of MOS Transistor; Threshold voltage; MOS Transistor Trans-conductance; Figure of Merit; Determination of Pull-up to Pull-down Ratio for an n-MOS inverter driven by another n-MOS inverter and by one or more pass transistor; alternative forms of Pull-up; CMOS and Bi-CMOS-inverters. Latch up in CMOS circuitry and Bi-CMOS Latch up susceptibility.

Unit 3. MOS CIRCUITS AND LOGIC DESIGN: Basic Physical Design of simple logic gates using n-MOS; p-MOS and CMOS; CMOS logic gate design considerations; CMOS logic structures

Unit-4. CIRCUIT CHARACTERIZATION AND PERFORMANCE ESTIMATION: Resistance estimation; Capacitance estimation; Inductance; Switching characteristics; Voltage Transfer Characteristics (VTC) of Resistor Load n-MOS and Comparison with CMOS Inverter, Noise Margin Estimation, CMOS Gate Transistor Sizing; Power Dissipation. design example using CMOS : Clocking Strategies, Incremented/ Decremented; Left/Right Shift Serial/Parallel Register; Comparator for two n-bit number; a two-phase non-overlapping clock generator with buffered output on both phases; design of an event driven element for EDL system

Unit-5 VLSI FABRICATION: Extraction of Silicon from Sand/Silica, Purification, Crystal growth and Chemical Cleaning Processes, Wafer preparation and orientations; Epitaxy; Oxidation; Lithography; Etching; Diffusion; Dielectric and Poly-silicon Film Deposition; Ion Implantation; Metallization. Yield and Reliability

Text Books

1.Sung-Mo Kang, Yusuf Leblebici, "CMOS Digital Integrated Circuits", Tata McGraw-Hill Education, 2003

Reference Books

1. Sze, S.M., "VLSI Technology", 2nd Edition, Tata McGraw Hill, 2001.
2. Sze, S.M., "Physics of Semiconductor Devices", Wiley

3. Sorab K. Ghandhi , "VLSI Fabrication Principles" 1994

4. Botkar, K.R., "Integrated Circuit", 4th Edition, Prentice Hall of India, 2000

5. Weste, N.H.F and Eshrghian, "Principal of CMOS VLSI Design", 2nd Edition, John Wiley & sons, 2000

6. Pucknell, Douglas A., "Basic VLSI Design", Kamsan Eshraghian, 5th Edition, Prentice Hall of India, 2005.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5 ii	PEC	EC -311C	Antenna and Wave Propagation	3	0	0	3

Course Outcome

CO1 Analyse the properties of different types of antennas and their design.
CO2 Understand the properties and various types of antennas.
CO3 Operate antenna design software tools and come up with the design of the antenna of required specifications.
CO4 Learn MIMO technique used in 4G &5g
CO5 Learn propagation of wave through different antennas

Unit-1 Fundamental Concepts- Physical concept of radiation, Radiation pattern, near-and far-field regions, reciprocity, directivity and gain, effective aperture, polarization, input impedance, efficiency, Friis transmission equation, radiation integrals and auxiliary potential functions. Radiation from Wires and Loops- Infinitesimal dipole, finite-length dipole, linear elements near conductors, dipoles for mobile communication, small circular loop.
Unit-2 Aperture and Reflector Antennas-Huygens' principle, radiation from rectangular and circular apertures, design considerations, Babinet's principle, Radiation from sectoral and pyramidal horns, design concepts, prime-focus parabolic reflector and Cassegrain antennas.

Unit -3 Broadband Antennas- Log-periodic and Yagi-Uda antennas, frequency independent antennas, broadcast antennas. Micro strip Antennas- Basic characteristics of micro strip antennas, feeding methods, methods of analysis, design of rectangular and circular patch antennas.

Unit-4 Antenna Arrays-Analysis of uniformly spaced arrays with uniform and non-uniform excitation amplitudes, extension to planar arrays, and synthesis of antenna arrays using Schelkunoff polynomial method, Woodward-Lawson method.

Unit-5 Basic Concepts of Smart Antennas-Concept and benefits of smart antennas, fixed weight beam forming basics, Adaptive beam forming. Different modes of Radio Wave propagation used in current practice. MIMO

Text Books

1. J.D. Kraus, Antennas, McGraw Hill, 1988.

Reference Books

1.C.A. Balanis, Antenna Theory - Analysis and Design, John Wiley, 1982.
2. R.E. Collin, Antennas and Radio Wave Propagation, McGraw Hill, 1985.
3. R.C. Johnson and H. Jasik, Antenna Engineering Handbook, McGraw ill, 1984.
4. I.J. Bahl and P. Bhartia, Micro Strip Antennas, Artech House, 1980.
5. R.K. Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill, 2005
6. R.E. Crompton, Adaptive Antennas, John Wiley

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5 iii	PEC	EC -313C	Microwave Theory & Techniques	3	0	0	3

Course Outcome After successfully completing the course students will be able to:
CO1. Ability to understand the basic operation and working of Microwave Tubes
CO2. Identify the state of art microwave tubes and semiconductors and their real use in real life
CO3. Application of microwave and RF antenna for industrial and scientific purpose
CO4. Learn operation and application of Radar.
CO5. Ability to deal with Microwave measurement.

Unit-1 WAVEGUIDES: Comparison with transmission lines; propagation in TE and TM mode; rectangular wave guide; TEM mode in rectangular wave guide; characteristic impedance; introduction to circular waveguides and planar transmission lines.

Unit-2 MICROWAVE COMPONENTS: S-parameters; Directional couplers; tees; hybrid ring; attenuators; cavity resonators; mixers and detectors; phase shifter; Ferrite devices: Isolators; circulators and gyrators.

Unit-3 MICROWAVE SOURCES: TUBES-Construction; operation and properties of Klystron amplifier; reflex Klystron; magnetron; TWT; BWO; crossed field amplifiers. SOLID STATE DEVICES: Varactor diode; Tunnel diode; Schottky diode; GUNN diode; IMPATT; TRAPATT and PIN diodes. MASER; parametric amplifiers.

Unit-4 MICROWAVE MEASUREMENTS:
Network Analyzer and measurement of scattering parameters, Spectrum Analyzer and measurement of spectrum of a microwave signal, Power, Frequency and impedance measurement at microwave frequency, Measurement of Microwave antenna parameters, Noise at microwave frequency.

Unit-5 INTRODUCTION TO RADAR: Block Diagram and operation; Radar Frequencies; Types of RADAR, Simple form of Radar Equation; Prediction of Range Performance; Pulse Repetition frequency and Range Ambiguities; Applications of Radar

Text Books

1. Samuel. Liao, “Microwave Devices and Circuits”, 3rd Edition, Prentice Hall of India,1996..
2.Kulkarni, M, “Microwave Devices and Radar Engineering”, 2nd Edition, Umesh Publications,

Reference Books

1.Reinhold Ludwig and Gene Bogdanov, “RF Circuit Design: Theory and Applications”, Pearson Education Inc., 2011
2.D.M. Pozar," Microwave Engg.", 2nd edition, John Wiley and Sons, 1999
3.Robert E Colin, “Foundations for Microwave Engineering”, John Wiley & Sons Inc, 2005

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5 iv	PEC	EC -315C	Introduction to MEMS	3	0	0	3

Course Objective

1.To introduce the basic concepts of micro systems and advantages of miniaturization.
2. To study the various materials and their properties used for micromachining techniques.
CO1. Gain thorough knowledge of materials used for micromachining techniques
CO2. Understand the process of Bulk Micro Machining techniques.
CO3. Acquire the knowledge of electromechanical effects, Thermal effects, Micro fluidics, Devices such as pumps, valves, mixers, integrated fluidic systems and BioMEMS.
CO4. Analyze and develop models for different types of Pressure Sensors and accelerometers.
CO5. Acquire expertise in the design of sensors for any practical applications

Unit-1 Introduction and Historical Background, Scaling Effects. Micro/Nano Sensors, Actuators and Systems overview: Case studies.
Unit-2 Review of Basic MEMS fabrication modules: Oxidation, Deposition Techniques, Lithography (LIGA), and Etching.
Unit-3 Micromachining: Surface Micromachining, sacrificial layer processes, Stiction; Bulk Micromachining, Isotropic Etching and Anisotropic Etching, Wafer Bonding.
Unit-4 Mechanics of solids in MEMS/NEMS: Stresses, Strain, Hookes's law, Poisson effect, Linear Thermal Expansion, Bending; Energy methods,
Unit-5 Overview of Finite Element Method, Modeling of Coupled Electromechanical Systems.

Text Books

1. G.K. Ananthasuresh, K.J. Vinoy, S. Gopalakrishnan, K.N. Bhat, V.K. Aatre, Micro and Smart Systems, Wiley India, First Edition, 2010..
2. Chang Liu, Foundations of MEMS, (ILLINOIS ECE Series), Pearson Education International, 2006.
3. Gregory TA Kovacs, Micro machined Transducers Source Book, WCB McGraw Hill, Singapore, 1998.

Reference Books

1. Tai-Ran-Hsu, MEMS & Microsystems Design and Manufacture, TATA McGraw-Hill, New Delhi, 2002.
2. Sorab. K. Ghandhi , VLSI Fabrication Principles, Wiley Inter Science Publication, New York, 1994.
3. M.H.Bao "Micromechanical transducers : Pressure sensors, accelerometers and gyroscopes", Elsevier, New York, 2000.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
6	ESC	CS-301C	Computer Network	3	0	0	3

Course Objective:To have a fundamental understanding of the design, performance and state of the art of wireless communication systems, Topics covered include state of the art wireless standards and research and thus changes substantially form one offering of this course to the next

CO1	Outline the basic concept of networking, types, networking topologies and layered architecture.
CO2	Explain data link layer and MAC sub-layer.
CO3	Demonstrate the network Layer functioning.
CO4	Identify the different types of network devices and their functions within a network.
CO5	Explain the transport layer and application layer operation.

Unit-1 OVERVIEW OF DATA COMMUNICATION AND NETWORKING: Introduction; Data communications: components, data, direction of data flow, Protocols, Networks: type of connection, topology: Star, Bus, Ring, Mesh, Tree, categories of network: LAN, MAN, WAN: Internet: brief history, Layered architecture of networks, OSI reference model, Functions of each layer, services and protocols of each layer, TCP / IP reference model.

Unit-2 PHYSICAL AND DATA LINK LAYER: Transmission media: Guided media, Unguided media Switching: Circuit switching, packet switching, datagram switching. Error Detection and Correction: Types of errors, detection vs correction, cyclic codes, checksum. Framing: Flow and Error Control, Protocols: Stop &wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ.

Unit-3 MEDIUM ACCESS SUBLAYER Random access: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, Controlled Access: Reservation, Polling, Channelization: FDMA, TDMA, CDMA, IEEE Standards, Standard Ethernet, Changes in the standard, Fast Ethernet, Gigabit Ethernet

Unit-4 NETWORK LAYER: Network Devices: Active and Passive Hubs, Repeaters, Bridges, Two and Three layer switch, Gateway. Internet Protocol, Transmission Control Protocol, User Datagram Protocol; IP Addressing, IP address classes, subnet addressing, DNS, Internet control protocols: ARP, RARP, ICMP.

Unit-5 TRANSPORT LAYER : Process to process delivery, user datagram protocol, TCP services, features, TCP Connection, flow control, error control and congestion control; Congestion control, Quality of Service, WAN Technologies: Synchronous Digital Hierarchy (SDH) / Synchronous Optical Network (SONET); Asynchronous Transfer Mode (ATM) Frame Relay.

Text Books

1.Tanenbaum Andrew S, ―Computer Networks‖, 4th Edition, Pearson Education/Prentice Hall of India, 2003

Reference Books

1. Forouzan Behrouz A., ―Data Communications and Networking‖, Tata McGraw Hill 2006.
2. Stallings William, ―Data and Computer Communication‖ , 5th Edition, Prentice Hall of India, 1997.
3. Fred H alsall, ―Data Communications, Computer Networks and Open Systems‖, 4th edition, Addison Wesley, Low Price Edition, 2000
4. Fitzgerald Jerry, ―Business Data Communications‖, Wiley, 2009.
5. Peterson Larry L. and Davie Bruce S., ―Computer Networks – A System Approach‖, 3rd Edition, Morgan Kaufmann, 2003.
6. Tittel E. D., ―Computer Networking‖, Tata McGraw Hill, 2002
7. Kurose James F. and Ross Keith W., ―Computer Networking: A Top-Down Approach Featuring the Internet‖, 2nd Edition, Pearson Education, 2003.
8. Keshav S., ―An Engineering Approach to Computer Networking‖, Addison-Wesley, 1997.
9. Comer D. E., ―Internetworking with TCP/IP‖, Volume 1, 3rd Edition, Prentice Hall of India, 1995.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
7	PCC	EC-351	Microprocessors & Microcontroller Lab	0	0	2	1

Course Objective

1. To provide practical exposure to the students on microprocessors, design and coding knowledge on 80x86 family.
2. To give the knowledge and practical exposure on connectivity and execute of interfacing devices with 8086 kit like LED displays, Keyboards, DAC/ADC, and various other devices

Course Outcomes

CO1 Learn importance of Microprocessors 8086 in designing real time applications
CO2. Develop interfacing to real world devices like LED displays, Keyboards, DAC/ADC, and various other devices.
CO3. Learn use of hardware & software tools
CO4.Learn about the interfacing of ICs.
CO5.Able to program the microcontroller.

List of Experiments

1. Write a program using 8085 for: a) Addition of two 8-bit numbers. b) Addition of two 16-bit numbers
2. Write a program using 8085 for: a) 8-bit subtraction b) 16-bit subtraction
3. Write a program using 8085 for a) Multiplication of two 8- bit numbers b) Division of two 8- bit numbers
4. Write a program using 8085 to arrange an array of 10 Nos in- a) Ascending order b) Descending order.
5. Write a program using 8086 for copying 12 bytes of data from source to destination.
6. Write a program using 8086 for: a) Finding the largest number from an array. b) Finding the smallest number from an array.
7. Write an Assembly language Program (ALP) to generate 10kHz square wave.
8. Write an ALP to generate 10 kHz frequency using interrupts.
9. Write an ALP to interface one Microcontroller with other wring serial/parallel communication.
10. Develop an embedded system for the automatic motion of a car (Model of car) and Subsequent display on LCD using Microcontroller
11. Write an ALP for temperature and pressure measurement and to display on intelligent LCD display.
12. Write an ALP for PWM based speed control of motor.
13. Write an ALP for PWM based regulator of voltage.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
8	PCC	EC-353	Network Theory Lab	0	0	2	1

Course Objective

1. To analyze the Circuits in time and frequency domain
2. To study network Topology, network Functions, two port network.
3. To synthesize passive network by various methods.

Course Outcomes

CO1. Apply their knowledge in analyzing Circuits by using network theorems.
CO2. Apply the time and frequency method of analysis.
CO3. Find the various parameters of two port network.
CO4. Apply network topology for analyzing the circuit.
CO5. Synthesize the network using passive elements

List of Experiments

1. To calculate the 'Z' parameters of given two port network and verify the result experimentally
2. To calculate the 'Y' parameters of given two port network and verify the result experimentally
3. To calculate the 'ABCD' parameters of given two port network and verify the result experimentally
4. To calculate the 'Y' parameters of given two port network and verify the result experimentally
5. To verify the frequency response of low pass filter circuit.
6. To verify the frequency response of high pass filter circuit.
7. To plot a frequency response of Band pass filter and determine the 3 - db Bandwidth
8. To study the frequency response of a series R-L-C circuit
9. To study the frequency response of a series R-L-C circuit
10. Introduction to PSPICE.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
9	PCC	EC-355	Digital Signal Processing Lab	0	0	2	1

Course Objective

To generate the elementary signals/ waveforms.
2. To Calculate and Plot DFT / IDFT of given DT signal and prove it theoretical.
3. To plot frequency response of a given LTI system.
4. To Implement FFT of a given sequence.
5. To determine and plot the Power Spectrum of a given signal(s).
6. To Plot Magnitude and Phase of LP FIR filter for any given sequence.

Course Outcomes

CO1 Able to generate elementary signals/ waveforms and perform arithmetic operations on signals.
CO2. Able to Calculate and Plot DFT / IDFT of given DT signal.
CO3. Able to plot frequency response of a given system and verify the properties of LTI system.
CO4. Able to Implement FFT of given sequence and identify the reduction of computations using FFT.
CO5. Able to Implement LP FIR filter for a given sequence and calculate the filter coefficients

List of Experiments

1.To represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine).
2.To develop program for discrete convolution.
3. To develop program for discrete correlation.
4. To understand stability test.
5. To understand sampling theorem.
6. To design analog filter (low-pass, high pass, band-pass, band-stop).
7. To design digital IIR filters (low-pass, high pass, band-pass, band-stop).
8. To design FIR filters using windows technique.
9. To design a program to compare direct realization values of IIR digital filter
10. To develop a program for computing parallel realization values of IIR digital filter.
11. To develop a program for computing cascade realization values of IIR digital filter
12. To develop a program for computing inverse Z-transform of a rational transfer function.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
10	PCC	ECEW-301C	Electronics Workshop-II	0	0	4	2

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
11 ii	PCC	EC-357	Electromagnetic Waves Lab	0	0	2	2

List of Experiments

1: Vector Representation and Coordinate Systems using Software Package: 'CAEME'
2: Coordinate Systems and Conversion using 'CAEME' Software.
3: Electrical Field and Potential inside the Parallel Plate Capacitor
4: Capacitance and Inductance of Transmission Lines
5: Simulation of Electric Field and Potential inside Capacitors.
6: Magnetic Field outside a Straight Conductor.
7: Magnetic Field of Coils.
8: Magnetic Force on a Current Carrying Conductor.
9: Magnetic Induction.
10: E.M Wave Radiation and Propagation of a Horn Antenna.
11: E.M Wave Transmission and Reflection.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
11	HSMC	PDP-301	Leadership & Entrepreneurship Development	0	0	2	1

COURSE OUTCOMES: Students will be able to:

- CO1: Demonstrate an ability to engage in critical thinking by analyzing situations and constructing and selecting viable solutions to solve problems.
- CO2: Identify own strengths and weaknesses and gain the ability to take better decisions
- CO3: Develop the skills to reflect on their learning and turn their understanding of their current knowledge and skills into a drive to learn more
- CO4: Develop an understanding of change processes and be able to think critically about obstacles to change

Unit Wise Syllabus:

UNIT 1- Leadership- Concept, styles of Leadership, Qualities to become a Leader. Case study
on world renowned leaders
UNIT 2- Teamwork & Team Building – Importance of Team Work, Stages of Team Formation,
Benefits of Working in a Team.
UNIT 3- Decision Making -7 steps of DM, Strategies to make good decisions

UNIT 4- Goal Setting – Difference between Goal & Dreams. SMART Technique of setting Goals, Types of Goals, Goal Tracker
UNIT 5 – Entrepreneurship – Concept of Entrepreneurship, Qualities of Entrepreneur,

SYLLABUS
B.TECH – 3nd Year, 6th Semester

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
1	PCC	EC-302C	Control System	3	0	0	3

1.To introduce different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form to interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis.
2. To employ time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions and identify the needs of different types of controllers and compensator to ascertain the required dynamic response from the system
3. Formulate different types of analysis in frequency domain to explain the nature of stability of the system

Course Objective At the end of this course,

CO1 Students will demonstrate the ability to understand the modeling of linear-time-invariant systems using transfer function and state space representations.
CO2 Understand the concept of stability and its assessment for linear-time invariant systems.
CO3 Interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis
CO4 Categorize different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form.
CO5 Characterize any system in Laplace domain to illustrate different specification of the system using

Unit 1: Introduction to control problem Industrial Control examples. Mathematical models of physical systems. Control hardware and their Models. Transfer function models of linear time-invariant systems. Feedback Control: Open-Loop and Closed-loop systems. Benefits of Feedback. Block diagram Algebra. Design simple feedback controllers.

Unit 2: Time Response Analysis Standard test signals. Time response of first and second order systems for standard test inputs. Application of initial and final value theorem. Design specifications for second-order systems based on the time-response. Concept of Stability. Routh-Hurwitz Criteria. Relative Stability analysis. Root-Locus technique. Construction of Root-loci.

Unit 3: Frequency-response analysis Relationship between time and frequency response, Polar plots, Bode plots. Nyquist stability criterion. Relative stability using Nyquist criterion – gain and phase margin. Closed-loop frequency response.

Unit 4: Introduction to Controller Design Stability, steady-state accuracy, transient accuracy, disturbance rejection, insensitivity and robustness of control systems. Root-loci method of feedback controller design. Design specifications in frequency-domain. Frequency-domain methods of design. Application of Proportional, Integral and Derivative Controllers, Lead and

Lag compensation in designs. Analog and Digital implementation of controllers.

Unit 5: State variable Analysis Concepts of state variables. State space model. Diagonalization of State Matrix. Solution of state equations. Eigenvalues and Stability Analysis. Concept of controllability and observability. Pole-placement by state feedback. Discrete-time systems. Difference Equations. State-space models of linear discrete-time systems. Stability of linear discrete-time systems.

. **Text/References:**

1. M. Gopal, "Control Systems: Principles and Design", McGraw Hill Education, 1997.
2. B. C. Kuo, "Automatic Control System", Prentice Hall, 1995.
3. K. Ogata, "Modern Control Engineering", Prentice Hall, 1991.
4. I. J. Nagrath and M. Gopal, "Control Systems Engineering", New Age International, 2009

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2	PCC	EC-304C	Probability Theory and Stochastic Process	3	0	0	3

Course Objective

Learn the concept and application of Random variables

Course Outcomes

CO1 Define Probability and different Theorems of Probability

CO2 Explain single, multiple Random Variables, distribution and density functions of Random Variables.

CO3 Apply the knowledge of Mathematical operations on Random Variables to find the moments.

CO4 Test the Temporal characteristics of a Random Process.

CO5 Measure the spectral characteristics of a Random Process

Unit-1 Sets and set operations; Probability space; Conditional probability and Bayes theorem; Combinational probability and sampling models. Discrete random variables, probability mass function, probability distribution function, and example

Unit-2 Random variables and distributions; Continuous random variables, probability density function,
Probability distribution function, example distributions;

Unit-3 Joint distributions, functions of one and two random variables, moments of random variables; Conditional distribution, densities and moments; Characteristic functions of a random variable; Markov, Chebyshev and Chernoff bounds;

Unit-4 Random sequences and modes of convergence (everywhere, almost everywhere, probability, distribution and mean square); Limit theorems; Strong and weak laws of large numbers, central limit theorem.

Unit-5 Random process. Stationary processes. Mean and covariance functions. Ergodicity. Transmission of random process through LTI. Power spectral density.

Text Books

. A.Papoulis and S. Unnikrishnan Pillai, ``Probability, Random Variables and Stochastic Processes," Fourth Edition, McGraw Hill.

Text/Reference Books:

1. H. Stark and J. Woods, ``Probability and Random Processes with Applications to Signal Processing," Third Edition, Pearson Education
2. K. L. Chung, Introduction to Probability Theory with Stochastic Processes, Springer International
3.P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Stochastic Processes, UBS Publishers
4. S. Ross, Introduction to Stochastic Models, Harcourt Asia, Academic Press.

Course Objective

1. Understanding the architecture, protocols and services that are used in broadband networks, and methods for acquisition of the new future technologies and services to be introduced in the next generation networks
2. Installing and maintaining the equipment needed to operate the broadband networks

CO1. Define services and specify their applications in modern broadband networks,
CO2. Explain communication protocols,
CO3. Analyze and compare the appropriate network architecture,
CO4. Develop, design and create broadband networks,
CO5. Choose an engineering approach to solving problems, starting with the acquired theoretical knowledge.

Unit 1. Overview of internet –concepts, challenges and history. Next Generation Internet-challenges and problems. Multicasting in Internet. Real time communication over Internet.

Unit 2. Packet scheduling Algorithms- requirements and choices. Admission control in internet. Differentiated Services in internet. Internet Telephony and voice over IP (VoIP)-

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3	PCC	EC-306C	Broadband Network	3	0	0	3

RTP and RTCP.

Unit 3. Broadband ISDN and ATM Networks- ATM protocols. IP switching and MPLS-Overview of IP over ATM and its evolution to IP switching. Policy based Networking. Policy servers.

Unit 4. Web in Qos domain. Architecture for Web Qos. Web Access – Intelligent web browsing and web caching. Internet and web Traffic measurement and characterization. Prediction for network management.

Unit 5. Optical communication networks- DWDM based transport network. Issues in IP over DWDM optical IP routers and switching.

Text Books

1. Residential Broadband Networks: Xdsl, HFC and Fixed Wireless Access by Utilizing D. Black Prentice Hall; 1st edition
2. An Introduction to Broadband Networks by Acampora Anthony S Springer Science Business Media

Reference Books

1.ISDN and Broadband ISDN with Frame Relay and ATM by William Stallings Pearson; 4th edition

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4 i	PEC-II	EC-308C	Data Communication	3	0	0	3

Course Objective:

1.To understand the basic concepts of data communication, layered model, protocols and interworking between computer networks and switching components in telecommunication systems.
2. Discuss the nature, uses and implications of internet technology.
3. To understand the functioning of Frame Relay, ATM.
4. An overview of security issues related to data communication in networks

Course Outcomes

CO1 Understand the basics of data communication, networking, internet and their importance.
CO2 Analyze the services and features of various protocol layers in data networks.
CO3 Differentiate wired and wireless computer networks
CO4 Analyze TCP/IP and their protocols.
CO5 Recognize the different internet devices and their functions.

Unit-1 Introduction

Introduction: Data Communications, Networks, Network Types, Internet History, Standards and Administration, Networks Models: Protocol Layering, TCP/IP Protocol suite, The OSI model, Introduction to Physical Layer-1: Data and Signals, Digital Signals, Transmission Impairment, Data Rate limits, Performance, Digital Transmission: Digital to digital conversion (Only Line coding: Polar, Bipolar and Manchester coding)

Unit -2 Physical Layer-2

Physical Layer-2: Analog to digital conversion (only PCM), Transmission Modes, Analog Transmission: Digital to analog conversion, Bandwidth Utilization: Multiplexing and Spread Spectrum, Switching: Introduction, Circuit Switched Networks and Packet switching.

Unit -3 Error Detection and Correction

Error Detection and Correction: Introduction, Block coding, Cyclic codes, Checksum, Forward error correction, Data link control: DLC services, Data link layer protocols, HDLC, and Point to Point protocol (Framing, Transition phases only)

Unit -4 Media Access control

Media Access control: Random Access, Controlled Access and Channelization, Wired LANs Ethernet: Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet and 10 Gigabit Ethernet, Wireless LANs: Introduction, IEEE 802.11 Project and Bluetooth.

Unit -5 wireless Networks

Other wireless Networks: WIMAX, Cellular Telephony, Satellite networks, Network layer Protocols : Internet Protocol, ICMPv4,Mobile IP, Next generation IP: IPv6addressing, The IPv6 Protocol, The ICMPv6 Protocol and Transition from IPv4 to IPv6.
Text Book 1.Data Communications & Networking – 5th Edition- B A Forouzan- Tata

McGraw-Hill.

Reference Books

1. Data Communications and Networks- 2nd edition -Achyut S Godbole- and Atul Kahate Tata McGraw-Hill
2. Computer Networks- 4th Edition- Andrew S Tanenbaum- Pearson-Prentice Hall
3. Computer Networking - James F. Kurose & Keith W. Ross- PEARSON
4. Computer Communications and Networking Technologies - Michael A. Gallo & William M. Hancock- BROOKS&COLE
5. Computer Networks and Internets -Douglas E. Comer- PEARSON.
6. Data and Computer Communications- Eighth Edition- William Stallings- Pearson Education.
7. Refer the course contents at NPTEL website of IIT Khargapur of course- Communication Networks and Switching.
8. Network Security Bible, 2nd edition, Eric Cole, Wiley Publishers.
9. Data communication and networks –James Irvine and David Harley- Publishers: Wiley India.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4 ii	PEC-II	EC-310C	Embedded System Design	3	0	0	3

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Course Objectives

To introduce the Building 1.Blocks of Embedded System
2. To Educate in Various Embedded Development Strategies
3. To Introduce Bus Communication in processors, Input/output interfacing.
4. To impart knowledge in various processor scheduling algorithms.
5. To introduce Basics of Real time operating system and example tutorials to discuss on one real time operating system tool

Course Outcomes

CO1: Acquire a basic knowledge about programming and system control to perform a specific task.
CO2: Acquire knowledge about devices and buses used in embedded networking
CO3: Develop programming skills in embedded systems for various applications.
CO4: Acquire knowledge about basic concepts of circuit emulators.
CO5: Acquire knowledge about Life cycle of embedded design and its testing

UNIT I – INTRODUCTION TO EMBEDDED CONCEPTS

Introduction to embedded systems, Application Areas, Categories of embedded systems, Overview of embedded system architecture, Specialties of embedded systems, recent trends in embedded systems, Architecture of embedded systems, Hardware architecture, Software architecture, Application Software, Communication Software.

UNIT II – OVERVIEW OF ARM AND CORTEX-M3

Background of ARM Architecture, Architecture Versions, Processor Naming, Instruction Set Development, Thumb-2 and Instruction Set Architecture. Cortex-M3 Basics: Registers, General Purpose Registers, Stack Pointer, Link Register, Program Counter, Special Registers, Operation Mode, Exceptions and Interrupts, Vector Tables, Stack Memory Operations, Reset Sequence. Cortex-M3Instruction Sets: Assembly Basics, Instruction List, Instruction Descriptions.Cortex-M3 Implementation Overview: Pipeline, Block Diagram, Bus. Interfaces on Cortex-M3, I-Code Bus, D Code Bus, System Bus, External PPB and DAP Bus

UNIT III – CORTEX EXCEPTION HANDLING AND INTERRUPTS

Exceptions: Exception Types, Priority, Vector Tables, Interrupt Inputs and Pending Behavior, Fault Exceptions, Supervisor Call and Pendable Service Call. NVIC: Nested Vectored Interrupt Controller Overview, Basic Interrupt Configuration, Software Interrupts and SYSTICK Timer. Interrupt Behavior: Interrupt/Exception Sequences, Exception Exits, Nested Interrupts, Tail-Chaining Interrupts, Late Arrivals and Interrupt Latency

UNIT IV – CORTEX-M3/M4 PROGRAMMING

Cortex-M3/M4 Programming: Overview, Typical Development Flow, Using C, CMSIS (Cortex Microcontroller Software Interface Standard), Using Assembly. Exception Programming: Using Interrupts, Exception/Interrupt Handlers, Software Interrupts, Vector

Table Relocation. Memory Protection Unit and other Cortex-M3 features: MPU Registers, Setting Up the MPU, Power Management, Multiprocessor Communication.

UNIT V – CORTEX-M3/M4 DEVELOPMENT AND DEBUGGING TOOLS

STM32L15xxx ARM Cortex M3/M4 Microcontroller: Memory and Bus Architecture, Power Control, Reset and Clock Control. STM32L15xxx Peripherals: GPIOs, System Configuration Controller, NVIC, ADC, Comparators, GP Timers, USART. Development & Debugging Tools: Software and Hardware tools like Cross Assembler, Compiler, Debugger, Simulator, In-Circuit Emulator (ICE), Logic Analyzer etc.

REFERENCE BOOKS

1. Joseph Yiu," The Definitive Guide to the ARM Cortex-M3", Second Edition, Elsevier Inc. 2010.
2. Andrew N Sloss, Dominic Symes, Chris Wright, "ARM System Developer's Guide Designing and Optimizing System Software", Elsevier Publications,2006
3. Steve Furber, "ARM System-on-Chip Architecture", 2nd Edition, Pearson Education, India ISBN: 9788131708408, 8131708403 , 2015
4. Dr. K.V.K. Prasad, "Embedded / Real-Time Systems: Concepts, Design and Programming Black Book" , New ed (MISL-DT) Paperback – 12 Nov 2003
5. David Seal "ARM Architecture Reference Manual", Addison Wesley, England; Morgan Kaufmann Publishers,2001
6. Ajay Deshmukh, "Microcontroller - Theory & Applications", Tata McGraw Hill, 2005
7. Arnold. S. Berger, "Embedded Systems Design - An introduction to Processes, Tools and Techniques", Easwer Press, 2001
8. Raj Kamal, "Microcontroller - Architecture Programming Interfacing and System Design" 2nd Edition, Pearson Education, 2011
9. Cortex-M series-ARM Reference Manual
10. Cortex-M3 Technical Reference Manual (TRM)
11. STM32L152xx ARM Cortex M3 Microcontroller Reference Manual 5/97

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4 iii	PEC-II	EC-312C	Internet of Things (IoT)	3	0	0	3

Course Objective Students will be explored to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop IOT Devices.

Course Outcomes

CO1.Able to understand the application areas of IOT
CO2· Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
CO3· Able to understand building blocks of Internet of Things and characteristics.
CO4. Recognize the factors that contributed to the emergence of IoT
CO5. Use real IoT protocols for communication

Unit-1 – Overview IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service (XaaS), M2M and IoT Analytics, Knowledge Management

Unit-2 – Reference architecture IoT Architecture-State of the Art – Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.

Unit-3 – IOT DATA LINK LAYER & NETWORK LAYER PROTOCOLS PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART,Z-Wave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7 - Network Layer-IPv4, IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP

Unit-4 – TRANSPORT & SESSION LAYER PROTOCOLS Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) – Session Layer-HTTP, CoAP, XMPP, AMQP, MQTT

Unit-5 – SERVICE LAYER PROTOCOLS & SECURITY Service Layer -oneM2M, ETSI M2M, OMA, BBF – Security in IoT Protocols – MAC 802.15.4 , 6LoWPAN, RPL, Application Layer

Text Book

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.

REFERENCES

2. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI

3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer

4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118- 47347-4, Willy Publications

5. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1 st Edition, VPT, 2014.

6. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.htm

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5 ii	PEC-III	EC-316C	Wireless and Cellular Communication	3	0	0	3

Course Outcomes

CO1 Analyze and design wireless and mobile cellular systems.
CO2 Understand impairments due to multipath fading channel.
CO3 Understand the fundamental techniques to overcome the different fading effects.
CO4 Understand Co-channel and Non Co-channel interferences
CO5 Familiar with cell coverage for signal and traffic, diversity techniques and mobile antennas.
CO6 Understanding of frequency management, Channel assignment, and types of handoff.

UNIT-1 Introduction to Cellular Mobile Systems: Cellular Mobile Telephone Systems, A Basic Cellular System, Operation of Cellular Systems. Elements of Cellular Mobile Radio System Design: General Description of the problem, Concept of Frequency reuse channels, CoChannel Interference Reduction Factor, Handoff Mechanism, Cell Splitting.

UNIT-2 Speech Coding for Wireless Systems Applications: Introduction to Digital Signal Processing (DSP) Techniques in Wireless Telephone and Broadcast Systems, Speech Coding Techniques for Audio and Voice – Pulse Code Modulation, DPCM, Delta Modulation, Vocoder and Linear Predictive Coding, Performance Comparison of Speech Processing Techniques.

UNIT-3 Radio Propagation and Cellular Engineering Concepts: Fundamental Radio Propagation and System Concepts, Propagation Characteristics, Models of Multipath-faded radio signals – Unmodulated Carrier, Envelope and Phase faded, Level Crossing rate and fade Duration, Delay Spread Measurements.

UNIT-4 Digital Modulation-Demodulation (Modem) Principles and Architectures: Coherent Modem – Baseband Modem Equivalence, Coherent and Differentially Coherent Binary Phase Shift Keying Systems, Synchronization – Carrier Recovery and Symbol Timing Recovery, Differential Encoding and Decoding Requirement, Quadrature Phase shift Keying – Coincident and offset Types, Pi/4 DQPSK Modems – Architecture.

UNIT-5 Interference In Wireless Digital Communication: Carrier-to-Interference and Carrier-to-Noise Limited Systems, Cochannel Interference, Adjacent Channel Interference. Externally caused Cochannel Interference, Definitions and performance of Spectral and Power Efficiency, Relationship of the Bit-Energy to Noise-Density Ratio and the Carrier-to-Noise Ratio,Power Efficiency and Bit-Error-Rate performance in an Additive White Gaussian Noise Environment, Concepts of Diversity Branch and Signal paths; Combining and Switching Methods.

TEXT BOOKS

1.DR Kamilo Feher Wireless Digital Communications, Prentice Hall of India, New Delhi – 1999 2.William Cy Lee, Mobile Cellular Telecommunications, 2nd Edition, MC Graw Hill.
2. Theodore S Rappaport, "Wireless Communication Principles and Practice", 2nd Ed, Pearson Education. 2002
3. Lawrence Harte, "3G Wireless Demystified", McGraw Hill Publications. 2000
4. Kaveh Pahlavan and Prashant Krishnamurthy, "Principles of Wireless Networks", PHI.2000

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
6 i	PEC-IV	EC-318C	Fiber Optical Communication	3	0	0	3

OBJECTIVE

The aim of this course is to describe the various technologies, implementation, mythologies and performance measurement techniques that make optical fiber communication system possible.

COURSE OUTCOMES

CO1: understand the modulation and demodulation schemes in the coherent optical systems.
CO2: understand the various types of the optical amplifiers
CO3: analyse various multiplexing techniques used and evaluate the recent advances in this field
CO4: compare the merits and demerits, potential applications of microwave semiconductor devices.
CO5: Analyze the operating principle of optical amplifiers.

Unit-1. INTRODUCTION TO OPTICAL COMMUNICATION SYSTEMS: Electromagnetic spectrum used for optical communication; block diagram of optical communication system. Basics of transmission of light rays. Advantages of optical fiber communication.

Unit-2. OPTICAL FIBERS: Optical fibers structures and their types; fiber characteristics : attenuation; scattering; absorption; fiber bend loss; dispersion; fiber couplers and connectors; splicing jointing LED LIGHT SOURCE: Light emitting diode :recombination processes; the spectrum of recombination radiation; LED characteristics; internal quantum efficiency; external quantum efficiency; LED structure; lens coupling to fiber; behavior at high frequencies.

Unit-3. LASER LIGHT SOURCE: Basic principles of laser action in semi -conductors; optical gain; lasing threshold; laser structures and characteristics; laser to fiber coupling; comparison with LED source. AVALANCHE AND PIN PHOTODETECTORS: Principles of optical detection; quantum efficiency; responsivity; general principles of PIN photodetector; intrinsic absorption; materials and designs for PIN photodiodes; impulse and frequency response of PIN photodiodes; noise in PIN Photodiodes; multiplication process; APD Design; APD bandwidth; APD noise.

Unit-4. OPTICAL AMPLIFIERS: optical amplifier; optical cavity;1 Laser amplifiers; Doped fibre amplifiers; Noise Gain saturation Inhomogeneous broadening effects Polarization effects Erbium-doped fibre amplifiers Doped fibre amplifiers for other wavelength ranges Semiconductor optical amplifier (SOA) Vertical-cavity SOA Raman amplifier Optical parametric amplifier.

Unit-5. OPTICAL MODULATORS and DEMODULATORS: Optical modulator Electro optic modulator ; Spatial light modulator Optical tweezers Modulating retro-reflector Optical DPSK demodulator Delay line interferometer Michelson interferometer Optical hybrid Phase detector (section Optical phase detectors) Laserdisc Phase-shift keying T-carrier Photo elastic modulator Super heterodyne receiver Symbol rate Lock-in amplifier Orthogonal frequency-division multiplexing (redirect Optical Orthogonal Code) Telecommunication

Reference book

1. Selvarajan, Kar Srinivas, “Optical Fiber Communication”, 4th Edition, Tata McGraw Hill, 2003.
2. Keiser, G., “Optical fiber communication”, Tata McGraw Hill, 2000.
3. Senior, J.M., “Optical fiber Communication Principles and Practice”, Prentice Hall of India, 1992

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
6 ii	PEC	EC-320C	Real Time System	3	0	0	3

Course Objective: This course covers the principles of real-time systems, Modeling of a Real-Time System, Task assignment and scheduling, Resource management, Real-time operating systems, RTOS services, Programming language with real-time support, System design techniques, Inter task communication, Fault tolerant techniques, Reliability evaluation methods; Performance analysis, Case studies of real-time systems.

Course Outcomes: On completion of this course, the students will be able to understand concepts of Real-Time systems and modeling recognize the characteristics of a real-time system understand and develop document on an architectural design of a real-time system develop and document Task scheduling, resource management, real-time operating systems and fault tolerant applications of Real-Time Systems.

Unit-1: Introduction to Real time systems
Issues in real time computing Structure of real time system Need for RTOS Task classes Performance measures for real time system: Properties, traditional performance measures, perform ability, cost functions and hard deadlines, and Estimating program run times. Introduction LINUX/ UNIX OS.

Unit-2: Embedded software and Task Scheduling
Examples of embedded system their characteristics and their typical hardware components embedded software architectures Scheduling algorithms: round robin, round robin with interrupts, function queue scheduling real time operating system selection, CPU scheduling algorithms: Rate monotonic, EDF, MLF. Priority Scheduling, Priority Ceiling and Priority inheritance Real time operating system: Tasks and task states, shared data and reentrancy semaphores and shared data, use of semaphores protecting shared data

Unit-3: Features of Real Time Operating System
Messages queues mailboxes pipes timer function events memory management Interrupt basic system design using an RT (OS design principles, interrupt routines, task structures and priority.) Current research in RTOS. Case Studies: Vx Works and Micro OS-II

Unit-4: Real Time Databases Real time v/s general purpose databases main memory databases transaction priorities transaction aborts concurrency control issues: pessimistic concurrency control and optimistic concurrency control Disk scheduling algorithms.

Unit-5: Fault Tolerance Techniques
Causes of failure Fault types Fault detection Fault and error containment Redundancy: hardware redundancy software redundancy Time redundancy information redundancy Data diversity Integrated failure handling

TEXT BOOKS

1. Real Time Systems – Jane W. S. Liu, Pearson Education Publication

REFERENCE BOOKS

1. Real Time Systems – Mall Rajib, Pearson Education
2. Real-Time Systems: Scheduling, Analysis, and Verification – Albert M. K. Cheng, Wiley.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
6 iii	PEC	EC-322C	VLSI Design	3	0	0	3

Course objective

1: Learn the design and realization of combinational & sequential digital circuits.
2: Architectural choices and performance tradeoffs involved in designing and realizing the circuits in CMOS technology are discussed
3: Learn the different FPGA architectures and testability of VLSI circuits.

OUTCOMES: upon completion of the course, students should be able to
CO1 Realize the concepts of digital building blocks using MOS transistor.
CO2 Design combinational MOS circuits and power strategies.
CO3 Design and construct Sequential Circuits and Timing systems.
CO4 Design arithmetic building blocks and memory subsystems.
CO5 Apply and implement FPGA design flow and testing.

UNIT -1 INTRODUCTION TO MOS TRANSISTOR
MOS Transistor, CMOS logic, Inverter, Pass Transistor, Transmission gate, Layout Design Rules, Gate Layouts, Stick Diagrams, Long-Channel I-V Charters tics, C-V Charters tics, Non ideal I-V Effects, DC Transfer characteristics, RC Delay Model, Elmore Delay, Linear Delay Model, Logical effort, Parasitic Delay, Delay in Logic Gate, Scaling.

UNIT-2 COMBINATIONAL MOS LOGIC CIRCUITS
Circuit Families: Static CMOS, Rationed Circuits, Cascade Voltage Switch Logic, Dynamic Circuits, Pass Transistor Logic, Transmission Gates, Domino, Dual Rail Domino, CPL, DCVSPG, DPL, Circuit Pitfalls.
Power: Dynamic Power, Static Power, Low Power Architecture.

UNIT-3 SEQUENTIAL CIRCUIT DESIGN
Static latches and Registers, Dynamic latches and Registers, Pulse Registers, Sense Amplifier Based Register, Pipelining, Schmitt Trigger, Monostable Sequential Circuits, Astable Sequential Circuits. Timing Issues: Timing Classification Of Digital System, Synchronous Design.

UNIT-4 DESIGN OF ARITHMETIC BUILDING BLOCKS AND SUBSYSTEM
Arithmetic Building Blocks: Data Paths, Adders, Multipliers, Shifters, ALUs, power and speed tradeoffs, Case Study: Design as a tradeoff. Designing Memory and Array structures: Memory Architectures and Building Blocks, Memory
Core, Memory Peripheral Circuitry.

UNIT-5 IMPLEMENTATION STRATEGIES AND TESTING
FPGA Building Block Architectures, FPGA Interconnect Routing Procedures. Design for Testability: Ad Hoc Testing, Scan Design, BIST, IDDQ Testing, Design for Manufacturability, Boundary Scan.

TEXT BOOKS:

1. Neil H.E. Weste, David Money Harris —CMOS VLSI Design: A Circuits and Systems Perspective‖, 4th Edition, Pearson , 2017 (UNIT I,II,V)
2. Jan M. Rabaey ,Anantha Chandrakasan, Borivoje. Nikolic, ‖Digital Integrated Circuits:A Design perspective‖, Second Edition , Pearson , 2016.

REFERENCES

1. M.J. Smith, ―Application Specific Integrated Circuits‖, Addisson Wesley, 1997
2. Sung-Mo kang, Yusuf leblebici, Chulwoo Kim ―CMOS Digital Integrated Circuits:Analysis & Design,4th edition McGraw Hill Education,2013
3. Wayne Wolf, ―Modern VLSI Design: System On Chip‖, Pearson Education, 2007
4. R.Jacob Baker, Harry W.LI., David E.Boyee, ―CMOS Circuit Design, Layout and Simulation, Prentice Hall of India 2005.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
7	PCC	EC-352C	Control System Lab	0	0	2	1

Course Objectives:

1. Will have a strong knowledge on MATLAB software.
2. To study the concept of time response and frequency response of the system
3. Students get the basic knowledge on practical control system applications on machines & electronic devices.
4. This course aims to familiarize with the modeling of dynamical systems, to simulate and analyze the stability of the system using MATLAB

Course Outcomes:

CO1. Understand the basics of Matlab and familiarize with control system tool box for designing various LTI systems.
CO2. Design, analyze various models of the systems in time domain and evaluate different response parameters
CO3. Analyze stability from root locus of the given model of the system.
CO4. Prepare professionals in laboratory to compute or to predict the characteristics of a system by visualizing experimental data and its graphical representation.
CO5. Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will develop the ability to divide up and share task responsibilities to complete assignments.

LIST OF EXPERIMENTS:

1. To study A.C. Servo-motor and to plot its torque-speed characteristics
2. To study magnetic amplifier and to plot its load current v/s control current characteristics for (a) Series connected mode (b) Parallel connected mode
3. To implement a PID controller for temperature control of a pilot plant
4. To study different components of process control simulator kit
5. To study A.C. Motor position control through continuous command
6. To study Synchro transmitter and receiver and to plot stator voltage v/s rotor angle for synchro transmitter
7. To study lead, lag, lead-lag compensator and to draw their magnitude and phase plot
8. To study D.C. Servo-motor and to plot its torque-speed characteristics
9. To study simple open loop and closed loop control system with disturbance and without disturbance using process control simulator kit
10. To study (PD), PI, PID controllers.
11. To study a stepper motor and control the speed by 8085 microprocessor kit

ADDITIONAL EXPERIMENTS

12. Obtain the unit step response of a second order system with given zeta and Wn using MATLAB.
13. Determine the unit step response of a given close loop transfer function using MATLAB.
14. Determine the damping ratio, undamped natural frequency of oscillation and percentage overshoot of a unity feedback open loop transfer function to a unit step input using MATLAB.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
8 i	PEC	EC-362B	Data Communication Lab	0	0	2	1

List of Experiments

1. To study various multiplexing techniques
2. To study of network interface card (NIC)
3. To study of parallel and serial transmission
4. To study of NRZ and RZ codes
5. To study of Integrated services digital network.
6. To study of digital interface rs-232.
7. To study LAN using star topology
8. To study of twisted pair, coaxial cable and fibre optic cable.
9. To study of different types of modem.
10. To study pc to pc communication using parallel port

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
8 ii	PEC Lab-II	EC-360C	Embedded System Design Lab	0	0	2	1

Course Objective: The student should be made to:
• Learn the working of ARM processor
• Understand the Building Blocks of Embedded Systems
• Learn the concept of memory map and memory interface
• Write programs to interface memory, I/Os with processor
• Study the interrupt performance

List of Experiments
1. Study of ARM evaluation system
2. Interfacing stepper motor and temperature sensor
3. Implementing zigbee protocol with ARM
4. Simulation of calculator using 8051 microcontroller in Proteus software
5. To develop a 'C'code to create a mailbox and to understand the RTOS functions
6. UART implementation FPGA & ARM7
7. To develop a 'C' program to make the LED blink (including delay routine).
8. To develop a C-Language program for displaying the Key pressed in the Keypad in the LCD module.
9. To develop a C-Language program for reading the RTC, convert into decimal and to display it.
10. Interfacing keyboard and LCD.

Course Outcome:
At the end of the course, the student should be able to:
CO1 Write programs in ARM for a specific Application
CO2 Interface memory, A/D and D/A convertors with ARM system
CO3 Analyze the performance of interrupt
CO4 Write program for interfacing keyboard, display, motor and sensor.
CO5 Formulate a mini project using embedded system

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
8 iii	PEC Lab -II	EC-362C	Internet of Things (IOT) Lab	0	0	2	1

Course Outcomes:
CO1 Understand the IoT Systems.
CO2 Understand the concept of M2M (machine to machine) with necessary protocols.
CO3 Create programs using python scripting language in IoT devices.
CO4 Create programs for Raspberry Pi interfaces.
CO5 Understand to communicate with IoT Systems through web-interface.

List of Experiments

1. Study and Install Python in Eclipse and WAP for data types in python.
2. Write a Program for arithmetic operation in Python.
3. Write a Program for looping statement in Python.
4. Study and Install IDE of Arduino and different types of Arduino.
5. Write program using Arduino IDE for Blink LED.
6. Write Program for RGB LED using Arduino.
7. Study the Temperature sensor and Write Program foe monitor temperature using Arduino.
8. Study and Implement RFID, NFC using Arduino.
9. Study and implement MQTT protocol using Arduino.
10. Study and Configure Raspberry Pi.
11. WAP for LED blink using Raspberry Pi.
12. Study and Implement ZigBee Protocol using Arduino / Raspberry Pi.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
9 iii	PEC Lab -IV	EC-372C	VLSI Design Lab	0	0	2	1

Course Objective learn Hardware Descriptive Language (Verilog/VHDL). To learn the fundamental principles of VLSI circuit design in digital and analog domain. To familiarize fusing of logical modules on FPGAs. To provide hands on design experience with professional design (EDA) platforms

Course Outcomes

CO1 Construct NMOS, PMOS, CMOS, and Bi CMOS transistors using various fabrication technologies.

CO2 Analyze the quality metrics of combinational circuits.

CO3 Acquire the knowledge in advanced technologies.

CO4 Design combinational and sequential circuits.

CO5 Analyze power dissipation and delays in sequential circuits.

Name of the Experiment

1. Digital design: Inverter
2. Digital design: Inverter Buffer
3. Digital design: Transmission gate
4. Digital design: Basic Gate and universal gate
5. Digital design: D, SR, JK & T Flip-flop
6 Digital design: Parallel adders
7 a) 4-bit counters asynchronous counter b) 4-bit counters synchronous counter
8. Analog design: Inverter
9. Analog design: Common source amplifier & Common drain amplifier
10 Analog design: Single stage differential amplifier

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
11	PROJ	ECP-302C	Minor Project	0	0	4	2

CO1Understand the process of conducting research in Digital electronics and Communication Engineering.

CO2 Ability to work individually in solving research problems.

CO3 Ability to handle research based on the suitable methodology and observation method.

CO4 Ability to analyze and discuss critically research outcomes and, also the capability to obtain information for the development of the research.

CO5 Ability to present the research outcome scientifically through thesis/dissertation writing to document the findings of research.

The object of Project Work I is to enable the student to take up investigative study in the broad field of Electronics & Communication Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an

individual basis or two/three students in a group, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:

1. Survey and study of published literature on the assigned topic;
2. Working out a preliminary Approach to the Problem relating to the assigned topic;
3. Conducting preliminary Analysis/Modelling/Simulation/Experiment/Design/Feasibility;
4. Preparing a Written Report on the Study conducted for presentation to the Department;
5. Final Seminar, as oral Presentation before a departmental committee.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
11	HSMC	ECP-302C	Problem Solving Skills	0	0	2	1

OBJECTIVE To train and enhance the students' problem solving skills, reasoning ability, quantitative ability, and reading comprehension skills.

UNIT 1 – Logical Reasoning – Logical Deductions (Syllogism & Venn Diagrams) logical connectives
UNIT 2- Analytical Reasoning – Seating Arrangements, combinations, selections, comparisons, blood relations, directions etc

UNIT 3 – Non – Verbal Reasoning (Alpha Numeric & Visual Puzzles) – To solve problems on numbers, alphabet, symbols, visuals, problem types and series, analogies, odd man out, coding, decoding and symbols & notations.

UNIT 4 – Higher Maths – Algebra & Mensuration

UNIT 5- Business Maths – Number system, ratios & averages, time & work, time & distance, percentages, profit & loss, simple & compound interest

UNIT 6 –Date Interpretation & Sufficiency – Tables, Bar Chart, Line Graph & Pie Chart

REFERENCE BOOKS

1. Aggarwal R. S., "Verbal & Non-Verbal Reasoning", 2008, S. Chand, 1994
2. Aggarwal R. S., "Quantitative Aptitude for Competitive Examinations", S. Chand, 2008
3. Gulati, SL, "Quantitative Ability", Bookhive India, 2006
4. "GRE Barron's", 13th Edition, Barron's Educational Series, 2009
5. Devi Shakuntla, "Book of Numbers", 1984
6. Summers George J., "The Great Book of Puzzles & Teasers", Jaico Publishing House, 1989

Syllabus
B.Tech – 4th Year, 7th Semester

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
1	PCC	EC-401C	Smart Grid Technology	3	0	0	3

Course Objectives:

1. A basic introduction to Smart Grid.
2. An understanding of the relevance of it in global perspective..
3. To introduce students about the challenging issues and architecture of smart grid
4. To give exposure to the students about the communication and wide area monitoring in smart grid

Course Outcomes At the end of the course, the student should be able to:

CO1 Understand issues, opportunities & challenges in Smart grid
CO2 Understand Power distribution sector framework in India and its comparison globally
CO3 To introduce the implementation of the control in computational intelligence and security issues in smart grid and the role of Power electronics and energy storage in smart grid
CO4 Understand issues, opportunities & challenges in Smart grid
CO5 Develop skills required for smart grid planning & formulation of regulations.

Unit-1 The smart grid Introduction – Necessity of smart grid – Definition – Early smart grid initiatives – overview of the technologies required for the smart grid-Information and communication technologies, Sensing measurement, control and automation technologies, Power electronics and energy storage.

Unit-2 Data communication Introduction – dedicated and shared communication channels – switching techniques – communication channels- layered architecture and protocols; Communication technologies for the smart grid: Introduction –communication technologies – standards for information exchange.

Unit-3 Information Security for the smart grid Introduction – Encryption and Decryption: Symmetric Key encryption, Public key encryption - Authentication – Digital signature: Secret key signature, Public key signature, Message digest – cyber security standards.

Unit-4 Smart metering and demand side integration: Introduction – smart metering – smart meters – Communication infrastructure and protocols for smart metering - Demand side integration.

Unit-5 Introduction to smart grid applications: Introduction – voltage and VAR control and optimization – fault detection, isolation and restoration (FDIR) – Demand response (DR) – Distributed energy resources (DERs) – wide area monitoring, control and protection (WAMCP).

Text Books:

1. "Smart Grid: Technology and Applications" by Janaka Ekanayake , Kithsiri Liyanage , Jianzhong Wu , Nick Jenkins – John Wiley & sons Limited ; 2012 first Edition.
2. "Smart Grid: Applications, communication and security" by Lars T. Berger and Krzysztof Iniewski - John Wiley & sons Limited; 2012 first Edition.

Reference Books:

1. "Smart grid: Fundamental of Design and analysis" by James Momoh "John Wiley & sons Limited IEEE Press, 2012.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2 i	PEC-V	EC-403C	Electronics System Design	3	0	0	3

Course Objectives: The course treats different aspects of printed circuit boards in electronic system design with the aim that the student should learn to design, simulate and assemble an electronic system and analyze the influence of interconnects at different levels on the performance of electronic systems

Course Outcomes At the end of the course, the student should be able to:

CO1 explain and apply basic principles and guidelines for physical architectural design for complex electronic systems from the level printed circuit boards (PCB) to higher levels
CO2 design PCBs considering signal integrity and impedance matching
CO3 analyse and budget system noise
CO4 design power distribution and analyse noise related to power supply
CO5 design impedance matching networks for electronic systems for radio frequency

Unit-1 Design of Power supply system: Unregulated D.C. power supply system with rectifiers and filters. Design of emitter follower regulator, series regulators, overload protection circuits for regulators. Design of SMPS: Step up and step down.

Unit-2 Design of class A small signal amplifiers: Emitter follower, Darlington pair amplifiers with and without Bootstrapping, Two stage direct coupled amplifier. Design of class A, Class AB audio power amplifier with drivers.

Unit-3 Design of sinusoidal oscillators: OPAMP based Wein bridge and Phase Shift oscillators with AGC circuits, Transistor based Hartley, Colpits and Crystal oscillators, Evaluation of figure of merit for all above oscillator circuits.

Unit-4 Design of constant current sources, Design of function generators, Design of tuned amplifiers. Design of Butterworth, Chebyshev filters up to sixth order with VCVS and IGMF configuration.

Unit-5 Basic EMC/EMI and shielding, Basic RF design and impedance matching, Performance modelling and conceptual design of electronic systems

Text Books:

1. Regulated Power supply Handbook. Texas Instruments.
2. Electronics: BJT's, FETS and Microcircuits – Anielo.
3. Monograph on Electronic circuit Design: Goyal & Khetan.

Reference Books:

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2 ii	PEC-V	EC-405C	ALTE	3	0	0	3

Course Objectives:

To transfer the knowledge of current LTE technology to local telecommunications industry and academia

To increase the technical competitiveness of engineers, researchers, managers, etc. working in field of telecommunications

Course Outcomes: students are expected to be able

CO1	To explain the basic concept of cellular mobile system and LTE system.
CO2	To understand the cellular system evolution from 2G to 4G
CO3	To learn different Internet Protocols
CO4	to learn OFDMA and NOMA applications in 5G To B5G
CO5	to learn MIMO concepts

Unit-1 Introduction to LTE (Long Term Evolution) and EPC/EPS

Long Term Evolution (LTE) as a new radio platform technology, Support to achieve higher peak throughputs than HSPA+ in higher spectrum bandwidth,LTE for mobile, fixed and portable wireless broadband access, Optimized for IP-based traffic, Increasing capacity, Reducing network complexity, Lowering deployment and operational costs, Enhanced UMTS Air Interface (E-UTRA),System Architecture Evolution (SAE) and Evolved Packet Core (EPC),EUTRAN/LTE and the SAE/EPC as the Evolved Packet System (EPS)

Unit-2 LTE Network Architecture

LTE Interfaces and protocols, Introduction to E-UTRAN,E-UTRAN network architecture-UTRAN protocols, Orthogonal Frequency Division Multiplexing (OFDM),Multiple Input/Multiple Output (MIMO),Architecture and node functions, The LTE Evolved Packet System (EPS),LTE SAE Evolved Packet Core (EPC),LTE-EPC Network Architecture, Network nodes and roles of HSS, MME, S-GW, P-GW, and PCRF,Key interfaces: S1, S5, S6, S10 and S11,Key features and services

Unit-3 LTE Packet Core (SAE/EPC and EPS)

Mobility Management Entity (MME),User Plane Entity (UPE),DIAMETER, IPv6, SIP, SCTP and SIGTRAN, Role of IP Multimedia Subsystem (IMS),Co-existence and Inter-working with 3GPP Radio Access Technology (RAT),Architecture and migration

Unit-4 LTE/SAE/EPC Network Architecture

New enhanced base station, "Evolved NodeB (eNodeB),Access Gateway (AGW) and termination of the LTE bearer, Key logical functions, MME (Mobility Management Entity) for the Control, SAE PDN GW (System Architecture Evolution Packet Data, Comparing the functional breakdown with existing 3G architecture, Radio Network elements functions, Radio Network Controller (RNC), the AGW and the enhanced BTS (eNodeB),Core Network elements functions, SGSN and GGSN or PDSN (Packet Data Serving Node),Routers and the AGW

Unit 5 LTE RF Planning and Design

Overview of LTE Radio Network Design and Engineering, Link Budget for LTE,LTE Capacity Planning, LTE Design and Site Selection, LTE Configuration Parameters, LTE Operational Parameters, KPIs in LTE Radio Network

Text Books:

4G: LTE/LTE-Advanced for Mobile Broadband Academic Press 1st Edition by Erik Dahlman , Stefan Parkvall, Johan Skold

LTE Signaling: Troubleshooting and Optimization Wiley 1st edition by Ralf Kreher (Author), Karsten Gaenger

Reference Books:

LTE - The UMTS Long Term Evolution: From Theory to Practice Wiley 2nd edition by Stefania Sesia (Author), Issam Toufik (Author), Matthew Baker

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2iii	PEC-V	EC-407C	Artificial Neural Network	3	0	0	3

Course Objectives:
Analyze ANN learning, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning and Boltzmann learning Implement Simple perception, Perception learning algorithm, Modified Perception learning algorithm, and Adaptive linear combiner, Continuous perception, learning in continuous perception.

Course Outcomes: The students will be able to learn
CO1 Basic neuron models McCulloch-Pitts model
CO2 Basic neural network models: multilayer perceptron, distance or similarity based neural networks, associative memory and self-organizing feature map, radial basis function based multilayer perceptron, neural network decision trees, etc
CO3 Basic learning algorithms: the delta learning rule, the back propagation algorithm, self-organization learning, the r4-rule, etc
CO4 Applications: pattern recognition, function approximation, information visualization, etc.
CO5 Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network

Unit-1 Introduction: Biological Neuron – Artificial Neural Model – Types of activation functions – Architecture: Feedforward and Feedback, Convex Sets, Convex Hull and Linear Separability, Non-Linear Separable Problem. XOR Problem, Multilayer Networks. Learning: Learning Algorithms, Error correction and Gradient Descent Rules, Learning objective of TLNs, Perceptron Learning Algorithm, Perceptron Convergence Theorem. L1, L2

Unit-2 Supervised Learning: Perceptron learning and Non Separable sets, a-Least Mean Square Learning, MSE Error surface, Steepest Descent Search, |j-LMS approximate to gradient descent, Application of LMS to Noise Cancelling, Multi-layered Network Architecture, Back propagation Learning Algorithm, Practical consideration of BP algorithm. L1, L2, L3

Unit 3 Attractor Neural Networks: Associative Learning Attractor Associative Memory, Linear Associative memory, Hopfield Network, application of Hopfield Network, Brain State in a Box neural Network, Simulated Annealing, Boltzmann Machine, Bidirectional Associative Memory. L1, L2, L3

Unit-4 Self-organization Feature Map: Maximal Eigenvector Filtering, Extracting Principal Components, Generalized Learning Laws, Vector Quantization, Self-organization Feature Maps, Application of SOM, Growing Neural Gas. L1, L2, L3

Unit-5 Associative models, hop field networks, brain state networks, Boltzmann machines, hetero associations.

Text Books: Neural Networks A Classroom Approach- Satish Kumar, McGraw Hill Education (India) Pvt. Ltd, Second Edition.

Reference Books: Jacek M. Zurada, Introduction to Artificial Neural Systems, PWS Publishing Company, 1995.
Simon Haykin, Neural Networks: A Comprehensive Foundation, Macmillan College Publishing Company, 1994.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4 iv	PEC-V	EC-409C	High Performance Computer Network	3	0	0	3

Course Objectives: The objective of the course is to: Provide the various high speed digital access and broadband technologies switching techniques used for communication Congestion control Performance issues and quality of service required for better performance of high speed networks. Understand how networking research is done Pre-requisites: Data Communication and Computer Networks, Network Fundamental from Cisco Exploration

Unit 1: Introduction to Communication Networks
Communication networks; network principles; applications; Quality of Services (QoS) in network and application; Traffic characterization; network services; elements; mechanisms

Unit 2: High Speed Digital Access & Broadband Technologies
ADSL, other DSL Technologies; Cable Modem: Traditional Cable Networks, HFC Networks, Internet Over Cable, Spectrum Allocation, Sharing, Cable Modems, CM & CMTS, Data Transmission Schemes DOCSIS etc., ADSL versus Cable; SONET: SONET Devices, SONET Frame, Frame Transmission, Synchronous Transport Signals, STS-1, Virtual Tributaries, Higher-Rate Services; B–ISDN architecture;

Unit-3: Virtual Circuit Switching and Multicast Routing
Virtual Circuit Switching: Global Addressing, Virtual Circuit Identifier, Three Phases, Data Transfer Phase, Setup Phase, Teardown Phase; Frame Relay: Architecture, Frame Relay Layers, FRADs, VOFR, LMI, Congestion Control and Quality of Service; ATM: Design Goals, Problems, Main Features of ATM, Architecture, cell format & Switching Addressing, signalling and routing, ATM traffic and Congestion Control, Flow Control, Error Detection and Error Control, Quality of Service, Internetworking with ATM, ATM LANs. ATM networks performance measures – cell transfer delay, cell delay variation, CDV tolerance; cell loss ratio buffer over flow probability; Multicast Routing: IGMP, Multicast Trees, MBONE; Multicast Routing Protocols: DVMRP, MOSPF, CBT, PIM Applications

Unit 4: Congestion and Quality Control
General Principles of Congestion Control; Congestion Prevention Policies; Data Traffic: Traffic Descriptor, Traffic Profiles; Congestion: Network Performance; Congestion Control: Open-Loop Congestion Control, Closed-Loop Congestion Control, Congestion Control in TCP, Congestion Control in Frame Relay, Load Shedding, Jitter Control; Quality of Service: Requirements, Flow Characteristics, Flow Classes; Techniques to improve QoS: Scheduling, Traffic Shaping, Resource Reservation, Admission Control; Integrated Services: Signalling, Flow Specification, Admission, Service Classes, RSVP, Problems with Integrated Services; Differentiated Services; Qos in Switched Networks: QoS in Frame Relay, QoS in ATM, Label Switching and MPLS

Unit 5: Performance Issues
Performance Problems in Computer Networks; Network Performance Measurement; System Design for Better Performance; Fast TPDU Processing; Protocols for Gigabit Networks; Challenges in Exabyte

Text & References:

Text: William stallings, "ISDN and broadband ISDN with frame relay and ATM", Pearson Education Asia, Fourth Edition, 2001.

Behrouz A. Forouzan, Data Communication and Networking, Third Edition, Tata McGraw-Hill 2003

References:
Walter Goralski, Optical Networking and WDM, Tata McGraw Hill, 2001.
Neelakanta P.S., A textbook on ATM Telecommunication Principles and Implementation; CRC Press, First edition; 2000.
John A. Vacca, Wireless Broadband Networks Handbook, Tata McGraw Hill, 2001.
Tom Sheldon, Encyclopedia of Networking and Telecommunication, Tata McGraw Hill, 2001
Andrew S. Tanenbaum, Computer Networks, Fourth Edition, Prentice Hall India 2002

Journals: Communications in High Performance Computing and networks, Springer IEEE Transactions on selected Areas in Communication

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 i	PEC-VI	EC-411C	Cloud Computing	3	1	0	4

Course Objectives: The aim this course to understand the basics and importance of cloud computing. Cloud computing is a general term for anything that involves delivering hosted services over the Internet. These services are broadly divided into different categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). The name cloud computing was inspired by the cloud symbol that's often used to represent the Internet in flowcharts and diagrams. Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet. Large clouds, predominant today, often have functions distributed over multiple locations from central servers.

Course Outcomes At the end of the course, the student should be able to:
To identify the appropriate cloud services for a given application and perform cloud oriented analysis.
To design the composition of a cloud services.
To analyze authentication, confidentiality and privacy issues in Cloud computing environment.
To analyze authentication, confidentiality and privacy issues in Cloud computing environment.
To determine financial and technological implications for selecting cloud computing platforms
To learn Virtualization concepts

Unit-1 Introduction to cloud computing: Introduction to cloud computing: Emergence of cloud computing in distributed computing; Cloud computing Definition, Architecture, Cloud-Based Services, Benefits of using a Cloud Model, Key Characteristics of Cloud Computing, Understanding- Public & Private cloud environments, The Evolution of Cloud Computing – Hardware & Internet Software Evolution, SPI framework.

Unit-2 Cloud services Communication-as-a-Service (CAAS), Infrastructure-as-Service (IAAS), Monitoring-as-a Service (MAAS), Platform-as-a-Service (PAAS), and Software-as-a-Service (SAAS).

Unit-3 Cloud security challenges Cloud security challenges: Security Management People, Security Governance, Security Portfolio Management, Security Architecture Design, Identity Access Management (IAM), Data Security. Cloud computing threats, Case studies Amazon EC2, Google App engine, IBM clouds.

Unit-4 The MSP Model : Evolution from the MSP Model to Cloud Computing and Software-as-a-Service, The Cloud Data Center, Basic Approach to a Data Center Based SOA, Open Source Software, Service- Oriented Architectures as a Step Toward Cloud Computing.

Unit-5 Virtualization concepts & Smartphone Virtualization concepts & Smartphone: virtualization benefits, Hardware &Software Virtualization, Memory Virtualization, Storage Virtualization, Data Virtualization, Network Virtualization, Virtualization Security Recommendations, Introduction to Various Virtualization OS VMware, KVM, Virtual Machine Security, Smartphone, Mobile Operating Systems for Smartphone's (iPhone, Windows Mobile),Google (Android).

Text Books:

1. Gautam Shroff, Enterprise Cloud Computing, Cambridge, 2010
2. Toby Velte, Anthony Vote and Robert Elsenpeter, "Cloud Computing: A Practical Approach", McGraw Hill, 2002

Reference Books:

1. Tim Matherm, Subra Kumara swamy and Shahed Latif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance", O'Reilly Media, 2005.
2. Ronald Krutz and Russell Dean Vines, Cloud Security, 1st Edition, Wiley, 2010

3. Roddy, "Satellite Communication" 5th Edition, Tata McGraw Hill, 2006.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 ii	PEC-VI	EC-413	Network Embedded Applications	3	1	0	4

Course Objectives: This course aim to teach the fundamentals concepts associated with: Networked Embedded Systems, wireless sensor networks; Wireless channel propagation and radio power consumption; Wireless networks, ZigBee, Bluetooth, etc. ; Sensor principle, data fusion, source detection and identification; Multiple source detection, multiple access communications; Network topology, routing, network information theory; Distributed source channel coding for sensor networks; Power-aware and energy-aware communication protocols

Course Outcomes At the end of the course, the student should be able to:
CO1 design a small scale wireless network using a systematic approach based on knowledge acquired and with the purpose of solving a clearly defined problem
CO2 demonstrate an understanding of topics in wireless sensor networks using principles developed
CO3. Demonstrate proficiency in assessing and debugging wireless sensor networks and other system problems, using concepts and techniques developed throughout the course.
CO4 Learn wireless mechanism used in WSN.
CO5 Learn real time Data communication

Unit-1 Networked Embedded Systems in Industrial Automation, Field-Area Networks Fieldbus Systems, Embedded Networks for Automation , Fieldbus History , Communication Fundamentals—The OSI Model , Fieldbus Characteristics , Networking Networks—Interconnection in Heterogeneous Environments , Industrial Ethernet

Unit-2 Real-Time Ethernet for Automation Applications , Introduction , Structure of the IEC Standardization , Real-Time Requirement Hybrid Wired/Wireless Real-Time Industrial Networks , Implementation of Hybrid Networks , IEEE 802.11 -Based Extensions: Fieldbuses, IEEE 802.15.4 Based Extensions: RTE Networks , IEEE 802.15.4 -Based Extensions.

Unit-3 Truly-Wireless Real-Time Sensor/Actuator Introduction, WISA Requirements and System Specifications, Communication Subsystem Design, Medium Access and Retransmission, Frequency Hopping, Antenna Diversity and Switching , Industrial Electromagnetic Interference, Wireless Power Subsystem

Unit-4 Wireless LAN Technology for the Factory Floor, Challenges and Approaches Physical Layer: Transmission Problems and Solution Approaches, Effects on Transmission, Wireless

Unit-5 Transmission Techniques Problems and Solution Approaches on the MAC and Link Layer, Problems for Wireless MAC Protocols , Methods for Combating Channel Errors and Channel Variation

Text Books:
1. Embedded and Networking Systems By Gul N. khan CRC Press Inc
Reference Books:
1. Embedded Systems Handbook Networked Embedded Systems By Richard Zurawski Published July 3, 2009 by CRC Press

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 iii	PEC-VI	EC-415C	Industry & Automotive Network	3	1	0	4

Course Objectives:
The aim of the course to understand the challenges of the global automotive market. Aim to design the complex automotive system, components, processes that meet the specified needs, with appropriate consideration for public health and safety along with social, cultural and environment considerations.

Course Outcomes At the end of the course, the student should be able to:

CO1 Model automotive system for its performance
CO2 Understand the basic components of automotive mechatronics and control systems
CO3 Understand the basics of sensors, actuators and its interaction with automotive parameters
CO4 Identify the use of multiplex networking for automotive applications
CO5 Understand the basics of Bus system

Unit-1 Trends in Automotive Communication Systems: Characteristics and Constraints In-Car Embedded Networks, Middleware Layer, Open Issues for Automotive Communication Systems
Unit-2 Time-Triggered Communication Automotive Domain, Dependability Concepts, Fundamental Services of a Time-Triggered Communication Protocol, Time-Triggered Communication Protocols

Unit-3 Controller Area Networks for Embedded Systems Introduction , CAN Protocol Basics, Schedulability Analysis of CAN Networks, Considerations about CAN , Time-Triggered CAN , CAN open ● CAN open Device Profile for Generic I/O Modules

Unit-4 Flex Ray Communication Technology Introduction, Automotive Requirements, What is Flex Ray?, System Configuration , Standard Software Components

Unit-5 LIN Standard Introduction , The Need , History , LIN Basics , LIN Physical Layer , LIN Protocol, Design Process and Workflow , System Definition Process , Debugging , LIN Network Architect , LIN Target Package , LIN Spector—Test Tool

Text Books:
Automotive In–vehicle Networks by J. Gabriel Leen Wiley–Blackwell
Reference Books:
Guide to Automotive Connectivity and Cybersecurity: Trends, Technologies, Innovations and Applications (Computer Communications and Networks) by Dietmar P.F. Möller , Roland E. Haas

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 iv	PEC-VI	EC-417C	Energy Harvesting Technologies & Power Management for IOT devices	3	1	0	4

Course Objectives:

1 Understanding the various energy sources and Energy harvesting based sensor network
2 Learn about the various piezoelectric materials and non linear techniques
3 Learn various power sources of WSN
4 Learn about the application of WSN

Course Outcomes At the end of the course, the student should be able to:

CO1 Understand the techniques used in Energy Harvesting
CO2 Undersatnd various power sources of WSN
CO3 Undestand the application of piezo materials
CO4 Understand the application of Bio MEMS
CO5 Develop system model for Energy harvesting

Unit-1 ENERGY HARVESTING SYSTEMS Introduction – Energy sources – energy harvesting based sensor networks – photovoltaic cell technologies – generation of electric power in semiconductor PV cells – types

Unit-2 PIEZO-ELECTRIC ENERGY HARVESTING AND ELECTROMECHANICAL MODELING Piezoelectric materials – transducers – harvesters – micro generators – strategies for enhancing the performance of energy harvesters. Electromechanical modeling of Lumped parameter model and coupled distributed parameter models and closed-form solutions

Unit-3 ELECTROMAGNETIC ENERGY HARVESTING AND NON-LINEAR TECHNIQUES Basic principles – micro fabricated coils and magnetic materials – scaling – power maximations – micro and macro scale implementations. Non-linear techniques – vibration control & steady state cases

Unit-4 ENERGY HARVESTING WIRELESS SENSORS Power sources for WSN – Power generation – conversion – examples – case studies. Harvesting microelectronic circuits – power conditioning and losses

Unit 5 SELECTED APPLICATIONS OF ENERGY HARVESTING SYSTEMS Case studies for implanted medical devices – Bio-MEMS based applications – harvesting for RF sensors and ID tags – powering wireless SHM sensor nodes

Text Books:

1. Danick Briand, Eric Yeatman, Shad Roundy ,"Micro Energy Harvesting"

Reference Books:

1. Carlos Manuel Ferreira Carvalho, Nuno Filipe Silva Veríssimo Paulino, "CMOS Indoor Light Energy Harvesting System for Wireless Sensing Applications", springer

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4 i	PEC VII	EC-419C	SDN & NFV	3	1	0	4

Course Objectives: The aim of the course is to give the students a deep understanding of two important, emerging network technologies: Software Defined Networking (SDN) and Network Functions Virtualization (NFV)

Course Outcomes At the end of the course, the student should be able to:
CO1 describe the key benefits of SDN, in particular those benefits brought about by the separation of data and control planes
CO2 explain in detail the operation of the SDN control plane
CO3 describe Network Functions Virtualization components and how they work together
CO4 configure an example service using SDN and NFV
CO4 program a sample SDN for a given task

Unit-1 Introduction Motivation and concepts, Software-Defined Networking (SDN) and Open Flow, NFV concept

Unit-2 SDN and Open flow Architecture Network architecture, Controllers, switches and protocols, The Open Flow protocols Open Flow ports, Open flow tables, Open Flow channels & messages

Unit-3 SDN deployment models Symmetric vs asymmetric, Floodless vs flood-based, Host-based vs Network-centric, Centralized vs Distributed Control Open Flow, Flow Routing vs. Aggregation

Unit-4 Network Functions Virtualization (NFV) Basics Network architecture , NFV Infrastructure , NFV Management and Orchestration (MANO) , NFV and SDN

Unit-5 Security Requirements - SDN Security - NFV Security - ETSI Security Perspective - IoT Security - The Patching Vulnerability - IoT Security and Privacy Requirements Defined by ITU-T - An IoT Security Framework - The Impact of the New Networking on IT Careers

Text Books:
SDN and NFV Simplified: A Visual Guide to Understanding Software Defined Networks and Network Function Virtualization by Jim Doherty Addison-Wesley; 1st edition
Reference Books:
Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud William Stallings Addison-Wesley Professional1st Edition

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4 ii	PEC-VII	EC-421	Fault Tolerance System Design	3	1	0	4

Course Objectives: The aim of the course is to enumerate the need and necessity to consider fault tolerant design in digital systems, Carry out assessment of the relationship between software testing, residual defects and security vulnerabilities.

Course Outcomes At the end of the course, the student should be able to:

CO1 To understand the fault tolerant design principles
CO2 To identify the requirement of fault tolerant systems
CO3 To understand fault tolerant distributed systems and its requirement
CO4 To design algorithms for fault tolerant systems
CO5 To Designing and implementing fault tolerant systems for different applications

Unit-1 Basic concepts of Reliability: Failures and faults, Reliability and failure rate, Relation between reliability & mean time between failure, Maintainability & Availability, reliability of series and parallel systems. Modeling of faults. Test generation for combinational logic Circuits: conventional methods (path sensitization, Boolean difference), Random testing, transition count testing and signature analysis.

Unit-2 Fault Tolerant Design-I: Basic concepts ,static,(NMR,use of error correcting codes), dynamic, hybrid and self-purging redundancy, Sift-out Modular Redundancy (SMR), triple modular redundancy, SMR reconfiguration.

Unit-3 Fault Tolerant Design-II: Time redundancy, software redundancy, fail-soft operation, examples of practical fault tolerant systems, introduction to fault tolerant design of VLSI chips.
Unit-4 Self-checking circuits: Design of totally self-checking checkers, checkers using m-out of a codes, Berger codes and low cost residue code, self-checking sequential machines, partially self-checking circuits. Fail safe Design: Strongly fault secure circuits, fail-safe design of sequential circuits using partition theory and Berger codes, totally self-checking PLA design.
Unit-5 Design for testable combination logic circuits: Basic concepts of testability, controllability and observability. The Read-Muller expansion technique, level OR-AND-OR design, use of control and syndrome-testing design. Built-in-test, built-in-test of VLSI chips, design for autonomous self-test, design in testability into logic boards.

Text Books:

1. D. K. Pradhan, "Fault-Tolerant Computing, Theory and Techniques", Prentice-Hall, 1998.
2. Konad Chakraborty & Pinaki Mujumdar, Fault tolerance and Reliability Techniques for high – density random – access memories Reason, 2002.

Reference Books:

1. N.N. Biswas, Logic Design Theory, PHI 1990
2. Israel Koren and C. Mani. Krishna, "Fault Tolerant Systems", Elsevier.2007.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
4 iii	PEC-VII	EC-423C	IOT Using RFID and microcontroller	3	1	0	4

Course Objectives: This course helps to learn RFID's basic technology and 8051 microcontrollers for designing general purpose applications.
Course Outcomes At the end of the course, the student should be able to:
CO1 learn the basics of RFID and 8051 microcontrollers
CO2 learn Interfacing RFID with microcontrollers
CO3 develop real time applications based on microcontrollers
CO4 Analyze different case studies.
CO5 develop library management system

Unit-1BAR CODES AND RFID Bar codes and RFID basics- Components of an RFID system-Data - Tags-Antennas Connectors- Cables- Readers- encoder/ printers for smart labels- controllers software- RFID advantages over Bar codes

Unit-2 MICROCONTROLLERS Intel 8051 - architecture- memory organization- special function registers- timing and control- port operation- memory interfacing - I/O interfacing- Programming the 8051 resources- interrupts- Measurement of frequency, period and pulse width of a signal power down operation

Unit-3 INTEL 8051 MICROCONTROLLER- INSTRUCTION SET AND PROGRAMMING
Programmers model of Intel-Operand types- Operand addressing- Data transfer instructions- Arithmetic Instructions - Logic instructions- Control transfer instructions.- 8051 Interfacing and applications.

Unit-4 RFID APPLICATIONS Short range RFID applications- access control - personal identification – Transportation ticketing- blood , tissue and organ identification- fleet management personal identification- car body production-passport security. Long range RFID applications- supply chain management- Mail and Shipping- Clothing Tags.

Unit 5 CASE STUDIES Reading RFID cards using 8051- RFID in the supply chain- Vehicles parking using RFID- library management system- electronic toll payment- smart shipping containers fleet monitoring and management.

Text Books:
1. Dennis E. Brown, "RFID implementation" Tata McGraw - Hill, 2007
Reference Books:
2. Steven Shepard, "RFID: Radio frequency and Identification", Tata McGraw - Hill.
3. Ajit Pal, "Microcontrollers- principles and applications", prentice hall of India, 2011
4. Krishna Kant. "Microprocessors and Microcontrollers", prentice hall of India, 2011

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5 i	PEC-VIII	EC-425	Satellite Communication	3	0	0	3

Course Objectives: The course aims to provide a comprehensive understanding of satellite Communication to perform and verify link budget equations. It also discusses the modulation and multiplexing techniques for satellite, link and application areas of the satellite.

CO1Explain the orbits of satellites, satellite mechanism, satellite hardware and Earth station design.
CO2 Describe the concepts of signal propagation effects, frequency and noise considerations, which affect satellite link design.
CO3 Investigate various multiple access techniques used for satellite communication.
CO4 Describe the fundamentals underlying the operation of VSAT systems and MSAT
CO5 Learn the satellite link design

Unit-1 PRINCIPLES OF SATELLITE COMMUNICATION: Evolution and growth of communication satellite; Synchronous satellite; Satellite frequency allocation and Band spectrum; Advantages of satellite communication; Active and Passive satellite; Modem and Codec. Applications of satellite communication.

Unit-2 COMMUNICATION SATELLITE LINK DESIGN Introduction; General link design equations; System noise temperature; C/N and G/T ratio; Atmospheric and Ionospheric effects on link design; Complete link design; Earth station parameters.

ANALOG SATELLITE COMMUNICATION: Introduction; Baseband analog(Voice) signal; FDM techniques; S/N and C/N ratio in frequency modulation in satellite link; S/N ratio in FM with multiplexed telephone signal in satellite link; Single channel per carrier(SCPC) systems; Companded single sideband (CSSB) systems; Analog FM/FDM TV satellite link; Intermodulation products and their effects in FM/FDM systems; Energy disposal in FM/FDM systems.

Unit-3 DIGITAL SATELLITE COMMUNICATION Advantages of digital communication; Elements of digital satellite communication systems; Digital baseband signals; Digital modulation techniques; Satellite digital link design; Time Division Multiplexing.

MULTIPLE ACCESS TECHNIQUES: Introduction; TDMA; TDMA-Frame structure; TDMA-Burst structure; TDMA-Frame efficiency; TDMA super frame; TDMA-Frame acquisition and Synchronization; TDMA compared to FDMA; TDMA Burst Time Plan; Multiple Beam (Satellite switched) TDMA satellite system; Beam Hopping (Transponder Hopping) TDMA; CDMA and hybrid access techniques.

Unit-4 SATELLITE ORBITS Introduction; Synchronous orbit; Orbital parameters; Satellite location with respect to earth; Look angles; Earth coverage and slant range; Eclipse effect; Satellite placement in geostationary orbit; station keeping; Satellite stabilization.

Unit-5 SPECIAL PURPOSE COMMUNICATION SATELLITES: BDS; INMARSAT; INTELSAT; VSAT (data broadband satellite); MSAT (Mobile Satellite Communication technique); Sarsat (Search and Rescue satellite) and LEOs (Lower earth orbit satellite); Satellite communication with respect to Fiber Optic Communication;

Text Books:

1. Aggarwal, D.C., "Satellite Communication", Khanna, 5th Edition, 2001.

Reference Books:

1. Gagliardi, "Satellite Communication", 4th Edition, CBS Publications, 2003.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5 ii	PEC	EC-427C	Embedded Control System	3	0	0	3

Course Objectives: This course is intended to explain the various concepts used in embedded control systems. Students will also familiarize with real time operating systems.
Course Outcomes At the end of the course, the student should be able to:
CO1Explain the concept of embedded Systems and its architecture
CO2 Elucidate the concept of programming for different interfacing devices
CO3 Analyze various software and hardware tools
CO4 Explain real-time operating systems
CO5 Implement Different sensors
Unit-1 CONTROL SYSTEM BASICS Z-transforms – performance requirements - block diagrams - analysis and design - sampling theory – difference equations.
Unit-2 CONTROL SYSTEM IMPLEMENTATION Discretization method – Fixed point mathematics – Nonlinear controller elements – Gain scheduling – Controller implementation and testing in Embedded Systems.
Unit-3 CONTROL SYSTEM TESTING Software implications - Controller implementation and testing in embedded systems - Measuring frequency response.
Unit-4 INPUT DEVICES Keyboard basics - Keyboard scanning algorithm - Character LCD modules - LCD module display Configuration - Time-of-day clock - Timer manager - Interrupts - Interrupt service routines - Interrupt-driven pulse width modulation. Triangle waves analog vs. digital values - Auto port detect - Capturing analog information in the timer interrupt service routine - Automatic, multiple channel analog to digital data acquisition.
Unit-5 OUTPUT DEVICES AND SENSORS H Bridge – relay drives - DC/ Stepper Motor control – optical devices. Linear and angular displacement sensors: resistance sensor – induction displacement sensor – digital optical displacement sensor – pneumatic sensors. Speed and flow rate sensors: electromagnetic sensors – fluid flow sensor – thermal flow sensor. Force sensors: piezoelectric sensors – strain gauge sensor – magnetic flux sensor – inductive pressure sensor – capacitive pressure sensor. Temperature sensors: electrical – thermal expansion – optical Case Study- Examples for sensor, actuator, and control circuits with applications.
Text Books:
1. Jim Ledin, “Embedded control systems in C/C++”, CMP Books, 2004.
2. Tim Wiscott, “Applied control for embedded systems”, Elsevier Publications, 2006.
Reference Books:
1. Jean J. Labrosse, “Embedded Systems Building Blocks: Complete and Ready-To-Use Modules in C”, The publisher, Paul Temme, 2011.
2. Ball S.R., “Embedded microprocessor Systems - Real World Design”, Prentice Hall, 2002.
3. Lewin A.R.W. Edwards, “Open source robotics and process control cookbook”, Elsevier Publications, 2005.
4. Ben-Zion Sandler, “Robotics”, Elsevier Publications, 1999.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
5 iii	PEC	EC-429C	5G Technology & Applications	3	0	0	3

Course Objectives:

1. Learning the Basics of 5G and Beyond Wireless communication
2. Providing a basic understanding of the key technologies and enablers of 5G and beyond communication systems.
3. Study of 5G wireless channel models
4. Learning 5G techniques e.g. massive MIMO. mm Wave etc.

Course Outcomes At the end of the course, the student should be able to:

CO1Distinguish and understand the major cellular communication standards (1G/2G/3G/4G/5G/6G systems) and wireless communications networks.

CO2 Understand the 5G techniques e.g. massive MIMO. mmWave etc. for the design of communication systems.

CO3 Characterize and analyze various modulation and multiplexing techniques e.g. OFDM, NOMA etc.

CO4 Applications of Machine Learning in 5G Wireless Communications.

CO5 Understand V2V communication

Unit-1 Introduction Unit-1 5G: An Introduction, What is 5G, Why 5G, Roadmap to 5G, End-to-end 5G ecosystem, Salient Features of 5G

Unit-2 5G: A Technology Overview , 5G technical objectives, How 5G will differ from 4G , 5G requirements for RAN: Bandwidth, power, spectral efficiency, new technology adaptation, latency, signaling load, capacity, coverage, interference, mobility , 5G requirements for Core: Network topology, cloud architectures, big data analytics , 5G service platforms

Unit-3 5G Business Vision 5G business landscape , Expectations and predictions , How 5G, M2M, and IoT tie together, 5G technology drivers: Major equipment vendor proposals (Ericsson, Huawei, Nokia, Samsung, etc.) 5G technology drivers: Major operator perspective (Vodafone, Telia, DoCoMo, Verizon, AT&T, etc.)

Unit-4 5G Standards , 3GPP standards for 5G: Features and technical proposals, 5GPPP partnership , 5G Americas , Chinese alliance , IEEE approach , ETSI , ITU-T , LPWAN approach , European Union FP7

Unit-5 5G Wireless Applications , Smart cities , Smart agriculture , Green technologies , The Li-Fi scenario of indoor 5G internet , The LPWAN cases , Wearable devices and smart personal body nets , E-health over 5G , Vehicular (V2V) communication , Intelligent Transportation Systems (ITS) , Industrial smart meters: SCADA , e-monitoring.

Text Books:

1. R. Vannithamby and S. Talwar, Towards 5G: Applications, Requirements and Candidate Technologies. John Willey & Sons, West Sussex, 2017.
2. Manish, M., Devendra, G., Pattanayak, P., Ha, N., 5G and Beyond Wireless Systems PHY Layer Perspective, Springer Series in Wireless Technology

Reference Books:

1.T. S. Rappaport, R. W. Heath Jr., R. C. Daniels, and J. M. Murdock,, Millimeter Wave Wireless Communication., Pearson Education, 2015.
2.M. Vaezi, Z. Ding, and H. V. Poor,, Multiple Access techniques for 5G Wireless Networks and Beyond., Springer Nature, Switzerland, 2019

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
6 i	PCC	EC-453C	Electronics System Design Lab	0	0	2	1

Course Objectives:
To understand the design procedure of different power supplies.
To know to design trans receiver and voltage regulator.
To understand the working of Microprocessor and DSP based system design
Course Outcomes At the end of the course, the student should be able to:

- **CO1** Design different forms of power supply.
- **CO2** Design Voltage regulators
- **CO3** AM/FM trans receiver.
- **CO4** Know the design procedure of Instrumentation amplifier and Digital Indicator.
- **CO5** Understand the working of modems and timers.

List of Experiments
1. OP AMP applications as Adder, Subtrator, Comparator circuits
2. Active filter application as LPF & HPL of first order
3. To analyze function generator using operational amplifier for Sine, Triangular and square wave
4. IC 555 Time Mostable and Astable operation Circuit
5. IC-566 VCO applications
6. Voltage regulator using IC-723
7. 4 Bit DAC using OP AMP
8. D Flip flop using IC 7474
9.4-Bit comparator 7485
10 3 to 8 Decoder 74138

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
8 i	PEC	EC-475C	Satellite Communication Lab	0	0	2	1

Course Objectives:

1. This course will introduce the basic concepts and techniques of Satellite communication and frequency allocations.
2. The course emphasizes intuitive understanding and practical implementations of the theoretical concepts.
3. To produce graduates who understand how to analyze and manipulate digital signals and to determine the orbital issues to have the fundamental knowledge to do so, for navigation and GPS

Course Outcomes At the end of the course, the student should be able to:

CO1 Able to obtain different types of satellites

CO2 Ability to calculate the orbital determination and launching methods

CO3 Ability to develop commands, monitoring power systems and developments of antennas.

CO4 Able to calculate multiple access techniques like TDMA, CDMA, FDMA,DAMA.

CO5 Able to design antennas to provide Uplink and Down link Frequency.

List of Experiments

1. To set up a satellite communication link and study of change in uplink and downlink frequency
2. To establish an Audio-Video satellite link between Transmitter and Receiver
3. To Study Frequency Hopping Spread Spectrum (FHSS) Modulation and Demodulation Technique
4. To study generation & demodulation of DSSS modulated signal.
5. To study radiation pattern of Yagi- uda & folded dipole antenna
6. To study radiation pattern for circular & triangular patch antenna
7. Study of Data and PN Sequence Generation
8. To study GPS data like longitude, latitude using GPS receiver
9. Study of Minimum Shift Keying (MSK) Modulation Process

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
7i	PEC	EC-469C	SDN &NFV Lab	0	0	2	1

Objectives

1. Define software-defined radio.
2. Draw a block diagram of a typical SDR receiver and identify each block and explain what it does.
3. State which functions of the receiver are hardware and software
4. Operate the SDR receiver by tuning the receiver.

This lab provides an introduction to Mininet, a virtual testbed used for testing network tools and protocols. It demonstrates how to invoke Mininet from the command-line interface (CLI) utility and how to build and emulate topologies using a graphical user interface (GUI) application. In this lab we will use Container net, a Mininet network emulator fork that allows the use of Docker containers as hosts in emulated network topologies. However, all the concepts covered are bounded to Mininet.

Course Outcomes By the end of this lab, you should be able to:
CO1. Understand what Mininet is and why it is useful for testing network topologies.
CO2. Invoke Mininet from the CLI.
CO3. Construct network topologies using the GUI.
CO4. Save/load Mininet topologies using the GUI.
CO5. Configure the interfaces of a router using the CLI.

1. Installation and Introduction to Mininet.
2. Invoke Mininet using the CLI.
3. Build and emulate a network in Mininet using the GUI.
4. Applying load-balancing within the SDN network.
5. Understand and apply ECMP
6. Utilize the sFlow tool and interact with its components.
7. Study of VPLS architecture
8. Quantitative analysis of SDN
9. The NFV functionality realization by the OPNFV (Open Platform for NFV)
10. Mapping of IaaS and Naas within NFV infrastructure

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
7 ii	PEC	EC-471C	Fault Tolerance System Design Lab	0	0	2	1

Course Outcomes

CO1 an ability to evaluate the dependability of a system

CO2 an ability to analyze a system for performance-dependability tradeoffs

CO3 an ability to select the appropriate detection techniques (hardware and software) for a given environment

CO4 an ability to select the appropriate recovery techniques (hardware and software) for a given environment

CO5 an ability to select the appropriate points in an end-to-end system to embed fault-tolerant techniques

List of Experiments

1.Design for testable combination logic circuits
2. Modeling and simulation based, Fault injection based
3. Practical steps in design of high availability networked systems.
4. Software fault tolerance: Process pairs and robust data structures.
5. Network fault tolerance: Reliable communication protocols.
6. study of Practical Systems for Fault Tolerance
7.Demonstration of error detection and recovery
8. Case studies of reliable system design
9. Study of support for error detection and recovery in the OS
10.Design of Reliable networked systems

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
7 iii	PEC	EC-473C	IOT Using RFID and microcontroller Lab	0	0	2	1

Course Objectives:

1	To learn programing of Arduino board
2	To learn website designing and publishing
3	To design Home automation system

Course Outcomes At the end of the course, the student should be able to:

CO1	Program the Arduino Board
CO2	host website
CO3	deal with gas Sensor
CO4	learn Interfacing of LCD display with Arduino
CO5	design home automation projects

List of Experiments

1	Design an application to update the sensed value to a HTTP webpage using node -RED on IBM Cloud.
2	Assignment of IPV4 address; perform a ping operation to the PC.
3	Simulate & Write a program to blinks pin 13 of the Arduino.
4	Write a program to control the rotation of servo motor using Arduino.
5	Interfacing Temperature sensor with Arduino.
6	Interfacing of 16 *2 LCD Display with Arduino UNO.
7	Temperature Data logger using ESP 8266 & LM35 & monitoring using thing speak IOT server.
8	Interfacing of Gas sensor MQ 2 with Arduino UNO.
9	Interfacing of Moisture sensor with Arduino UNO.
10	Use an Arduino & an Ultrasonic sensor to make a door Alarm.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
9	OEC	CS-303C	Artificial Intelligence	3	0	0	3

Course Objectives: The aim of Artificial Intelligence & Machine Learning course is to prepare students for career in computer science & engineering where knowledge of AI & ML techniques leading to the advancement of research and technology. Artificial Intelligence and Machine Learning are the terms of computer science. Machine Learning is the learning in which machine can learn by its own without being explicitly programmed. It is an application of AI that provide system the ability to automatically learn and improve from experience.

Course Outcomes At the end of the course, the student should be able to:

CO1 Define the concept of Artificial Intelligence.

CO2 Apply AI techniques to real-world problems to develop intelligent systems.

CO3 Select appropriately from a range of techniques when implementing intelligent systems.

CO4 Solve basic AI based problems.

CO5 Demonstrate proficiency in applying scientific method to models of machine learning

Unit-1 Overview and Search Techniques Introduction to AI, Problem Solving,State space search, Blind search: Depth first search, Breadth first search, Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search,Constraint satisfaction problem; Game tree, Evaluation function, Mini-Max search,Alpha-beta pruning, Games of chance.

Unit-2 Knowledge Representation (KR) Introduction to KR, Knowledge agent,Predicate logic, Inference rule & theorem proving forward chaining, backward chaining,resolution; Propositional knowledge, Boolean circuit agents; Rule Based Systems,Forward reasoning: Conflict resolution, backward reasoning: Structured KR: Semantic Net - slots, inheritance, Conceptual Dependency.

Unit-3 MODULE 3. Handling uncertainty and Learning Source of uncertainty, Probabilistic inference, Bayes' theorem, Limitation of naïve Bayesian system, Bayesian Belief Network (BBN); Machine learning, Basic principal, Utility of ML Well defined learning system, Challenges in ML, Application of ML.

Unit-4 Learning and Classifier Linear Regression (with one variable and multiple variables), Decision Trees and issue in decision tree,Clustering (K-means,Hierarchical, etc), Dimensionality reduction, Principal Component Analysis, Anomaly detection, Feasibility of learning, Reinforcement learning.

Unit-5 Artificial Neural Networks Introduction, Artificial Perceptron's, Gradient Descent and The Delta Rule, Adaline, Multilayer Networks, Back-propagation Rule back-propagation Algorithm- Convergence; Evolutionary algorithm,Genetic Algorithms – An Illustrative Example, Hypothesis Space Search, Swarm intelligence algorithm.

Text Books:

1. David Barton .K, "Modern Radar System Analysis", Artech House, 1988.

3.Artificial Intelligence by Elaine Rich and Kevin Knight, Tata MeGraw Hill

4. Understanding Machine Learning. Shai Shalev-Shwartz and Shai Ben-David.Cambridge University Press.

5. Artificial Neural Network, B. Yegnanarayana, PHI, 2005

Reference Books:

1.Christopher M. Bishop. Pattern Recognition and Machine Learning (Springer)

2. Introduction to Artificial Intelligence and Expert Systems by Dan W. Patterson, Prentice Hall of India

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
10	PROJ	EC-491C	Major Project	0	0	4	2

The object of Project Work II & Dissertation is to enable the student to extend further the Investigative study taken up under EC P1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or
Jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
1. In depth study of the topic assigned in the light of the Report prepared under Project work-I;
2. Review and finalization of the Approach to the Problem relating to the assigned topic;
3. Preparing an Action Plan for conducting the investigation, including team work;
4. Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
5. Final development of product/process, testing, results, conclusions and future directions;
6. Preparing a paper for Conference presentation/Publication in Journals, if possible;
7. Preparing a Dissertation in the standard format for being evaluated by the Department.
8. Final Seminar Presentation before a Departmental Committee.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
11	HSMC	PDP-401	Campus to Corporate	0	0	2	1

COURSE OUTCOMES: Students will be able to:

- CO1: Enhance their performance, minimize errors and promote collaboration with their coworkers, enabling them to perform their role more effectively.
- CO2: Improve their thinking, listening and speaking skills and promote level of self-confidence.
- CO3: Critically analyse the internal and external environments in which businesses operate and assess their significance for strategic planning

Unit Wise Syllabus:

UNIT 1 –Employability Quotient - Resume Writing, Types of Resume, Profile Building Resume Writing Practice
UNIT 2 – Group Discussion – Definition of GD, Difference between GD and debate, Do's and don'ts of GD. Mock GD sessions

UNIT 3 – Interview Skills – Facing Personal, Technical & HR, FAQ and their answers Mock interviews

UNIT 4 – Organizational Skills at Work place – focus & productivity, delegation, resource management & management skills

UNIT 5 – Corporate Policies, Corporate Life, Corporate Etiquette Corporate Truths for every Fresher

UNIT 6 – Presentation Skills – how to prepare an effective Presentation Skills, do and don'ts of presentation. Mock presentations

SYLLABUS
B.TECH – 4th Year, 8th Semester

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
1	PROJ	EC-483C	Internship /Dissertation Phase	0	0	32	16

Course Objectives:

1.To enhance employ ability skills and become job ready along with real corporate exposure.
2.To enhance students' knowledge in core study.
3.To Increase self-confidence of students and helps in finding their own proficiency
4.To cultivate student's leadership ability and responsibility to perform or execute the given task.
5.To provide knowledge of a real job situation.

Course Outcomes At the end of the course, the student should be able to:

CO1 Capability to acquire and apply fundamental principles of engineering
CO2 Become updated with all the latest changes in technological world
CO3 To be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills
CO4 Ability to identify, formulate and model problems and find engineering solution based on a systems approach
CO5 capability and enthusiasm for self-improvement through continuous professional development and life-long learning

Minimum of five months in an Industry in the area of Computer & Electronics Engineering. The internship should give exposure to the practical aspects of the discipline. In addition, the Student may also work on a specified task or project which may be assigned to him/her. The outcome of the internship should be presented in the form of a report.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
2	PROJ	EC-484	Seminar based on Internship	0	0	2	1

Course Objectives: The objective of the seminar is to impart training to the students in collecting materials on a specific topic in the broad domain of Engineering/Science from books, journals and other sources, compressing and organizing them in a logical sequence, and presenting the matter effectively both orally and as a technical report.

Course Outcomes At the end of the course, the student should be able to:

CO1Organize and illustrate technical documentation with scientific rigor and adequate literal standards on the chosen topic strictly abiding by professional ethics while reporting results and stating claims
CO2 Demonstrate communication skills in conveying the technical documentation via oral

presentations using modern presentation tools.
CO3 To impart training to students to face audience and present their ideas and thus creating in them self esteem and courage that are essential for engineers.
CO4 To assess the debating capability of the student to present a technical topic.
CO5 To learn real working condition and technologies of Industry.
Individual students are required to choose a topic of their interest from their Internship or related topics and give a seminar on that topic lerned while their intership duration . A committee consisting of at least three faculty members preferably Expertise in respective fields shall assess the presentation of the seminar and award marks to the students.
Each student shall submit two copies of a write up of his/her seminar topic. One copy shall be returned to the student after duly certifying it by the chairman of the assessing committee and the other will be kept in the departmental library. Internal continuous assessment marks are awarded based on the relevance of the topic, presentation skill, quality of the report and participation.

SN	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 i	PEC	EC-402C	Cryptography &Network Security	3	0	0	3

Course Objectives:

1. To understand basics of Cryptography and Network Security.
2. To be able to secure a message over insecure channel by various means.
3. To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
4. To understand various protocols for network security to protect against the threats in the networks.

Course Outcomes At the end of the course, the student should be able to:

CO1 Provide security of the data over the network.
CO2 Do research in the emerging areas of cryptography and network security.
CO3 Implement various networking protocols.
CO4 Protect any network from the threats.
CO5 Designing of Security system

Unit-1 CONVENTIONAL AND MODERN ENCRYPTION Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher Principles DES – Strength of DES – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC4 - Differential and linear cryptanalysis – Placement of encryption function – traffic confidentiality.
Unit-2 PUBLIC KEY ENCRYPTION Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermet's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm – Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography.
Unit-3 AUTHENTICATION requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS.
Unit-4 SECURITY PRACTICE Authentication applications – Kerberos – X.509 Authentication services - E-mail security – IP security - Web security

Unit 5 SYSTEM SECURITY Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

Text Books:

1. William Stallings, "Cryptography & Network Security", Pearson Education, Fourth Edition 2010.

Reference Books:

1. Charlie Kaufman, Radia Perlman, Mike Speciner, "Network Security, Private communication in public world", PHI Second Edition, 2002.
2.Bruce Schneier, Neils Ferguson, "Practical Cryptography", Wiley Dreamtech India Pvt Ltd, First Edition, 2003.
3. Douglas R Simson "Cryptography – Theory and practice", CRC Press, First Edition, 1995.
4. www.williamstallings.com/Security2e.html 5. www.ocw.mit.edu/OcwWeb/Electrical-Engineering-and-Computer-Science/ 6857Fall2003/Course Home /index.html

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S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 ii	PEC	EC-404C	Telecommunication Switching Method	3	0	0	3

Course Objectives: This subject aims at introducing to the students the knowledge about the telecommunication industry: its services and market, the theoretical basis about performance (queuing theory) and operation (multiplexing, switching, routing, and signaling) in telecom networks.

Course Outcomes At the end of the course, the student should be able to:

CO1Describe and apply fundamentals of telecommunication systems and associated technologies.

CO2 Apply the principles of queuing theory in evaluating the performance of congested telecommunication networks.

CO3 Solve problems and design simple systems related to tele-traffic and trunking efficiency.

CO4 Understand and explain the reasons for switching, and the relative merits of the possible switching modes, e.g. packet and circuit switching.

CO5 Understand the principles of the internal design and operation of telecommunication switches, and the essence of the key signaling systems that are used in telecommunication networks

Unit-1 Introduction Evolution of Telecommunications, Simple Telephone Communication, Manual switching system, major telecommunication Networks, Stronger Switching System, Crossbar Switching Electronic Space Division Switching: Stored Program Control, Centralized SPC, Distributed SPC, Enhanced Services, Two stage networks, Three stage network n-stage networks.

Unit-2 Time Division Switching Time multiplexed Space Switching, Time Multiplexed time switching, combination Switching, Three stage combination switching, n-stage combination switching. Traffic Engineering: Network Traffic load and parameters, Grade of service and blocking probability, Modelling Switching Systems, Incoming Traffic and Service Time Characterization, Blocking Models and Loss Estimates, Delay systems

Unit-3 Telephone Networks Subscriber Loop Systems, Switching Hierarchy and Routing, Transmission Plan, Transmission Systems, Numbering Plan, Charging Plan, Signaling Techniques, In channel signaling, common channel signaling, Cellular mobile telephony.

Unit-4 Data networks Block Diagram, features, working of EPABX Systems, Data transmission in PSTNs, Data Rates in PSTNs, Modems, Switching Techniques for data Transmission, Circuit Switching, Store and Forward Switching Data communication Architecture, ISO-OSI Reference Model, Link to Link Layers, Physical Layer, Data Link Layer, Network Layer, End to End layers, Transport Layer, Session Layer, Presentation Layer, Satellite based data networks, LAN, Metropolitan Area network, Fiber optic networks, and Data network standards

Unit 5 Integrated Services Digital Networks Motivation for ISDN, New services, Network and Protocol architecture, Transmission Channels, User Network Interface, signaling, Numbering and Addressing, Service characterization, Interworking ,ISDN standards, Broadband ISDN ,Voice data Integration.

Text Books:

1.ThiagarajanVishwanathan/ Telecommunication Switching Systems and Networks/PHI

2.Joseph Y. Hui/Switching and Traffic Theory for Integrated Broad Band Networks/Kleewer publishers, 1990
3.V.E. Benes/Mathematical Theory of connecting Networks & Telephone Traffic/Academic 1965.

Reference Books:

1. G. Hebuterve / Traffic Flow in Switching Systems / Artech House, 1987.
2. J.C. Bellamy/Digital Telephony/John Wiley 2nd Ed., 1992
4. Anders Hellman & Gudrun Bager/ Understanding Telecommunication 1/Printed in Sweden, Student literature, Lund Ericcson Telecom AB, Competence Development centre

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 iii	PEC	EC-406C	Big Data Analysis	3	0	0	3

Course Objectives: The aim of this course is to

1.Understand the Big Data Platform and its Use cases
2.Understand Map Reduce Jobs
3.Provide an overview of Apache Hadoop
4.Provide HDFS Concepts and Interfacing with HDFS
5.Provide hands on Hodoop Eco System
6.Apply analytics on Structured, Unstructured Data.
7.Exposure to Data Analytics with R.

Course Outcomes At the end of the course, the student should be able to:

CO1	Identify Big Data and its Business Implications.
CO2	List the components of Hadoop and Hadoop Eco-System
CO3	Access and Process Data on Distributed File System
CO4	Manage Job Execution in Hadoop Environment
CO5	Develop Big Data Solutions using Hadoop Eco System

Unit-1 INTRODUCTION TO BIG DATA AND HADOOP Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analyzing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Info sphere Big Insights and Big Sheets.

Unit-2 HDFS(Hadoop Distributed File System) The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

Unit-3 Map Reduce Anatomy Map Reduce Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

Unit-4 Hadoop Eco System Pig Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. Hive : Hive Shell, Hive Services, Hive Megastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase : HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. Big SQL : Introduction

Unit 5 Data Analytics with R Machine Learning Data Analytics with R Machine Learning : Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with BigR.

Text Books:

1.Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015. References
3. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.

4.Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)

Reference Books:

1. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press
2. Anand Rajaraman and Jef rey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012
3.Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
4.Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 iv	PEC	EC-408C	Industry 4.0 and industrial internet of things	3	0	0	3

Course Objectives:

1. Knowledge for the design and analysis of Industry 4.0Systems for Electronics Engineering students.
2. To provide students with good depth of knowledge of Designing Industrial IOT Systems for various application.

Course Outcomes At the end of the course, the student should be able to:

CO1 Knowledge of theory and practice related to Industrial IoT Systems

CO2 Ability to identify, formulate and solve engineering problems by using Industrial IoT.

CO3 Ability to implement real field problem by gained knowledge of Industrial applications with IoT capability.

CO4 to deal with Security Issues Related to Undustry 4.0

CO5 identify UAVs related Issues

Unit-1 INDUSTRY 4.0 Cyber Physical Systems and Next Generation Sensors, Collaborative Platform and Product Lifecycle Management, Augmented Reality and Virtual Reality, Artificial Intelligence, Big Data and Advanced Analysis

Unit-2 INDUSTRIAL IoT IIoT-Introduction, Industrial IoT: Business Model and Reference Architecture: IIoT-Business Models, Industrial IoT- Layers: IIoT Sensing, IIoT Processing, IIoT Communication, IIoT Networking

Unit-3 IIoT ANALYTICS Big Data Analytics and Software Defined Networks, Machine Learning and Data Science, Julia Programming, Data Management with Hadoop.

Unit-4 IoT SECURITY Industrial IoT: Security and Fog Computing - Cloud Computing in IIoT, Fog Computing in IIoT, Security in IIoT

Unit 5 CASE STUDY Industrial IoT- Application Domains: Oil, chemical and pharmaceutical industry, Applications of UAVs in Industries, Real case studies: Milk Processing and Packaging Industries, Manufacturing Industries

Text Books:

1. Industry 4.0: The Industrial Internet of Things", by Alasdair Gilchrist (Apress), 2017
2. "Industrial Internet of Things: Cyber manufacturing Systems "by Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat (Springer), 2017

Reference Books:

Hands-On Industrial Internet of Things: Create a powerful Industrial IoT by Giacomo Veneri, Antonio Capasso, Packt, 2018

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 v	PEC	EC-410C	Deep Learning	3	0	0	3

Course Objectives: The aim of this course is to

1.understand complexity of Deep Learning algorithms and their limitations

2.understand modern notions in data analysis oriented computing;

3.applying common Deep Learning algorithms in practice and implementing their own

4.perform distributed computations

5. perform experiments in Deep Learning using real-world data.

Course Outcomes At the end of the course, the student should be able to:

CO1 Understand the concepts of Tensor Flow, its main functions, operations and the execution pipeline

CO2 Implement deep learning algorithms, understand neural networks and traverse the layers of data abstraction which will empower the student to understand data more precisely

CO3 Learn topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces

CO4 Understand the language and fundamental concepts of artificial neural networks

CO5 Troubleshoot and improve deep learning models

Unit-1 Introduction Feed forward Neural networks. Gradient descent and the backpropagation algorithm. Unit saturation, aka the vanishing gradient problem, and ways to mitigate it. RelU Heuristics for avoiding bad local minima. Heuristics for faster training. Nestors accelerated gradient descent. Regularization. Dropout.

Unit-2 Convolutional Neural Networks Convolutional Neural Networks Architectures, convolution / pooling layers Recurrent Neural Networks LSTM, GRU, Encoder Decoder architectures Deep Unsupervised Learning Autoencoders (standard, sparse, denoising, contractive, etc), Variational Autoencoders, Adversarial Generative Networks, Autoencoder and DBM Attention and memory models,

Unit-3 Dynamic memory networks Applications of Deep Learning to Computer Vision Image segmentation, object detection, automatic image captioning, Image generation with Generative adversarial networks, video to text with LSTM models. Attention models for computer vision tasks. Applications of Deep Learning to NLP: Introduction to NLP

Unit-4 Vector Space Model of Semantics Word Vector Representations: Continuous Skip-Gram Model, Continuous Bag-ofWords model (CBOW), Glove, Evaluations and Applications in word similarity, analogy reasoning Named Entity Recognition, Opinion Mining using Recurrent Neural Networks Parsing and Sentiment Analysis using Recursive Neural Networks

Unit 5 NLP Sentence Classification using Convolutional Neural Networks Dialogue Generation with LSTMs Applications of Dynamic Memory Networks in NLP Recent Research in NLP using Deep Learning: Factoid Question Answering, similar question detection, Dialogue topic tracking, Neural Summarization, Smart Reply

Text Books:

1. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016.

2. Golub, G.,H., and Van Loan,C.,F., Matrix Computations, JHU Press,2013.

3. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education,2004.

Reference Books:

1. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 vi	PEC	EC-412C	Wireless Sensor Network	3	0	0	3

Course Objectives: This course covers the challenges and the latest research results related to the design and management of wireless sensor networks (WSNs). WSNs have recently gained tremendous popularity due to the wide range of applications they can be used for such as disaster management, military, building and road monitoring, health care, etc. WSNs are infrastructures wireless networks that are significantly constrained in the amount of available resources such as energy, storage and computation

Course Outcomes At the end of the course, the student should be able to:

CO1 Design a wireless sensor network for given sensor data using microcontroller, transceiver, middleware and operating system.

CO2 Evaluate the performance of schedule based and random Medium Access Control protocols for power consumption, fairness, channel utilization and control packet overhead.

CO3 Evaluate the performance of Geographic routing protocols for power consumption, scalability and latency parameters.

CO4 Evaluate the performance of transport control protocols for congestion detection and avoidance, reliability and control packet overhead parameters.

CO5 Understand and explain mobile data-centric networking principles.

Unit-1 FUNDAMENTALS OF SENSOR NETWORKS Introduction to computer and wireless sensor networks and Overview of the syllabus Motivation for a network of Wireless Sensor nodes- Sensing and sensors-challenges and constraints - node architecture-sensing subsystem, processor subsystem communication interfaces- prototypes, Application of Wireless sensors- Introduction of Tiny OS Programming and TOSSIM Simulator.

Unit-2 COMMUNICATION CHARACTERISTICS AND DEPLOYMENT MECHANISMS Wireless Transmission Technology and systems-Radio Technology Primer-Available Wireless Technologies - Hardware- Telosb, Micaz motes- Time Synchronization Clock and the Synchronization Problem - Basics of time synchronization-Time synchronization protocols - Localization- Ranging Techniques- Range based Localization-Range Free Localization- Event driven Localization

Unit-3 MAC LAYER Overview-Wireless Mac Protocols-Characteristics of MAC protocols in Sensor networks – Contention free MAC Protocols- characteristics- Traffic Adaptive Medium Access-Y-MAC, Low energy Adaptive Clustering - Contention based MAC Protocols Power Aware Multi-Access with signaling, Sensor MAC-Timeout MAC-Data gathering MAC- Case study –Implementation and Analysis of MAC player protocol in TinyOS.

Unit-4 ROUTING IN WIRELESS SENSOR NETWORKS Design Issues in WSN routing-Data Dissemination and Gathering-Routing Challenges in WSN - Flooding-Flat Based Routing – SAR, Directed Diffusion, Hierarchical Routing- LEACH, PEGASIS - Query Based Routing- Negotiation Based Routing Geographical Based Routing- Transport layer-Transport protocol Design issues Performance of Transport Control Protocols.

Unit 5 MIDDLEWARE AND SECURITY ISSUES WSN middleware principles-Middleware architecture-Existing middleware - operating systems for wireless sensor networks-performance and traffic management - Fundamentals of network security-challenges and

attacks - Protocols and mechanisms for security.

Text Books:

1. Waltenegus Dargie, Christian Poellabauer , "Fundamentals of Wireless Sensor Networks, Theory and Practice", Wiley Series on wireless Communication and Mobile Computing, 2011

Reference Books:

1. Kazem Sohraby, Daniel manoli , "Wireless Sensor networks- Technology, Protocols and Applications", Wiley InterScience Publications 2010.
2. Bhaskar Krishnamachari , " Networking Wireless Sensors", Cambridge University Press, 2005
3. C.S Raghavendra, Krishna M.Sivalingam, Taiebznati , "Wireless Sensor Networks", Springer Science 2004.

S.No.	Category	Course Code	Course Name	Periods			Credit
				L	T	P	
3 vii	PEC	EC-413C	Massive Open Online Courses (MOOCs)	3	0	0	4

Compared with the traditional courses, MOOC has intrinsic characteristics such as **large scale**, openness, networking, personalized and participation, which includes the online learning effectiveness, the mastery learning, the interactive cooperation and the learning mechanism of complex system self-organization core.

It is one of the most amazing innovations in online learning over the past few years has been the growth and development of Massive Open Online Courses (MOOCs). These courses (MOOCs) are the future of Quality Enhancement in Engineering Education (QEEE) and improve self-learning.

MOOCs are college-level courses made available, free of charge or with nominal charges. The students in B.Tech VIII Semester are required to complete one MOOC course by the end of the semester.

https://nptel.ac.in/courses

SCHEME FOR CSE(MCA)

MCA			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCA-101A	Computer Programming	4	0	0	4
2	MCA-102A	Discrete Structures	4	0	0	4
3	MCA-104A	Data Communication and Networking	3	0	0	3
4	MCA-106A	Web Development	4	0	0	4
5	MCA-108A	Data Structures and its application	4	0	0	4
6	MCA-107A	Computer Organization and Architecture	3	0	0	3
7	MCA-151A	Computer Programming Lab	0	0	4	2
8	MCA-154A	Data Communication and Networking Lab	0	0	4	2
9	MCA-156A	Web Development Lab	0	0	4	2
		Total---->	**22**	**0**	**12**	**28**

SCHEME FOR CSE

MCA			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCA-103A	Relational DBMS	3	1	0	4
2	MCA-105A	Object Oriented Programming USING C++	3	0	0	3
3	EN-105A	Technical Communication/ Functional English	3	0	0	3
4	MCA-109A	Operating Systems	3	0	0	3
5	MCA-110A	Analysis and Design of Algorithms	4	0	0	4
6	MCA-111A	Software Engineering Principles	4	0	0	4
7	MCA-153A	Relational DBMS Lab	0	0	4	2
8	MCA-155A	Object Oriented Programming using C++ Lab	0	0	4	2
9	MCA-159A	Operating System lab	0	0	4	2
		Total---->	**20**	**1**	**12**	**27**

SCHEME FOR CSE

MCA			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCA-201A	Computer Graphics and Multimedia	4	0	0	4
2	MCA-206A	Core and Advanced Java	4	0	0	4
3	MCA-208A	Programming Using C#	3	0	0	3
4	MCA-215A	Computer Software Testing	3	0	0	3
5	MCA-218A	Object Oriented Software Engineering & UML	3	0	0	3
6	MCA-219A	Cyber Laws and Intellectual Property Right	3	0	0	3
7	MCA-251A	Computer Graphics and Multimedia Lab	0	0	4	2
8	MCA-256A	Core and Advanced Java Lab	0	0	4	2
9	MCA-258A	Programming using C# Lab	0	0	4	2
		Total---->	**20**	**0**	**12**	**26**

SCHEME FOR CSE (MCA)

MCA			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCA-209A	Data Mining and Data Warehousing	4	0	0	4
2	MCA-213A	Advanced Operating System	3	0	0	3
3	MCA -214A	Soft Computing techniques	4	0	0	4
4	MCA-216A	Cloud Computing	3	0	0	3
5	MCA-220A	Cryptography & Data Compression	3	0	0	3
6	MCA-221A	Big Data Analysis	3	0	0	3
7	MCA-259A	Data Mining and Data Warehousing Lab	0	0	4	2
8	MCA-266A	Cloud Computing Lab	0	0	2	1
9	MCA-271A	Big Data Analysis Lab	0	0	4	2
		Total---->	**20**	**0**	**10**	**26**

MCA			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCA-301A	Artificial Intelligence	3	1	0	4
2	MCA-303A	Introduction to ERP	3	1	0	4
3	CS-407B	**Elective –I** (Natural Language processing)	3	0	0	3
4	MCA-310A	Software project management	3	0	0	3
5	MCA-305A	Data science using Python	3	0	0	3
6	MCA-351A	Artificial Intelligence Lab	0	1	1	2
7	MCA-355A	Data science using Python lab	0	0	2	1
8	MCA-381	Minor project	0	0	4	2
9		**Total---->**	**15**	**3**	**7**	**22**

MCA			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCA-371 A	Internship	0	0	24	12
2	CA-1307A	**Elective-II** (Neural Network)	3	0	0	3
3	MCA-391 A	Seminar	0	0	4	2
4		**Total---->**	**3**	**0**	**28**	**17**

MCA-101 A	COMPUTER PROGRAMMING	L-T-P	Cr
		4-0-0	4

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Know the basic concepts of programming languages as well as operating system

CO2: Learn the basics of programming using C

CO3: undergo the functions and pointers

CO4: Learn about the structures, unions as well as functions using recursion

CO5: Know about the dynamic programming as well as file handling

UNIT I

INTRODUCTION TO COMPUTER SYSTEMS, PROGRAMMING LANGUAGES, OPERATING SYSTEM, NETWORKING, AND SECURITY: Overview of Computer Systems: Characteristics of Computer- speed, storage, Accuracy, Categories of computer- Micro Computers, Mini Computers, Main Frames, Super Computers, Computer Organization- Central processing unit, Arithmetic and Logic Unit, Control Unit, Memory System- Primary memory, secondary memory. Data Representation in a Computer System- Number system - decimal, Binary, Octal, Hexadecimal representation and conversion.

SOFTWARE BASICS: Application software, System Software, Programming languages: Low level languages, Machine language, Assembly language, High Level languages, Translator, Assembler, Interpreter, Compiler, Operating System: Need of Operating System, Function of Operating System, Types of Operating System, Introduction to Networking: Local and Wide Area Networks.

SECURITY THREATS: Intruders, Password Cracking, Types of malicious Software- Virus, Worms, Trojan Horse, Prevention from malicious Software- Antivirus

UNIT II

BASICS OF PROGRAMMING USING C: Problem definition, Representation of Algorithms: Flow charts/ Pseudocode with example, Types of programming languages, Translators, From algorithms to programs; source code, variables and memory location, Introduction to C: Structure of C program, C character set, Identifier and Keywords, Data types, constants, variables, Declaration, Arithmetic expressions & precedence , statements, Symbolic constants, type conversion, Types of operators, Input and output functions in C, header files, common programming errors, Control Statements, Sequencing, Selection, Condition and iteration, Arrays and Strings: Declaring, Referencing and initializing arrays, array subscript, using for loop for sequential access, multi-dimensional array, String basics string library functions, assignment and substring, concatenation, string comparison.

UNIT III

FUNCTIONS AND POINTERS: Definition of function, function prototype, Purpose of main function, passing parameters, Scope of function, recursion, Call by value and reference, Types of storage classes, Scope of variable: Global and local, static variables, Recursion. Pointer variables, initializing pointers, pointer operators, pointer expressions, pointers and arrays, pointer and functions.

UNIT IV

STRUCTURES, UNIONS & RECURSION: Defining a structure, Declaring structure variables, Structure initialization, Copying and Comparing Structure variables, Array of structures, Arrays within structure, nested structures, Unions. Recursion as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

UNIT V

DYNAMIC ALLOCATION, AND FILE HANDLING: C's dynamic allocation functions. Streams and file types, opening and closing a data file, input and output operations, text mode versus binary mode, formatted input output operations with files, random access to files.

REFERENCES

1. Pradeep K. Sinha, Priti Sinha (2004), Computer Fundamentals, BPB Publications, ISBN: 9788176567527.
2. Byron S. Gottfried(1996), Programming with C, McGraw-Hill Education, ISBN:9780070240353.
3. E. Balagurusamy (1990), Programming in C, Tata McGraw-Hill Publishing ISBN: 9780074600474

MCA-102 A	DISCRETE STRUCTURE	L T P	Cr
		4 0 0	4

OBJECTIVES

To lay mathematical foundation for the fundamentals of various computational structures such as Boolean algebra, propositional logic, graph and trees.

PRE-REQUISITES: Knowledge of Data Structure

COURSE OUTCOMES

CO1: Perform operations on various discrete structures such as sets, functions, relations, and sequences.

CO2: Ability to solve problems using Counting techniques, Permutation and Combination, Recursion and generating functions

CO3: Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems.

CO4: Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems.

CO5: Understand the various properties of algebraic systems like Rings, Monoids and Groups

UNIT I

SET THEORY: Introduction to set theory; set operations; algebra of sets: duality, finite and infinite sets, classes of sets, power sets, multi sets, Cartesian product, representation of relations, types of relation, equivalence relations and partitions, partial ordering relations and lattices; function and its types, composition of function and relations; cardinality and inverse relations.

UNIT II

PROPOSITIONAL CALCULUS AND TECHNIQUES OF COUNTING: Basic operations: AND (Λ), OR (V), NOT (~), truth value of a compound statement, propositions, tautologies, contradictions, Permutations with and without repetition, combination.

UNIT III

RECURSION AND RECURRENCE RELATION: Polynomials and their evaluation; sequences, introduction to AP, GP and AG series, partial fractions; linear recurrence relation with constant coefficients; homogeneous solutions, particular solutions, total solution of a recurrence relation using generating functions.

UNIT IV

ALGEBRIC STRUCTURES: Definition and examples of a monoid, semigroup, groups and rings; homomorphism, isomorphism and auto morphism; subgroups and normal subgroups; cyclic groups, integral domain and fields; co-sets; Lag range‘s theorem

UNIT V

GRAPHS: Introduction to graphs, directed and undirected graphs; homomorphic and isomorphic graphs; subgraphs; cut points and bridges; multigraph and weighted graph; paths and circuits, shortest path in weighted graphs; Eulerian path and circuits, Hamilton paths and circuits; planar graphs; Euler‘s formula.

TEXT BOOK

Liu C. L., Elements of Discrete Mathem atics‖, McGraw Hill, 1989

REFERENCE BOOKS

1. Johnson Bough R., —Discrete Mathematics‖, 5th Edition, Pearson Education, 2001
2. Graham Ronald, Knuth Donald E. and Patashik Oren, —Concrete Mathematics: A Foundation for Computer Science‖ , Addison-Wesley, 1989
3. Gersting Judith L., —Mathematical Structures for Computer Science‖, Computer Science Press, 1993
4. Chtewynd A. and Diggle P.. , Discrete Mathem atics‖ , Modular Mathematics Series, Edward Arnold, London, 1995
5. Lipshutz S ., —S chaums Outline series: Theory and problems of Probability‖, McGraw Hill Singapore, 1982
6. Kolm an B. and Busby R. C., —Discrete Mathematical Structures‖, Prentice Hall of India, 1996
7. Trembley and Manohar, —Discrete Mathematical Structures with Applications to Com puters‖, McGraw Hill, 1995

MCA-104 A	DATA COMMUNICATION AND NETWORKING	L-T-P	Cr
		3-0-0	3

OBJECTIVES

To have a fundamental understanding of the design, performance and state of the art of wireless communication systems, Topics covered include state of the art wireless standards and research and thus changes substantially form one offering of this course to the next

PRE-REQUISITES

Knowledge of computers hardware and software

COURSE OUTCOMES

CO1: Understand computer network basics, network architecture, TCP/IP and OSI reference models.

CO2: Identify and understand various techniques and modes of transmission

CO3: Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN

CO4: Describe routing and congestion in network layer with routing algorithms and classify IPV4 addressing scheme

CO5: Discuss the elements and protocols of transport layer. Understand network security and define various protocols such as FTP, HTTP, Telnet, DNS

UNIT I

OVERVIEW OF DATA COMMUNICATION AND NETWORKING: Introduction; Data communications: components, data, direction of data flow, Protocols, Networks: type of connection, topology: Star, Bus, Ring, Mesh, Tree, categories of network: LAN, MAN, WAN: Internet: brief history, Layered architecture of networks, OSI reference model, Functions of each layer, services and protocols of each layer, TCP / IP reference model.

UNIT II

PHYSICAL AND DATA LINK LAYER: Transmission media: Guided media, Unguided media Switching: Circuit switching, packet switching, datagram switching. Error Detection and Correction: Types of errors, detection vs correction, cyclic codes, checksum. Framing: Flow and Error Control, Protocols: Stop &wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ.

UNIT III

MEDIUM ACCESS SUBLAYER RANDOM ACCESS: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, Controlled Access: Reservation, Polling, Channelization: FDMA, TDMA, CDMA, IEEE Standards, Standard Ethernet, Changes in the standard, Fast Ethernet, Gigabit Ethernet

UNIT IV

NETWORK LAYER: Network Devices**:** Active and Passive Hubs, Repeaters, Bridges, Two and Three layer switch, Gateway. Internet Protocol, Transmission Control Protocol, User Datagram Protocol; IP Addressing, IP address classes, subnet addressing, DNS, Internet control protocols: ARP, RARP, ICMP.

UNIT V

TRANSPORT LAYER: Process to process delivery, user datagram protocol, TCP services, features, TCP Connection, flow control, error control and congestion control; Congestion control, Quality of Service, WAN Technologies: Synchronous Digital Hierarchy (SDH) / Synchronous Optical Network (SONET); Asynchronous Transfer Mode (ATM) Frame Relay.

TEXT BOOK

Tanenbaum Andrew S, ―Computer Networks‖, 4th Edition, Pearson Education/Prentice Hall of India, 2003.

REFERENCE BOOKS

1. Forouzan Behrouz A., ―Data Communications and Networking‖, Tata McGraw Hill 2006.
2. Stallings William, ―Data and Computer Com munication‖ , 5th Edition, Prentice Hall of India, 1997.
3. Fred H alsall, ―Data Communications, Computer Networks and Open Systems‖, 4th edition, Addison Wesley, Low Price Edition, 2000
4. Fitzgerald Jerry, ―Business Data Communications‖, Wiley, 2009.
5. Peterson Larry L. and Davie Bruce S., ―Computer Networks – A System Approach‖, 3rd Edition, Morgan Kaufmann, 2003.
6. Tittel E. D., ―Computer Networking‖, Tata McGraw Hill, 2002
7. Kurose James F. and Ross Keith W., ―Computer Networking: A Top-Down Approach Featuring the Internet‖, 2nd Edition, Pearson Education, 2003.
8. Keshav S., ―An Engineering Approach to Computer Networking‖, Addison-Wesley, 1997.
9. Comer D. E., ―Internetworking with TCP/IP‖, Volume 1, 3rd Edition, Prentice Hall of India, 1995.

CA-106A	WEB DEVELOPMENT	L T P	Cr
		4 0 0	5

COURSE OUTCOMES

CO1: Explain the history of the internet and related internet concepts that are vital in understanding web development.

CO2: Discuss the insights of internet programming and implement complete application over the web.

CO3: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.

CO4: Utilize the concepts of JavaScript and Java

CO5: Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.

UNIT I

HYPERTEXT MARKUP LANGUAGE: Plugin's and Helper Application, XML and XHTML, The Anatomy of HTML, Structure and other semantic elements of HTML 4.1,**HTML 5:** HTML responsive, HTML entities, HTML 5 canvas, HTML API, HTML5 Data Storage, HTML5 Plugin's HTML5 Audio and Video, HTML5 Geolocation.

UNIT II

POWER OF CSS: CSS Introduction, Syntax and different CSS properties, CSS3: Rounded Corner, border images, CSS3 transitions and animations, CSS3 multiple columns, CSS3 box sizing, Responsive Web Designing: Introduction, viewport, Grid View, Media Query: add a breakpoint, including breakpoint, orientation, Bootstrap3.

UNIT III

CLIENT SIDEPROGRAMMING: Introduction to JavaScript syntax: output, Comments, variables, functions, operators, conditions, switch, loop; JavaScript event handling, objects and functions, J Query: Introduction, Selectors, J Query Events and Effects, J Query HTML.

UNIT IV

SERVER SIDE PROGRAMMING: Basics of PHP: Installation, syntax, variables, output, data types,operators, conditional loop i.e. if-else, switch; while loop, for loop, multidimensional arrays, Predefined PHP Functions and creating user defined functions; PHP form handling and database connectivity; Managing Sessions: Using Session Variables, Destroying a Session; Cookies: Storing Data in Cookies , Setting Cookies.

UNIT V

AJAX and My SQL: Introduction to AJAX, AJAX Request and Response, AJAX Events, MySQL Introduction, Installation, SQL Syntax: Where, And, OR, Update, Delete, SQL Joins, Create DB, Create Table, SQL Keys, SQL Functions: Avg, Count, Max, Min, Sum, Group By, UCase, LCase, AJAX and PHP.

TEXTBOOK

Uttam K. Roy, "Web Technology", Oxford Publication

REFERENCES

1. Musciano Chuck, "HTML & XHTML: The Definitive Guide", Bill Kennedy, 4th Edition, 2000
2. Holzner Steven, "XHTML Black Book", Paraglyph Press, 2000
3. Uttam K. Roy, "Web Technology", Oxford Publication
4. Kamal Raj, "Internet and Web Technologies", Tata McGraw Hill, 2002
5. GodboleAchyut S. and KahateAtul, "Web Technologies, Tata McGraw Hill, 2003
6. Roger S. Pressman,David Lowe, "Web Engineering".Tata McGraw Hill Publication, 2007

MCA-107A	COMPUTER ORGANIZATION AND ARCHITECHTURE	L T P	Cr
		3-0-0	3

OBJECTIVE

To make the students savvy about hardware, their counterparts and frame constructed with these hardware components

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Explain the organization of basic computer, its design and the design of control unit.
CO2: Demonstrate the working of central processing unit and RISC and CISC Architecture.
CO3: Describe the operations and language of the register transfer, micro-operations and I/O organization.
CO4: Understand the organization of memory and memory management hardware.
CO5: Elaborate advanced concepts of computer architecture, Parallel Processing, inter processor communication and synchronization.

UNIT-I

INTRODUCATION OF COMPUTER & COMPUTER ARITHMETIC: Store Program Concept, Flynn's Classification of computers, Von Neumann Architecture, Generation of Computer, Classification of Computers, Addition And Subtraction With Signed-Magnitude, Multiplication Algorithm, Booth Multiplication Algorithm, Array Multiplier, Division Algorithm, Hardware Algorithm, Divide Overflow, Floating-Point Arithmetic Operations, BCD Adder, BCD Subtraction.

UNIT-II

ORGANIZATION OF A COMPUTER: Stack Organization, Register Stack, Memory Stack, Instruction Formats, Three- Address Instructions, Two – Address Instructions, One-Address Instructions, Zero Address Instructions, RISC Instructions, Addressing Modes Reduced Instruction Set Computer, CISC Characteristics RISC Characteristics.

UNIT-III

INPUT, OUTPUT & MEMORY ORGANIZATION: Modes of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPUIOP Communication, Memory Hierarchy, Main Memory, Auxiliary Memory, Cache Memory, Virtual Memory. Address Space and Memory Space, cache memory: associative &direct mapped cache organizations.

UNIT-IV

PIPELINING & SUPERSCALAR TECHNIQUE: Linear pipeline processor – asynchronous and synchronous model, clocking and timing control, speedup, efficiency and throughput. Nonlinear Pipeline Processor – reservation and latency analysis, collision free scheduling; Instruction Pipeline Design – principles & mechanisms; dynamic instruction scheduling, branch handling techniques, branch prediction. Arithmetic Pipeline Design - computer arithmetic principles, static Arithmetic pipeline.

UNIT-V

MULTIPROCESSOR ARCHITECTURE: Symmetric shared memory architectures, distributed shared memory architectures, models of memory consistency, cache coherence problem, Snoopy cache coherence protocol, directory-based protocols, design challenges of directory protocols, memory-based directory protocols, cache-based directory protocols, protocol design tradeoffs, synchronization,

TEXT BOOKS

1. Kai Hwang, "Advanced computer architecture"; TMH, 1993.
2. "Computer System Architecture", M.Morris Mano

REFERENCES

1. "Computer System Architecture", John. P. Hayes.
2. "Computer Architecture and parallel Processing ", Hwang K. Briggs.
3. D.Sima, T.Fountain, P.Kasuk, "Advanced Computer Architecture-A Design space Approach," Addison Wesley, 1997.

MCA-108 A	DATA STRUCTURES AND ITS APPLICATIONS	L T P	Cr
		4 0 0	4

OBJECTIVE

To give the students knowledge about the data storage using different data structures and implementation using C programming language

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.

CO2: Understand basic data structures such as arrays, linked lists, stacks and queues.

CO3: Describe the hash function and concepts of collision and its resolution methods

CO4: Solve problem involving graphs, trees and heaps

CO5: Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

UNIT I

INTRODUCTION TO DATA STRUCTURES AND C: Introduction to programming – definitions and developing Algorithms and flowcharts for simple programs. Introduction to C Programming: Origin and history of c programming character set, Identifiers and keywords data types, constants, variables, operators, special operators, constants, Expressions, compound statements, structure of C program, Input and output function. Definition of data structures and abstract data types; linear vs. non-linear data types; Static and Dynamic implementations; Arrays; 2; Examples and real life applications. Time Complexity; Asymptotic Notations; Running Times; Best Case; Worst Case; Average Case; Introduction to Recursion.

UNIT II

STACKS AND QUEUES: Definition of Stacks; Array based implementation of stacks; Examples: Infix; postfix; prefix representation; Conversions; Applications; definition of Queues; Circular Queue; Array based implementation of Queues.

UNIT III

LINKED LISTS: Define Lists; different types of linked lists; Linked List implementation of stacks and queues; Implementation of Singly linked Lists and Circular Linked List; Applications.

UNIT IV

TREES AND GRAPHS: Definition of trees and Binary trees; Properties of Binary trees and Implementation; Binary Traversal pre-order; post order; In- order traversal; Binary Search Trees; Implementations. Definition of Undirected and Directed Graphs; The Array based implementation of graphs; Adjacency matrix; path matrix implementation; The Linked List representation of graphs; Graph Traversal – Breadth first Traversal; Depth first Traversal.

UNIT V

SORTING AND SEARCHING: Introduction; selection; insertions; bubble sort; Efficiency of above algorithms; Shell sort; Merge sort; Quick sort; Heap sort, Searching Algorithms: Straight Sequential Search; Binary Search (recursive & non–recursive Algorithms).

TEXT BOOKS

1. A.K. Sharma – Data structure Using C, 2nd edition pearson 2013
2. Langsam, Augentem M.J. and Tenenbaum A. M., ―Data Structures using C & C++‖, Prentice Hall of India, 2009.

REFERENCE BOOKS

1. Aho A. V., Hopcroft J. E. and Ullman T. D., ―Data Structures and Algorithms‖, Original Edition, Addison-Wesley, Low Priced Edition, 1983.
2. Horowitz Ellis and S ahni S artaj, ―Fundamentals of Data Structures‖, Addison-Wesley Pub, 1984.
3. Horowitz, S ahni and Rajasekaran, ―Fundamentals of Computer Algorithms‖ 2007.
4. Kruse Robert, ―Data Structures and Program Design in C‖, Prentice Hall of India, 1994
5. Lipschetz Jr. Seymour, ―Theory & Problems of Data Structures‖, S chaum „s Outline, Tata McGraw Hill

MCA-151A	COMPUTER PROGRAMMING LAB	L-T-P 0-0-2	CR 2

List of Topics (Students have to do at 3-4 programs from each section)

SEQUENTIAL CONTROL STATEMENTS

1. Write a program to Print HELLO
2. Write a program to add two numbers
3. Write a program to calculate simple interest
4. Write a program to calculate average of three numbers
5. Write a program to swap two numbers
6. Write a program to illustrate mixed data types
7. Write a program to calculate area and circumference of circle
8. Write a program to evaluate a polynomial expression
9. Write a program to add digits of a four digit number
10. Write a program to check whether the person if eligible for voting or not

CONDITIONAL CONTROL STATEMENTS

11. Write a program to find greatest of two numbers
12. Write a program to find out which type of triangle it is
13. Write a program to find out greatest of three numbers
14. Write a program to evaluate performance of the student
15. Write a program to make a basic calculator

LOOP CONTROL STATEMENTS

16. Write a program to print Fibonacci up-to the given limit
17. Write a program to find the sum of digits of a number
18. Write a program to find factorial of a number
19. Write a program to print table of any number
20. Write program for printing different pyramid pattern

ARRAYS AND STRINGS

21. Write a program to enter the elements in a one dimensional array
22. Write a program to find the sum and average of five numbers
23. Write a program to sort the array elements
24. Write a program to enter the marks of 50 students an calculate the average
25. Write a program to add 2 matrix
26. Write a program to multiply 2 matrices
27. Write a program to calculate the length of string
28. Write a program to concatenate 2 strings
29. Write a program to reverse the string
30. Write a program to count the numbers of characters in a string
31. Write a program that converts lower case characters to upper case
32. Write a program without using predefined functions to check whether the string is palindrome or not

FUNCTIONS & POINTERS

33. Write a program using function to find the largest of three numbers
34. Write a program using function to sum the digits of a number
35. Write a program to calculate factorial of a number using recursive function
36. Write a program to print first n Fibonacci using recursive function
37. Write a program to illustrate the concept of chain of pointers
38. Write a program using function to swap two numbers using call by reference
39. Write a program to calculate the area and perimeter of circle using pointers
40. Write a program to copy the contents of one array into another in the reverse order using pointers

STRUCTURES

41. Write a program to read an employee record using structure and print it
42. Write a program to prepare salary chart of employee using array of structures
43. Write a program to print the name and percentage of 20 students (array of structures andarrays within structures).
44. Write a program to demonstrate structure within structure.

FILE HANDLING

45. Write a program to create, open, and close files.
46. Write a program to demonstrate the purpose of different file opening modes.
47. Write a program to count the number of characters, spaces, tabs, new line characters in a file.
48. Write a program to receive strings from keyboard and write them to a file.
49. Write a program to copy a file to another.
50. Write a program to read strings from a file and display them on screen

MCA-158 A	DATA STRUCTURE AND ITS APPLICATION LAB	L T P	Cr
		0 0 3	2

LIST OF EXPERIMENTS

1. Search an element in a two-dimensional array using linear search.
2. Using iteration and recursion concepts write programs for finding the element in the array using Binary Search Method
3. Inserting & deleting an element in the array
4. Tower of Hanoi problem using recursion
5. Perform following operations on matrices using functions only
   a) Addition b) Subtraction c) Multiplication d) Transpose
6. Static & dynamic Implementation of stack (push & pop operation)
7. Implementation of Circular queue (insert & delelte operation)
8. Create a linear linked list & perform operations such as insert, delete, update, reverse in the link list
9. Create a circular linked list & perform operations such as insert, delete
10. Implement binary search tree. (Insertion and Deletion in Binary Search Tree)
11. Simulates the various tree traversal algorithms
12. Implementation Bubble, Insertion & selection sort.
13. Implementation of quick sort
14. Implementation of merge sort
15. Implementation of heap sort
16. Simulate various graph traversing algorithms.

REFERENCE BOOKS

1. A.K. Sharma – Data structure Using C, 2nd edition pearson 2013
2. R. S. Salaria -Data Structure Using C
3. Kruse Robert, ―Data Structures and Program Design in C‖, Prentice Hall of India, 1994
4. Lipschitz Jr. Seymour, ―Theory & Problems of Data Structures‖, Schaum's Outline, 2nd Edition, Tata McGraw Hill

MCA-156 A	WEB DEVELOPMENT LAB	L T P	Cr
		0 0 3	2

COURSE OUTCOMES

CO1: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.
CO2: Utilize the concepts of JavaScript and Java
CO3: Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.
CO4: Understanding of XML programming language.
CO5: understanding of programming languages of PHP.

LIST OF EXPERIMENT

HTML

1. Simple HTML
2. Hyper Links
3. Using Frames
4. Registration Form with Table

CSS

5. Inline Style , Internal Style ,and external Style Sheets

JAVA SCRIPT

6. Use user defined function to get array of values and sort them in ascending order
7. Demonstrate String and Math Object's predefined methods
8. Demonstrate Array Objects and Date Object's predefined methods
9. Exception Handling
10. Calendar Creation : Display all month

Event Handling

11. Validation of registration form
12. Open a Window from the current window
13. Change color of background at each click of button or refresh of a page
14. Display calendar for the month and year selected from combo box
15. OnMouseover event

XML

16. Create a any catalog
17. Display the catalog created using CSS and XSL

PHP

18. File operation
19. Regular Expression, Array, Math, Date functions

MCA-103 A	DATABASE MANAGEMENT SYSTEM	L T P	Cr
		3 1 0	4

COURSE OUTCOMES

CO1: Implement the basic concepts of DBMS and Demonstrate the basic elements of a relational database management system

CO2: Identify the data models for relevant problems and Design entity relationship models.

CO3: Design and Implement of entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data.

CO4: Demonstrate their understanding of key notions of query evaluation and optimization techniques and Extend normalization for the development of application software's.

CO5: Analyze functional dependencies for designing a robust database.

LIST OF EXPRIMENTS

1. Introduction to PL/SQL
2. Write a program to carry out
    a. Creation of table
    b. Insertion of data into table
    c. Viewing of data into table: All rows and all columns, Selected columns and all rows, Selected rows and all columns, Selected rows and selected columns, Elimination of duplicates from selected statements, Sorting of data into a table.
    d. Deletion of data from given table: Removal of all rows, Removal of selected rows
    e. Updating of table contents: Updating all rows, Updating of record conditionally
    f. Modifying the structure of table: Adding new column, Modifying existing column
    g. Renaming tables
    h. Destroying tables
    i. Examining objects created by user: Finding tables created by user, Finding column details of table created
    j. Computation on table data: Arithmetic operators, Logical operators (AND, OR, NOT), Range searching (BETWEEN, NOT BETWEEN), Pattern matching (LIKE, IN, NOT IN)
3. Oracle set functions (Scalar, Group & Pattern Matching Operator): AVG, SUM, MIN, MAX, COUNT, COUNT(*), ABS, ROUND, LENGTH, SUBSTR, POWER, SQRT, LOWER, UPPER, LPAD, RPAD, LTRIM, RTRIM

4. Data constraints at column level and at table level: NULL value concept, UNIQUE constraints, Primary key constraint, Foreign key constraint, Check constraint.
5. VIEWS: Creation of views, Renaming of columns in view, Selection, Updation, Destroy
6. Grouping Data from tables in SQL
7. INDEXES
8. SEQUENCES
9. Granting and Revoking Permissions in SQL
10. CURSORS & its Applications
11. Create Function and use Cursor in Function
12. TRIGGERS
13. Hands on Exercises

REFERENCE BOOKS

1. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross
2. Date C. J. and Darwen H., "A Guide to the SQL Standard", 4th edition, Addison-Wesley, 2003
3. Desai Bipin, "Introduction to Database Management System", Galgotia Publications, 1991
4. Date C. J., "An Introduction to Database Systems", 8th edition, Addison-Wesley, Low Priced Edition

MCA-105 A	OBJECT ORIENTED PROGRAMMING USING C++	L T P	Cr
		3 0 0	3

OBJECTIVE

Providing a sound conceptual understanding of the fundamental concepts of computing hardware, software, networking and services; build programming logic and thereby developing skills in problem solving using C++ programming language; Introduce the concept of object orientation and on how to handle data in different forms; Emphasize the concepts and constructs rather than on language features.

PRE-REQUISITE

Knowledge of C programming language.

COURSE OUTCOMES:

The students undergoing this course will be able to:

CO1: Specify simple abstract data types
CO2: Design implementations, using abstraction functions to document them. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
CO3: Learn about the overloading of operators and their usage
CO4: Know about inheritance and polymorphism
CO5: Manage the data via files

UNIT I

OBJECT ORIENTED CONCEPTS& INTRODUCTION TO C++: Introduction to objects and object oriented programming, difference between procedure oriented & Object oriented programming; main feature of Object oriented programming: Class, Object, encapsulation (information hiding); Polymorphism: overloading, inheritance, overriding methods, abstract classes, access modifiers: controlling access to a class; method, or variable (public, protected, private, package); other modifiers; Basics of C++,Simple C++ Programs, preprocessors directives, Namespace, Memory management operators in C++, Inline function, default arguments, & reference types.

UNIT II

CLASSES AND DATA ABSTRACTION: Introduction; structure definitions; accessing members of structures; class scope and accessing class members; separating interface from implementation; controlling access function and utility functions, initializing class objects:

constructors, using default arguments with constructors; using destructors; classes: const(constant) object and const member functions, object as member of classes, friend function and friend classes; using this pointer, dynamic memory allocation with new and delete; static class members& function; container classes and integrators;.

UNIT III

OPERATOR OVERLOADING, TEMPLATE & EXCETION HANDLING: Introduction; fundamentals of operator overloading; restrictions on operators overloading; operator functions as class members vs. as friend functions; overloading, <<; >> overloading unary operators; overloading binary operators. Function templates; overloading template functions; class template; class templates and non- type parameters; basics of C++ exception handling: try, throw, catch, throwing an exception, catching an exception, re-throwing an exception.

UNIT IV

INHERITANCE, VIRTUAL FUNCTIONS AND POLYMORPHISM: Introduction, inheritance: base classes and derived classes, protected members; casting base-class pointers to derived-class pointers; using member functions; overriding base–class members in a derived class; public, protected and private inheritance; using constructors and destructors in derived classes; implicit derived–class object to base-class object conversion; composition vs. inheritance; virtual functions; abstract base classes and concrete classes; polymorphism; new classes and dynamic binding; virtual destructors; polymorphism; dynamic binding.

UNIT V

FILES AND I/O STREAMS: Files and streams; creating a sequential access file; reading data from a sequential access file; updating sequential access files, random access files; creating a random access file; writing data randomly to a random access file; reading data sequentially from a random access file; stream input/output classes and objects; stream output; stream input; unformatted I/O (with read and write); stream manipulators; stream format states; stream error states.

TEXT BOOKS

1. Balagurusam y , E., —Object Oriented Programming with C++‖, Prentice Hall of India, 2008
2. Scheldt, Herbert —C++: The Complete Reference‖, Tata McGraw Hill, 3rd Ed, 2008

REFERENCE BOOKS

1. Kamthane, —Object Oriented Programming with ANSI and Turbo C++, Pearson

Education
2. Lafore, Robert, —Object Oriented Programming in Turbo C++‖, The WAITE Group Press, 1994
3. Balagurusam y , E., —Object Oriented Programming with C++‖, Prentice Hall of India, 2008

Bhave, —Object Oriented Programming with C++‖, Pearson Education

EN-105 A	TECHNICAL COMMUNICATION	L T P	Cr
		3 0 0	3

Objective : The subject aims to strengthen the communication ability of the students, to nurture their business communication and presentation skills, leading to their holistic personality development and overall assisting them in developing managerial capacity.

Course Outcomes:

CO1:Acquisition of technical communication's generic aspects like Reading Technical Material, Technical Writing, Listening, Thinking and using technical phrases in spoken, Knowing the parts of a technical documents like screenshots, graphs, tabular data, data analysis, pictorial depiction.
CO2: Getting adapted with the technical generic formats/templates of technical writing of memos, technical report writing, technical presentations, technical proposal writing, minutes of meeting and the notes taking techniques.
CO3: Accessing the reading material and developing the writing technical material with the use of technical concepts and tools like Vacaroo, Miscrosoft Visio, Notepad ++, Kinemaster, Powtoon, Split Page Technique, Diagram Technique.
CO4: Learning the skill of proofreading and copy editing, paraphrasing and spinning using technical tools and manually using the knowledge of advance technical grammar.
CO5: Learning the technical phrases and writing styles like descriptive, argumentative etc for developing good technical documents for presentations or disseminating technical documents.

UNIT I: Communication skills& Vocabulary Building
Nature and significance of communication, Types of communication, Barriers of Communication Reading, Writing , Speaking and Listening Skills.
A Selected list of Homophones, Foreign words & Business Terms

UNIT II: Effective Communication & Personality Development
Fluency Enhancement Game/Activities.Team Building skill, Leadership skill development. Body language in GD; Types of GD. Mock Group Discussion. Expressing opinions & disagreements; GD in the selection process; Creative Brainstorming,Self introduction in front of the Interview board; Public speaking tips; Humorous speech

UNIT III: Internal Communication &Technology in Education:- Meeting- Need and importance of Meeting. Role of the chairperson.; Agenda; Minutes; Notice; Memo; Memorandum; Circular, Role of the chairperson, Role of the Participants.
Fusion of Management, Nature of participation in different group activities, seminars, conferences and workshops, Technology and communication.

UNIT IV: Employment & Business Related Development
CV & Job application; Covering letter; Inquiry, Order, Credit and Status enquiry; Complaints, Claims, Adjustment and Collection letter

UNIT V: Corporate communication & Facing Interviews:- Public Relations(PR); Tools of PR; External and Internal Measures of PR,Tools of presentation, oral presentation skill, removal of stage fear. Activities based on PowerPoint Presentation, process of interview andbody language in an interview.

TEXT BOOKS:

1. Pal Rajender, Korlahalli,"Essentials of Business Communications" S.Chand and Sons.
2. Lesikar,Pedit,"Business Communication and Managerial skills, All India Book Travellers.
3. T.N. CHHABRA, " Business Communication concepts and skills, Sun India Publications.

REFERENCE BOOKS:

1. Flatley,Lesikar" Basic Business Communication skills for empowering the internet generation", All India Traveller booksellers
2. Hewing Martin, "Advanced Business Communication ", Cambridge University Press

MCA-109 A	OPERATING SYSTEMS	L T P	Cr
		3 0 0	3

OBJECTIVE

To provide the knowledge of internals, different types and purpose of operating systems

PRE-REQUISITES

Knowledge of computer organization and architecture programming skills

COURSE OUTCOMES

CO1: Understand the basics of operating systems like kernel, shell, types and views of operating systems

CO2: Describe the various CPU scheduling algorithms and remove deadlocks.

CO3: Explain various memory management techniques and concept of thrashing

CO4: Use disk management and disk scheduling algorithms for better utilization of external memory.

CO5: Recognize file system interface, protection and security mechanisms. Explain the various features of distributed OS like Unix, Linux, windows etc

UNIT I

INTRODUCTION: Introduction to operating system concepts (including multitasking, multiprogramming, multi user, multithreading, etc)., types of operating systems: batch operating system, time-sharing systems, distributed OS, network OS, real time OS, embedded and smart card OS, various operating system services, architecture, system programs and calls.

UNIT II

PROCESS MANAGEMENT: Process concept, Life cycle and implementation of process, Thread usage and implementation in user space and in kernel, process scheduling, operation on processes, CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), priority scheduling, Round Robin (RR), multilevel feedback queue scheduling.

UNIT III

Deadlocks, Deadlock characteristics, prevention, avoidance using banker's algorithm, detection and recovery; Critical section problems, mutual exclusion with busy waiting,
Process synchronization, semaphores: binary and counting semaphores, Classical IPC problems: dining philosophers' problem, readers-writers problem.

UNIT IV

MEMORY MANAGEMENT: Logical & physical address space, swapping, contiguous memory allocation, non-contiguous memory allocation paging and segmentation techniques, segmentation with paging, virtual memory management - demand paging & page-replacement algorithms, demand segmentation.

UNIT V

I/O AND FILE YSTEMS: I/O hardware, device controllers, interrupt handlers, device drivers, application I/O interface, kernel, transforming I/O requests, performance issues, Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms, introduction to distributed file system.

LINUX/UNIX SYSTEM: LINUX/UNIX architecture, UNIX system calls for processes and file system management, basic commands of LINUX/UNIX, shell interpreter, shell scripts.

TEXT BOOK

1. William Stallings, Operating System: Internals and Design Principles, Prentice Hall, 8th Edition, 2014, ISBN10: 0133805913 • ISBN13: 9780133805918
2. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley & Sons ,Inc., 9th Edition,2012, ISBN 9781118063330
3. Maurice J. Bach, "Design of UNIX Operating System", PHI
4. Silberchatz et al, "Operating System Concepts", 5th edition, Addison-Wesley, 1998

REFERENCE BOOKS

1. Tom Adelstein and Bill Lubanovic, Linux System Administration, O'Reilly Media, Inc., 1st Edition, 2007.ISBN10: 0596009526 | ISBN13: 9780596009526
2. Harvey M. Deitel, Operating Systems, Prentice Hall, 3rd Edition,2003, ISBN10: 0131828274 | ISBN13: 9780131828278
3. Andrew S. Tanenbaum, Modern Operating System, Prentice Hall, 3rd Edition, 2007,ISBN10: 0136006639 | ISBN13: 9780136006633
4. Operating System in depth by Thomson
5. Tanenbaum A., "Modern Operating Systems", Prentice-Hall, 1992
6. Stallings William, "Operating Systems Internals and Design Principles", 4th edition, Prentice-Hall, 2001
7. Dhamdhere D. M., "Operating System", 2nd Edition, Tata McGraw Hill, 1999
8. Kernighan Brian and Pike Rob, "The Unix Programming Environment", Prentice Hall of India, 1984
9. Bach Maurich, "Design of the Unix Operating System", Prentice Hall of India, 1986
10. Muster John, "Introduction to UNIX and LINUX", Tata McGraw Hill, 2003
11. Ritchie Colin, "Operating System Incorporating Unix & Windows", Tata McGraw Hill, 1974
12. Madnick Stuart and Donovan John, "Operating Systems", Tata McGraw Hill, 2001
13. Deitel, "Operating Systems", Addison-Wesley, 1990

MCA-110A	ANALYSIS & DESIGN OF ALGORITHMS	L T P	Cr
		4 0 0	4

OBJECTIVE:
To relay the theoretical and practical aspects of design of algorithms

PRE-REQUISITES
Knowledge of fundamentals of basic computer programming for implementing algorithms.

COURSE OUTCOMES
CO1: Define the basic concepts of algorithms and analyze the performance of algorithms.
CO2: Discuss various algorithm design techniques for developing algorithms.
CO3: Discuss various searching, sorting and graph traversal algorithms.
CO4: Understand NP completeness and identify different NP complete problems.
CO5: Discuss various advanced topics on algorithms.

UNIT I
BRIEF REVIEW: Growth of functions, Asymptotic Notations, Representation of Graphs, Breadth First Search, Depth First Search and Data Structures for Disjoint Sets.

UNIT II
DIVIDE AND CONQUER: General method; binary search; merge sort; quick sort; selection sort; Strassen's matrix multiplication algorithms and analysis of algorithms for these problems.

UNIT III
GREEDY AND DYNAMIC ALGORITHMS : Activity selection; Fractional Knapsack, Job Sequencing with dead line; task scheduling problem. Matrix multiplications; 0/1 knapsack; the traveling salesperson problem.

UNIT IV
ELEMENTARY GRAPH ALGORITHM AND TREES: Representation of Graph; Breadth-first search, Depth first search; topological sort; strongly connected components , Growing a minimum spanning tree; Kruskal & Prims algorithms; Single source shortest path: Dijkstra's algorithm.

UNIT V
BACK TRACKING: General method; 8 queens' problem; graph colouring; Hamiltonian cycles; analysis of these problems. Introduction to NP hard & NP complete

TEXT BOOKS
Cormen Thomas H., Leiserson Charles E. and Rivest Ronald L., "Introduction to Algorithms", Tata McGraw Hill, 1990

REFERENCES

1. A. V. Aho, J. E. Hopcroft, J. D. Ullman, "The Design and Analysis of Computer Algorithms", Addition Wesley, 1998.
2. Ellis Horowitz and Sartaz Sahani, "Computer Algorithms", Galgotia Publications, 1999.
3. D. E. Knuth, "The Art of Computer Programming", 2 ndEd., Addison Wesley, 1998.
4. Trembley Jean Paul and Bunt Richard B., "Introduction to Computers Science - An Algorithms Approach", Tata McGraw Hill, 2002

MCA-111A	SOFTWARE ENGINEERING PRINCIPLES	L T P	Cr
		3 0 0	3

Course Outcomes

After completing the course, the students will be able:

CO1: To know the basics of software and its procedure

CO2: To aware about the different models and planning ways for a software project

CO3: To create a design based on different functions

CO4: To get familiar with different testing methods of a software

CO5: To know how to maintain a software and re-engineering of the software

UNIT-I:- Software Processes: Processes projects and products, Component software processes, characteristics of a software process, software Development Process, project management process, software configuration management process, software configuration management process, process management process. Software requirement Analysis and Specification: Software requirement, need for SRS, requirement process, problem analysis, analysis issues. Informal approach, structured analysis, object oriented modeling, other modeling approaches, prototyping, requirement specification, characteristics of an SRS, component of an SRS, specification languages, structure of requirement document validation requirement reviews, other method metrics, size measures, quality metrics.

UNIT-II- Planning Software Project:- Cost estimation, uncertainties in cost estimation, building cost estimation models, on size estimation, COCOMO model, project scheduling, average duration estimation, project scheduling and milestones, staffing and personnel planning, rayleigh curve, personnel plan, team structure, software configuration management plans, quality assurance plans, verification and validation, project monitoring plans, risk management.

UNIT-III- Function Oriented Design:- Design principles, coupling, cohesion, design notation and specification, structured design methodology, verification, network metrics, stability metrics, information flow metrics Software Testing.

UNIT-IV- Testing Methods: Software testing fundamentals, test case design, white box testing, control structure testing, black-box testing, testing for specialized environments. Software Testing Strategies: A Strategic Approach to software testing, strategic issues, unit testing, validation testing, system testing, the art of debugging

UNIT-V - Re-Engineering : Software re-engineering, software maintenance, a software reengineering process model, reverse engineering, reverse engineering user interfaces, restructuring, code restructuring, data restructuring, forward engineering the economics of reengineering. Client/Server software Engineering: The structure of client/server systems, software engineering for c/s systems, analysis modeling issues, design for C/S systems, testing issues. Computer-Aided software Engineering: What is case, building blocks forcase, a taxonomy of case tools, integrated case environments, the integration architecture, the case repository.

TEXT BOOKS:

1. Presman Roger, Software, Engineering: A Practitioner's Approach Tata McGraw Hill, New Delhi.
2. Jalote Pankaj, An Integrated Approach to Software Engineering Narosa, New Delhi.

REFERENCE BOOKS:

1. R.E. Fairly. Software Engineering Concepts. McGraw Hill, Inc 1985.
2. Poyce, Software Project Management, Addison-Wesly.
3. Sommerville , Software Engineering, Addison-Wesly.

MCA-153 A	RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB	L T P	Cr
		0 0 4	2

1. Introduction to PL/SQL
2. Write a program to carry out
    k. Creation of table
    l. Insertion of data into table
    m. Viewing of data into table: All rows and all columns, Selected columns and all rows, Selected rows and all columns, Selected rows and selected columns, Elimination of duplicates from selected statements, Sorting of data into a table.
    n. Deletion of data from given table: Removal of all rows, Removal of selected rows
    o. Updating of table contents: Updating all rows, Updating of record conditionally
    p. Modifying the structure of table: Adding new column, Modifying existing column
    q. Renaming tables
    r. Destroying tables
    s. Examining objects created by user: Finding tables created by user, Finding column details of table created
    t. Computation on table data: Arithmetic operators, Logical operators (AND, OR, NOT), Range searching (BETWEEN, NOT BETWEEN), Pattern matching (LIKE, IN, NOT IN)
3. Oracle set functions (Scalar, Group & Pattern Matching Operator): AVG, SUM, MIN, MAX, COUNT, COUNT(*), ABS, ROUND, LENGTH, SUBSTR, POWER, SQRT, LOWER, UPPER, LPAD, RPAD, LTRIM, RTRIM
4. Data constraints at column level and at table level: NULL value concept, UNIQUE constraints, Primary key constraint, Foreign key constraint, Check constraint.
5. VIEWS: Creation of views, Renaming of columns in view, Selection, Updation, Destroy
6. Grouping Data from tables in SQL
7. INDEXES
8. SEQUENCES
9. Granting and Revoking Permissions in SQL
10. CURSORS & its Applications
11. Create Function and use Cursor in Function
12. TRIGGERS
13. Hands on Exercises

REFERENCE BOOKS

1. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross
2. Date C. J. and Darwen H., "A Guide to the SQL Standard", 4th edition, Addison-Wesley, 2003
3. Desai Bipin, "Introduction to Database Management System", Galgotia Publications, 1991
4. Date C. J., "An Introduction to Database Systems", 8th edition, Addison-Wesley, Low Priced Edition

MCA-155 A	OBJECT ORIENTED PROGRAMMING USING C++LAB	L T P	Cr
		0 0 4	2

LIST OF EXPERIMENTS:

BASIC CONCEPT OF C++

1. Write a program to show the concept reference type, call by reference & return by reference in C++
2. Write a program to show the concept of default arguments in C++
3. Write a program to show the concept of inline function
4. Write a program to show the concept of dynamic memory management in C++
5. Write a program to show the concept of function overloading
6. Write a program to Create a file and store text and display the contents.

CLASS & OBJECTS

7. Write a C++ program to show the concept of class & object
8. Write A C++ program showing function taking objects as a arguments and function returning objects
9. Write C++ programs to show the concept of static data member & static member function
10. Write C++ program to show the concept of friend function
11. Write C++ program to show the concept of different type of constructor
12. Write C++ program to show the concept of destructor

OPERATOR OVERLOADING

13. Write a C++ program showing overloading of unary operator using member function & friend function
14. Write a C++ program showing overloading of binary operator using member function & friend function
15. Write a C++ program showing overloading of << and >> operators

INHERITANCE

16. Write a C++ program to show the concept of multilevel inheritance
17. Write a program to show the concept of multiple inheritance
18. Write a C++ program to show the concept of hybrid inheritance
19. Write a program to show the concept of virtual base class

DYNAMIC BINDING & VIRTUAL FUNCTION

20. Write a C++ to show the concept of virtual function to implement dynamic binding
21. Write a C++ program to show the concept of pure virtual function & abstract class

FILES HANDLING

22. Write C++ programs for creating, reading& writing sequential access file
23. Write C++ programs for creating, reading & writing random access file

TEMPLATES

24. Write a C++ program to show the concept of class template
25. Write a C++ program to show the concept of function template

TEXT BOOK

1. Balagurusam y , E., —Object Oriented Programming with C++‖, Prentice Hall of India, 2008
2. Schildt, Herbert —C++: The Complete Reference‖, Tata McGraw Hill, 3rd Ed, 2008

REFERENCE BOOKS

3. Kamthane, —Object Oriented Programming with ANSI and Turbo C++‖, Pearson Education
4. Lafore, Robert, —Object Oriented Programming in Turbo C++‖, The WAITE Group Press, 1994
5. Balagurusam y , E., —Object Oriented Programming with C++‖, Prentice Hall of India, 2008
6. Bhave, —Object Oriented Programming with C++‖, Pearson Education.

MCA-159 A	OPERATING SYSTEM LAB	L T P	Cr
		0 0 4	2

List of Experiments

Part – 1 : Introduction to Operating System

1 Operating System: Concept & Services

2 Process Management

3 Memory Management

4 File System

5 Deadlocks

Part – 2 : Windows 2003 Operating System

6 Study of Windows 2003 Operating System

7 Various services available in Windows 2003 Server

8 Internal/system commands for network and system monitoring in Windows 2003 Server

9 Difference between the Windows 2003 Server and Windows 2003 Client software

Part – 3 : Linux Operating System

10 Study of Linux Operating System

11 Internal System commands and Control Structure in Linux OS

12 Processes and Threads in Linux Operating System

13 Systems and Function Calls in Linux OS

14 Writing of shell scripts in Linux OS

15 AWK Programming in Linux OS

Part – 4 : MacOS : Case Study

16 Study of MacOS Features

17 Internal System commands for network and system monitoring in MacOS

18 Primitive Communications Tool in MacOS

19 Message Queues used in MacOS

20 Pipes: Unnamed Pipes, Named Pipes in MacOS

MCA 201A	COMPUTER GRAPHICS AND MULTIMEDIA	L T P	Cr
		4 0 0	4

OBJECTIVE

To impart the knowledge about the different graphics, image, color models as well as its role in real world applications

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.

CO2: Use of geometric transformations on graphics objects and their application in composite form. Extract scene with different clipping methods and its transformation to graphics display device

CO3: Explore projections and visible surface detection techniques for display of 3D scene on 2D screen. Render projected objects to naturalize the scene in 2D view and use of illumination models for this.

CO4: Understand the basics of computer graphics, framework for multimedia systems; multimedia devices.

CO5: Understand the basics of Multimedia graphics, different graphics systems and applications of computer graphics.

UNIT-I

INTRODUCTION: What is computer graphics, computer graphics applications, computer graphics hardware and software, two-dimensional graphics primitives: points and lines, line drawing algorithms: DDA, Bresenhem; circle drawing algorithms: using polar coordinates, Bresenhem circle drawing, midpoint circle drawing algorithm; polygon filling algorithm, boundary filled algorithm, scan-line algorithm, flood fill algorithm.

UNIT-II

TWO-DIMENSIONAL VIEWING Clipping: The 2-D viewing pipeline, windows, viewports, window to View port mapping; clipping: point, clipping line (algorithms): 4 bit code algorithm, Sutherland-Cohen algorithm, parametric line clipping algorithm (Cyrus Beck). Sutherland-Hodgeman polygon clipping algorithm

UNIT-III

2D TRANSFORMATION & 3D GRAPHICS: Homogeneous coordinates system, two dimensional transformations: transformations, translation, scaling, rotation, reflection, shearing, transformation, composite transformation. Three dimensional graphics concept, matrix, Representation of 3-D transformations, composition of 3-D transformation.

UNIT-IV

BASICS OF MULTIMEDIA TECHNOLOGY & APPLICATIONS: Computers, communication and entertainment, multimedia an introduction; framework for multimedia systems; multimedia devices; CD Audio, CD-ROM, CD-I, presentation devices and the user interface; multimedia presentation and authoring; professional development tools; Applications of environment in various fields.

UNIT-V

LAN AND MULTIMEDIA: internet, World WideWeb and multimedia distribution network: ATM & ADSL; multimedia servers and databases; vector graphics; 3D graphics programs; animation techniques; shading; anti-aliasing; morphing; video on demand.

TEXT BOOK

Computer Graphics – Donald Hearn & M.Pauline Baker, Prentice Hall of India

REFERENCES:

1. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill
2. Asthana, Sinha, "Computer Graphics", Addison Wesley Newman and Sproul,
3. "Principle of Interactive Computer Graphics", McGraw Hill
4. Steven Harrington, "Computer Graphics", A Programming Approach, 2nd Edition

MCA-206 A	CORE AND ADVANCE JAVA	L T P	Cr
		4 0 0	4

OBJECTIVE

To relay the theoretical and practical knowledge of Core Java programming language

PRE-REQUISITES

Basic Knowledge of programming language and object oriented programming

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To understand the various features of object-oriented programming and features of OOP specific to Java programming.

CO2: To understand the components involved in designing web pages through Java programming.

CO3: To understand the various components of event mechanism.

CO4: To understand the major components of network programming through java swings.

CO5: To understand the major key contributing components to enable web-based applications through Java programming.

UNIT I

INTRODUCTION TO JAVA, DATA TYPE, VARIABLES, ARRAY : Basic Concepts of OOP and its Benefits; Application of OOP; Features of Java; Different types of data types, Literals, Variables, Type conversion and casting :Java's automatic type conversion, Casting incompatible types; Automatic type promotion in expression; Arrays: One-Dimensional Arrays, Multidimensional Arrays, Alternative Array Declaration Syntax

UNIT II

STRINGS, OPERATORS, EXPRESSION, CONTROL STATEMENTS: String handling: String class, Different string operations, String comparison ,Searching and modifying a string, Using string buffer class, Vector & Wrapper classes Different types of operators: arithmetic, bitwise, logical, relational, Boolean, assignment, conditional, special; Operator precedence and associatively; Using parentheses; Expression; Solving an expression; Control statements: if-else, nested if-else switch; Iteration statements: while, do-while, for, nested loops Jump Statements: using break, using continue, return

UNIT III

INHERITANCE, INTERFACES, PACKAGE : Inheritance: Different types of Inheritance, super keyword, Method overriding, Different types of access specifiers Defining Interface, Extending & Implementing interfaces, implementing multiple inheritance, Package: Java API Packages, Using System Package, Naming Conventions, Creating package, Accessing a package, using your own package

UNIT IV

MULTITHREADING, EXCEPTION HANDLING & APPLET PROGRAMMING: Multithreading: The Java Thread Model, Creating a Thread: extending Thread class and implementing Runnable interface, life cycle of a thread, using Thread methods, Thread exception Thread priority, Synchronization Exception: Exception Handling mechanism , Multiple catch statements , Using finally statements , throwing our own exception; Applet: Local & Remote Applets ,Steps to write & running Applets, Applet life cycle, Passing parameters, Displaying numerical values, getting input from the user

UNIT V

GRAPHICS PROGRAMMING & FILE HANDLING: Graphics class: Lines & Rectangle, Circles & Ellipses, Arcs, Polygons, Line Graphs, Bar Charts; File Handling: Stream Classes: Character & Byte Stream Class, I/O Exceptions, Reading /Writing character, Reading /Writing bytes, Concatenating & buffering files, Random Access Files

TEXT BOOK

Herbert Schildt , "The Complete Reference Java 2 fifth edition, McGraw Hill.

REFERENCE BOOKS

1. Balaguruswamy , E., ""Programming with Java", Tata Mcgraw Hill.
2. Horetmann Cay and Cornell Gary, "Core Java Volume – I", Pearson Education.
3. Horetmann Cay and Cornell Gary, "Core JavaTM 2, Volume II – Advanced Features", 7th Edition, Pearson Publisher.
4. Kathy Sierra and Bert Bates, "Head First Java" by O'REILLY publications.

MCA-208 A	PROGRAMMING USING C#	L-T-P	Cr
		3-1-0	4

OBJECTIVE
To equip students with C# programming Concepts

Course outcomes

After completing this course, the students will be able:
CO1: To know the basics of C# programming language
CO2: To know the evolution of different Programming Languages like C++, Java etc.
CO3: To aware about the different properties of C#
CO4: To illustrate different operations on practical grounds
CO5: To get the knowledge about different data connectivity like ADO & ADO.Net

UNIT I
PHILOSOPHY OF .NET AND ITS. MAJOR COMPONENTS: Origin of .NET technology; .NET platform; benefits and limitations of .NET; building blocks of .NET framework; .NET programming languages; .NET types and namespaces. Understanding CLR; CTS and CLS; Developing C# Applications using Visual Studio .Net

UNIT II
EVOLUTION OF C#: comparison among C++; Java and C#; benefits of C#; object-oriented programming using C#

UNIT III
C# PROGRAMMING: introduction to C#; creating a C# program; types in C#; classes; inheritance and polymorphism; methods; statements and control; arrays and strings; interfaces; abstract and base classes.

UNIT IV
STATEMENTS AND CONTROL: properties and indexers; delegates and their usefulness; attributes; I/O in C#; exception and error handling in C#; C# and windows application.

UNIT V
ADO .NETAND ASP .NET: Comparison of ADO and ADO. NET; introduction to data access with ADO.NET components of ADO.NET; Comparison of ASP and ASP .NET; features of ASP .NET; features provided by ASP .NET; web forms and their components; web services.

REFERENCE BOOKS

1. Balaguruswammy, E, "Programming in C#", Tata McGraw Hill
2. Jain, V K, "The Complete Guide to C# Programming", IDG Books India.
3. Pappas & Murray, "C# Essentials", Prentice Hall of India
4. Gunnerson Eric, "A programmer's Introduction to C#", IDG Books
5. Wakefield, "C# and .NET Web Developers Guide", IDG Books India

MCA-215 A	COMPUTER SOFTWARE AND TESTING TESTING	L T P	Cr
		3 0 0	3

OBJECTIVE

To develop deep understanding about computer software testing methodologies and tools

PRE-REQUISITES

Knowledge of programming, software engineering, software project management

COURSE OUTCOMES

After completing this course, the students will be able:

CO1: To know the planning, design and testing phases of the software
CO2: To learn how to tackle the drawbacks of a software system
CO3: To design the test cases to make the software robust
CO4: To test the software manually at user level
CO5: To know about the different tools

UNIT I

FUNDAMENTALS & TESTING TYPES: First, second and later cycles of testing, Objectives and limits of testing, Overview of software development stages, Planning and Design stages and testing during these stages. Glass box code, Regression and Black box testing, Software errors, Categories of software error

UNIT II

REPORTING BUGS&PROBLEM TRACKING SYSTEM: Problem reports, Content and Characteristics of Problem Report, analysis and Tactics for analyzing a reproducible bug, Making a bug reproducible; Objective of Problem Tracking System, tasks of the system, Problem tracking overview, users of the tracking system, mechanics of the database

UNIT III

TEST CASE DESIGN: Characteristics of a good test, equivalence classes and boundary values, visible state transitions, Race conditions and other time dependencies, load testing. Error guessing, Function equivalence testing, Regression Testing, General issues in configuration testing, printer testing

UNIT IV

LOCALIZATION AND USER MANUALS TESTING: Translated text expands, Character sets, Keyboards, Text filters, Loading, saving, importing, and exporting high and low ASCII, Operating system Language, Hot keys, Error message identifiers, Hyphenation rules, Spelling rules, Sorting Rules, Uppercase and Lowercase conversion, Printers, Sizes of paper, CPU‘s and video, Rodents, Data formats and setup options, Rulers and measurements, Culture-bound Graphics and output, European product compatibility, Memory availability, automated testing, Testing User Manuals, Effective documentation, documentation tester‘s objective, How testing documentation contributes to software reliability

UNIT V

TESTING TOOLS &MANAGEMENT ISSUES OF TESTING: Fundamental tools, automated acceptance and regression tests, standards, translucent box testing Overall objective of the test plan: product or tool? Detailed objective, type of test, strategy for developing components of test planning documents, components of test planning documents, documenting test materials**:** Software Development tradeoffs and models, Quality-related costs, The development time line, Product design, alpha, Pre-beta, Beta, User Interface freeze, Pre- final, Final integrity testing, Project post-mortems, Legal consequences of defective software, Managing and role of a testing group, independent test agencies

TEXT BOOK

Cem Kaner,Jack Falk and Hung Quoc Nguyen, ―Testing Computer Software‖, 2nd Edition, Wiley, 1999.

REFERENCE BOOKS

1. Craig, Jaskiel, ―Systematic Software Testing‖, Artech House, 2002
2. Aditya P. Mathur, ―Foundation of Software T esting ‖, 1st Edition, Pearson Education, 2008
3. Bauersfeld, ―Software by Design: Creating People Friendly Software‖, M&T Books, New York, 1994
4. Beck, ―Test Driven Development‖, Addison-Wesley Signature Series, Library of Congress Catalogingin-Publication, 5th Edition, 2004.
5. Elfriede Dustin, ―Effective Software Testing: 50 Specific Ways to Improve Your T esting ‖, 1st Edition, Addison-Wesley, 2002.
6. Freedman, Weinberg, ―Handbook of Walkthroug hs, Inspections & Technical Reviews‖, 3rd Edition, Dorset House, 1990.

MCA-218 A	OBJECT ORIENTED SOFTWARE ENGINEERING & UML	L T P	Cr
		3 0 0	3

Course Outcome:

CO1: Basic knowledge and understanding of the analysis and design of complex systems.

CO2: Ability to apply software engineering principles and techniques.

CO3: Understanding the difference between object-oriented analysis and object-oriented design.

CO4: object-oriented analysis and other forms of analysis is that in object-oriented approach, requirements are organized around objects, which integrate both data and functions.

CO5: Understanding the modeled after real-world objects that the system interacts with.

UNIT I
Introduction: Object Oriented system concepts and Principles, Object Oriented system development, Component reuse, The common process framework for Object Oriented processes, System Development and Methodologies, object oriented software estimation.

UNIT II
System development: System as model building, model architecture, The importance of modeling, principle of modeling, object oriented modeling, Introduction to Object oriented Methodologies such as Unified Modeling Language, Overview of UML, conceptual model of UML, architecture, software development lifecycle using Rational Unified Process

UNIT III
Object Oriented Analysis: requirement model, analysis model, Object oriented analysis using methods of Rumbaugh. Software Design: Software design Models, Object oriented methodologies of Booch, design model, System development using various UML Diagrams.

UNIT IV
UML Methodology: Detailed study of various UML Diagrams, System Analysis using UML Diagrams

UNIT V
Object Oriented Testing and metrics: Path Testing, State based testing, Class Testing, object oriented metrics. Applications & Tools: A complete case study of Software development using above Methodologies, Concepts of Computer-Aided Software Engineering and knowledge about current CASE tools use in the industry.
Text Books:
1. R . S. Pressman, “Software Engineering – A practitioner’s approach”, 5th Ed., McGraw Hill Int. Ed., 2001.
2. I. Jacobson, M. Christerson, P. Jonsson, G. Overgaard, “Object Oriented Software Engineering”,

2nd Edition, Pearson Education, 2007.
3. G. Booch, J Rumbaugh, I Jacobson, "The Unified Modeling Language User Guide" 11th Ed., Pearson Education, 2003.
4. Y.Singh, R.Malhotra, "Object Orinted Software Engineering", PHI Learning, 2012.

Reference Books:
1 I. Sommerville, "Software Engineering", Addison Wesley, 2004

MCA-219 A	Cyber Laws and Intellectual Property Right	L T P	Cr
		0 0 3	2

Course Outcome :

CO1:Intellectual property means knowledge or information in any form which has a commercial value.

CO2:and Intellectual property rights can be defined as a mix of ideas, inventions and creations, Copyright, Patent, Trademark, Design are some of the types of Intellectual Properties.

CO3:Understnding of Intellectual property law is to encourage innovation and to provide incentives for innovation by granting protection to inventors that will allow them to recover research and development investments and reap the benefits of their inventions for a limited period of time.

CO4: To be a safety net against online data predators. To prevent debit card or credit card fraud. Many people have switched to digital paying methods. Cyber law tries to make sure that victims do not have to go through the additional agony of long procedures.

CO5: Granting legal recognition to all transactions done through electronic data exchange, other means of electronic communication or e-commerce in place of the earlier paper-based communication.

Unit I Intellectual Property & Information Technology IPR:- Introduction, Protection of Intellectual Property Copyright, Related Rights, Patents, Industrial Designs, Trademark, Unfair Competition. Information Technology Related Intellectual Property Rights Computer Software and Intellectual Property-Objective, Copyright Protection, Reproducing, Defences, Patent Protection. Database and Data Protection-Objective, Need for Protection, UK Data Protection Act, 1998, US Safe Harbor Principle, Enforcement. Protection of Semiconductor Chips-Objectives Justification of protection, Criteria, Subject-matter of Protection, WIPO Treaty, TRIPs, SCPA. Domain Name Protection-Objectives, domain name and Intellectual Property, Registration of domain names, disputes under Intellectual Property Rights, Jurisdictional Issues, and International Perspective.

Unit II Patents (Ownership and Enforcement of Intellectual Property):- Patents-Objectives, Rights, Assignments, Defences in case of Infringement CopyrightObjectives, Rights, Transfer of Copyright, work of employment Infringement, Defences for infringement Trademarks-Objectives, Rights, Protection of good will, Infringement, Passing off, Defences. Designs-Objectives, Rights, Assignments, Infringements, Defences of Design Infringement

Unit III Enforcement of Intellectual Property Rights:- Civil Remedies, Criminal Remedies, Border Security measures. Practical Aspects of Licencing – Benefits, Determinative factors, important clauses, licensing clauses.

Unit VI Cyber Law:- Basic Concepts of Technology and Law : Understanding the Technology of Internet, Scope of Cyber Laws, Cyber Jurisprudence Law of Digital Contracts : The Essence of Digital Contracts, The System of Digital Signatures, The Role and Function of Certifying Authorities, The Science of Cryptography Intellectual Property Issues in Cyber Space: Domain Names and Related issues, Copyright in the Digital Media, Patents in the Cyber World. Rights of Netizens and E-Governance : Privacy and Freedom Issues in the Cyber World, EGovernance, Cyber Crimes and Cyber Laws

Unit VI Information Technology Act 2000:- Information Technology Act-2000-1, Information Technology Act-2000-2 (Sec 14 to 42 and Certifying authority Rules), Information Technology Act-2000-3 (Sec 43 to 45 and Sec 65 to 78), Information Technology Act-2000-4(Sec 46 to Sec 64 and CRAT Rules), Information Technology Act-2000-5 (Sec 79 to 90), Information Technology Act-2000-6 (Sec 91-94) Amendments in 2008.

MCA-251 A	Computer Graphics and Multimedia LAB	L T P	Cr
		0 0 3	2

List of Experiments

PART -1	**Basics/Inbuilt functions in computer graphics**
1	To draw a line using inbuilt functions.
2	To draw a circle/Ellipse using inbuilt functions.
3	To draw a rectangle using inbuilt functions.
4	To change the background and foreground color using inbuilt functions.
5	To fill area using inbuilt functions.
6	To draw a triangle using inbuilt functions and a circle is centered at each corner of the triangle.
PART-2	**Line/circle/ellipse drawing algorithms**
7	To draw a line using DDA Line drawing algorithm.
8	To draw a line using Bresenhem Line drawing algorithm.
9	To draw a circle using eight way symmetry.
10	To draw a circle using incremental circle drawing algorithm.
11	To draw a circle using mid point/Bresenhem circle drawing algorithm.
12	To draw an Ellipse using midpoint ellipse drawing algorithm.
PART-3	**Polygon Filling/Area Filling/Region filling**
13	Polygon filling/area filling using boundary fill algorithm.
14	Polygon filling/area filling using flood fill algorithm.
15	Polygon filling/area filling using Scan line algorithm.
PART-4	**2D Clipping/2D Transformation /Window to View port mapping**
16	To clip a line using Midpoint Line clipping algorithm.
17	To clip a line using Cohen Sutherland /Four bit op-code line clipping algorithm.
18	To clip a line using Cyrus Back line clipping algorithm.
19	To implement a clock.
20	To implement a screen saver.
21	To transform a 2D object (Line, Rectangle, circle) using 1 Translation 2 Scaling 3 Rotation 4 Reflection 5 Shearing
22	To transform a 2D object (Line, Rectangle, circle) using Homogenous Coordinate system. 1 Translation 2 Scaling 3 Rotation 4 Reflection 5 Shearing
23	To transform window to view port.
24	To zoom an object.
25	To perform reverse zooming.

PART-5 Projection and 3D Transformation

26 To perform perspective projection.

27 To perform parallel projection.

28 To perform 3D Transformation.

1 Translation
2 Scaling
3 Rotation

List of Experiments Based on Multimedia

29 Create Motion Tweening using Macromedia Flash(Moving Ball).

30 Create Spot Light using Macromedia Flash.

31 Create Shape Tweening using Macromedia Flash.

32 Create Shadow of building that change according to position of Sun using Macromedia Flash.

33 Create and show the use of guided layer using Macromedia Flash(Any Example).

34 Create Animated Pool Table.

35 Create Animated Birthday card.

36 Create Bow & Arrow hitting a Ball.

37 Create Masking Effect with Motion Twinning.

38 Create Animation of Moving Car.

MCA-256 A	CORE AND ADVANCE JAVA LAB	L T P	Cr
		0 0 4	2

LIST OF EXPERIMENTS

Part -1 : Simple classes and methods

1 Write a program to print "Hello Java".

2 Write a program to find the area of a room using two classes.

3 Program that calculates and prints the simple interest using the formula: simple interest=PNR/100 Input values P, N, R should be accepted as command line input as below, e.g. java Simple interest 5 10 15

4 Write a program to find the greatest of the following numbers:

325, 712, 478

Part -2 : Array implementation

5 Write a program to tell that how many numbers are evens and odds in the followings: 50, 65, 56, 71, 81

6 Write a program to sort the following numbers in ascending orders.

55, 40, 80, 65, 71

7 Write a program to print a pattern like:

1

2 2

3 3 3

4 4 4 4

5 5 5 5 5

Part -3 : Command line arguments, String Implementation

8 Write a program to implement command line arguments.

9 Write a program to arrange the following words in dictionary order.

Madras, Delhi, Ahmadabad, Calcutta, Bombay

Part -4 : Implementation of constructor & method overloading, overriding, nesting

10 Write a program to find the area of a room using Constructor.

11 Write a program to implement methods overloading.

12 Write a program to implement static keyword.

13 Write a program to implement "nesting of methods".

14 Write a program to implement overriding of methods.

Part -5 : Inheritance, Package

15 Write a program to implement single inheritance.

16 Write a program to implement multiple inheritance.

17 Write a program to create your own package and use that package in another program to print " Hello package".

Part -6 : Multithreading, Exception Handling, Applet programming

18 Write a program to implement multithreading using the system function like yield(), stop(), sleep().

19 Write a program to implement multiple try/catch statements.

20 Write a program to print "Hello Java" using applet programming.

Part -7 : File Handling, Java Networking

21 Write a program to copy the content of one file into another using character stream classes.

22 Write a program to copy the content of one file into another using byte stream

classes.

23 Write a program to find the IP address of a Local machine.

24 Write a program to find the IP address of a Remote machine.

25 Write a program to find the protocol, port number, host name, file name from a URL address.

Part -8 : Awt, Swing, Collection, Java Database Connectivity

26 Write a program to implement a calculator in AWT

27 Write the programs to implement the followings in:-

JTable, JList, JTree, JCombobox, JColorChooser, JProgressBar

28 Write the programs to implement the followings in Collection:-

ArrayList, Vector, Map

29 Create a Java application to insert data in the product table using the Statement object.

30 Create a Java application to execute a stored procedure that retrieves and displays the information from the customer table.

Part -9 : Java RMI and Java Beans

31 Write a program to implement Java RMI.

32 Write a program to create a simple java bean.

Part -10 : Java server & JSP

33 Write a program to create a web page using Java server programming.

34 Write a program to create a web page using JSP.

CA-258 A	PROGRAMMING using C# LAB	L-T-P	Cr
		0-0-4	2

LIST OF EXPERIMENTS

1. Write a program in C# illustrating the use of sequence, conditional and iteration construct.
2. Write a program in C# illustrating various operators like logical, arithmetical, relational, etc.
3. Write a program in C# illustrating overloading of various operators.
4. Write a program in C# illustrating use of friend, inline and Static Member functions, default arguments.
5. Write a program in C# illustrating use of destructor and various types of constructor.
6. Write a program in C# illustrating various forms of inheritance.
7. Write a program in C# illustrating use of virtual functions, Virtual base class, delegates.
8. Write a program in C# illustrating file operations.
9. Write a program in C# illustrating simple web applications using ASP.net
10. Write a program in C# illustrating use of Active X Controls.

MCA-209 A	Data Mining and Data Warehousing	L T P	Cr
		4 0 0	4

OBJECTIVE

This course introduces basic concepts, tasks, methods, and techniques in data mining. The emphasis is on various data mining problems and their solutions. Students will develop an understanding of the data mining process and issues, learn various techniques for data mining, and apply the techniques in solving data mining problems using data mining tools and systems. Students will also be exposed to a sample of data mining applications.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand the functionality of the various data mining and data warehousing component

CO2: Appreciate the strengths and limitations of various data mining and data warehousing models

CO3: Explain the analyzing techniques of various data

CO4: Describe different methodologies used in data mining and data ware housing.

CO5: Compare different approaches of data ware housing and data mining with various technologies.

UNIT I

DATA WAREHOUSING: Definition, usage and trends. DBMS vs data warehouse, data marts, metadata, multidimensional data mode, data cubes, schemas for multidimensional database: stars, snowflakes and fact constellations.

UNIT II

DATA WAREHOUSE ARCHITECTUREANDIMPLEMENTATION: OLTP vs. OLAP, ROLAP vs MOLAP, types of OLAP, servers, 3-Tier data warehouse architecture, distributed and virtual data warehouses, data warehouse manager, Computation of data cubes, OLAP queries manager, data warehouse back end tools, complex aggregation at multiple granularities, tuning and testing of data warehouse.

UNIT III

DATA MINING &ITS CURRENT TRENDS: Definition and task, KDD versus data mining, data mining techniques, Spatial databases, multimedia databases, time series and sequence data, mining text databases and mining Word Wide Web tools and applications. Strategy and business model current trends in data mining, open research area should be added in the course.

UNIT IV

DATA MINING QUERY LANGUAGES: Data specification, specifying knowledge, hierarchy specification, pattern presentation and visualization specification, data mining languages and standardization of data mining.

UNIT V

DATA MINING TECHNIQUES: Association rules, clustering techniques and implementation, decision tree knowledge discovery through neural networks and genetic algorithm, rough sets, support vector machines and fuzzy techniques.

TEXT BOOK

Data Mining Techbniques by ArjunPujri,PHI, Publication

REFERENCES:

1. Berson, "Data Warehousing, Data-Mining & OLAP", TMH
2. Mallach, "Decision Support and Data Warehousing System", TMH
3. Bhavani Thura-is-ingham, "Data-Mining Technologies, Techniques Tools & Trends", CRC Press
4. Navathe, "Fundamental of Database System", Pearson Education
5. Margaret H. Dunham, "Data-Mining. Introductory & Advanced Topics", Pearson Education
6. Pieter Adriaans, Dolf Zantinge, "Data-Mining", Pearson Education

MCA-213A	ADVANCE OPERATING SYSTEMS	L T P	Cr
		3 0 0	3

COURSE OBJECTIVE

To provide the knowledge of internals, different types and purpose of operating systems

PRE-REQUISITES

Knowledge of computer organization and architecture programming skills

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand the basics of operating systems like kernel, shell, types and views of operating systems

CO2: Describe the various CPU scheduling algorithms and remove deadlocks.

CO3: Explain various memory management techniques and concept of thrashing

CO4: Use disk management and disk scheduling algorithms for better utilization of external memory.

CO5: Recognize file system interface, protection and security mechanisms. Explain the various features of distributed OS like Unix, Linux, windows etc.

UNIT I

INTRODUCTION: Introduction to operating system concepts (including multitasking, multiprogramming, multi user, multithreading, etc)., types of operating systems: batch operating system, time-sharing systems, distributed OS, network OS, real time OS, embedded and smart card OS, various operating system services, architecture, system programs and calls.

UNIT II

PROCESS MANAGEMENT: Process concept, Life cycle and implementation of process, Thread usage and implementation in user space and in kernel, process scheduling, operation on processes, CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), priority scheduling, Round Robin (RR), multilevel feedback queue scheduling. Deadlocks, Deadlock characteristics, prevention, avoidance using banker's algorithm, detection and recovery; Critical section problems, mutual exclusion with busy waiting, Process synchronization, semaphores: binary and counting semaphores, Classical IPC problems: dining philosophers' problem, readers-writers problem.

UNIT III

MEMORY MANAGEMENT: Logical & physical address space, swapping, contiguous memory allocation, non-contiguous memory allocation paging and segmentation techniques, segmentation with paging, virtual memory management - demand paging & page-replacement algorithms, demand segmentation.

UNIT IV

I/O AND FILE YSTEMS: I/O hardware, device controllers, interrupt handlers, device drivers, application I/O interface, kernel, transforming I/O requests, performance issues, Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms, introduction to distributed file system.

UNIT V

LINUX/UNIX SYSTEM: LINUX/UNIX architecture, UNIX system calls for processes and file system management, basic commands of LINUX/UNIX, shell interpreter, shell scripts.

TEXT BOOK

1. William Stallings, Operating System: Internals and Design Principles, Prentice Hall, 8th Edition, 2014, ISBN10: 0133805913 • ISBN13: 9780133805918

2. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts John Wiley & Sons ,Inc., 9th Edition,2012, ISBN 9781118063330

3. Maurice J. Bach, "Design of UNIX Operating System", PHI

4.T1: Silberchatz et al, "Operating System Concepts", 5th edition, Addison-Wesley, 1998

REFERENCE BOOKS

1. Tom Adelstein and Bill Lubanovic, Linux System Administration, O'Reilly Media, Inc., 1st Edition, 2007.ISBN10: 0596009526 | ISBN13: 9780596009526
2. Harvey M. Deitel, Operating Systems, Prentice Hall, 3rd Edition,2003, ISBN10: 0131828274 | ISBN13: 9780131828278
3. Andrew S. Tanenbaum, Modern Operating System, Prentice Hall, 3rd Edition, 2007,ISBN10: 0136006639 | ISBN13: 9780136006633
4. Operating System in depth by Thomson
5. Tanenbaum A., "Modern Operating Systems", Prentice-Hall, 1992
6. Stallings William, "Operating Systems Internals and Design Principles", 4th edition, Prentice-Hall, 2001
7. Dhamdhere D. M., "Operating System", 2nd Edition, Tata McGraw Hill, 1999
8. Kernighan Brian and Pike Rob, "The Unix Programming Environment", Prentice Hall of India, 1984
9. Bach Maurich, "Design of the Unix Operating System", Prentice Hall of India, 1986
10. Muster John, "Introduction to UNIX and LINUX", Tata McGraw Hill, 2003
11. Ritchie Colin, "Operating System Incorporating Unix & Windows", Tata McGraw Hill, 1974
12. Madnick Stuart and Donovan John, "Operating Systems", Tata McGraw Hill, 2001
13. Deitel, "Operating Systems", Addison-Wesley, 1990
14. SinghalMukesh and Shivaratri N.G., "Operating Systems", Tata McGraw Hill, 2003

MCA-214A	SOFT COMPUTING TECHNIQUES	L T P	Cr
		4 0 0	4

OBJECTIVE:
To introduce about incorporating more mathematical approach (beyond conventional logic system) into the artificial intelligence approaches for problem solving such as fuzzy logic, genetic algorithms, etc.

CO1 Develop intelligent systems leveraging the paradigm of soft computing techniques.

CO2 Implement, evaluate and compare solutions by various soft computing approaches for finding the optimal solutions.

CO3 Recognize the feasibility of applying a soft computing methodology for a particular problem.

CO4 Design the methodology to solve optimization problems using fuzzy logic, genetic algorithms and neural networks.

CO5 Design hybrid system to revise the principles of soft computing in various applications.

Unit I
INTRODUCTION: Comparison of soft computing methods: neural networks, fuzzy logic, genetic algorithm with conventional artificial intelligence (hard computing).Least-square methods for system identification, recursive least square estimator; LSE for nonlinear models; derivative based optimization: descent methods, Newton's method, conjugate gradient methods; nonlinear least-squares problems: Gauss Newton method, Levenberg- Marquardt method.

Unit II
NEURAL NETWORKS: Different architectures; back-propagation algorithm; hybrid learning rule; supervised learning- perceptrons, back-propagation multilayer perceptrons, radial basis function networks; unsupervised learning – competitive learning network, Kohonen self-organizing networks, the Hopfield network.

Unit III
FUZZY SET THEORY: Basic definition and terminology; basic concepts of fuzzy logic; set theoretic operators; membership functions: formulation and parameterization; fuzzy union, intersection and complement; fuzzy rules and fuzzy reasoning; fuzzy inference systems: Mamdani and Sugeno fuzzy models.

Unit IV
NEURO-FUZZY MODELLING: Adaptive neuro-fuzzy inference systems; neuro-fuzzy controller-feedback control; back propagation through time and real-time recurrent learning; gradient-free optimization.

Unit V
GENETIC ALGORITHMS: Genetic algorithm, Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling:

Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, Applications & advances in GA, Differences & similarities between GA & other traditional method.

Text Book:- S.N Shivnandam & Deepa " Soft Computing Techniques" Wiley publication.

REFERENCE BOOKS

1. Rajase, Kharan S. and VijayalakshmiPai S. A., "Neural Networks, Fuzzy Logic & Genetic Algorithms", Prentice-Hall of India, 2003
2. Kecman Vojislav, "Learning and Soft Computing", MIT Press, 2001
3. Konar Amit, "Artificial Intelligence and Soft Computing – Behavioural and Cognitive Modeling of the Human Brain", Special Indian Edition, CRC Press, 2008
4. Goldberg David E., "Genetic Algorithms", Pearson Education, 2003.
5. Sivanandam, "Introduction to Neural Networks with MATLAB 6.0", Tata McGraw Hill
6. Kumar Satish, "Neural Networks: Classroom Approach", Tata McGraw Hill
7. Yen John and Langari Reza, "Fuzzy Logic, Intelligence, Control, and Information", Pearson Education, 2003.
8. Zurada Jack N., "Introduction to Neural Networks", Jaico Publishers.
9. Haykin Simon, "Neural Networks", Prentice Hall, 1993/Pearson Education, 1999.
10. Koza J., "Genetic Programming", MIT Press, 1993

MCA-216A	Cloud Computing	L T P	Cr
		3 0 0	3

Course Outcome:

CO1: Compare the strengths and limitations of cloud computing.

CO2: Identify the architecture, infrastructure and delivery models of cloud computing.

CO3: Apply suitable virtualization concept.

CO4: Choose the appropriate cloud player, Programming models and approach.

CO5: Address the core issues of cloud computing such as security, privacy and interoperability.

1. CLOUD ARCHITECTURE AND MODEL: Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models: - Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

2. **VIRTUALIZATION :** Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

3. **CLOUD INFRASTRUCTURE:** Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

4. PROGRAMMING MODEL: Parallel and Distributed Programming Paradigms – MapReduce, Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

5. SECURITY IN THE CLOUD : Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

Text Book:-

Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, 'Mastering Cloud Computing", TMGH,2013. 10. Gautam Shroff,Enterprise Cloud Computing,Cambridge University Press,2011

REFERENCES:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.

3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.

4. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011.

5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly

6. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.

7. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, "Grid and Cloud Computing – A Business Perspective on Technology and Applications", Springer.

8. Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010.

10. Michael Miller, Cloud Computing,Que Publishing,2008

11. Nick Antonopoulos, Cloud computing,Springer Publications,2010

MCA-220A	CRYPTOGRAPHY AND DATA COMPRESSION	L T P	Cr
		3 0 0	3

OBJECTIVE

The course will provide a down-to-earth overview of cryptographic techniques applicable in an IT environment, and outline the constraints and limitations of realistic secure systems. A running theme is the tradeoff between usability and security of a system. Also covered are a number of compression techniques - data compression and data encryption are, in some respects, closely related. A working knowledge of C is assumed and essential.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Apply various compression techniques for text and understand image compression and its standards.

CO2: Select suitable compression techniques for specified lossless and lossy audio and video applications.

CO3: Compare between symmetric and asymmetric cryptography and also describe different symmetric cryptographic techniques and standards.

CO4: Apply number theory concepts to solve the cryptographic problems.

CO5: Analyze different public key cryptography algorithms and also describe methods that provide the goals for integrity, confidentiality and authentication.

UNIT-I

COMPRESSION: Packing; Huffman coding; run length encoding; Lempel-Ziv-Welch; Phil Katz's PKZIP; Delta modulation; JPEG.

UNIT-II

ERROR DETECTION AND CORRECTION: Parity; 1, 2, n-dimensions, Hamming codes; p-out-of-q codes

UNIT-III

CRYPTOGRAPHY: Vocabulary; history, steganography – visual, textual; cipher hiding; false errors; public key cryptography - authentication, signatures, deniability

UNIT-IV

MATHEMATICS: Information; confusion; diffusion; modular arithmetic; inverses; Fermat's little theorem, Chinese remainder theorem; factoring; prime numbers; discrete logarithms

UNIT-V

ALGORITHMS: DES; AES (Rijndael); IDEA; one time pad; secret sharing and splitting; RSA; elliptic curves; modes; random numbers

REFERENCE BOOKS

1. IEEE, "Integration of Data Compression and Cryptography: Another Way to Increase the Information Security", IEEE Computer Society

2. Schneier B., "Applied Cryptography: Protocols, Algorithms and Source Code in C", 2nd edition, Wiley, 1996.
3. Desai Suhag, "Security in Computing", Pearson Education
4. Trappe W. and Washington L., "Introduction to Cryptography", 2nd edition, Pearson Education, 2006

MCA-221A	Big Data Analysis	L T P	Cr
		3 0 0	3

OBJECTIVE: The basics of Hadoop, the basics of Analytics – Concepts, Data preparation – merging, managing missing numbers sampling, Data visualization and Basic statistics.

Course Outcome
CO1: Identify big data application area.
CO2: Use big data framework
CO3: Model and analyze data by applying selected techniques
CO4: Demonstrate an integrated approach to big data.
CO5: Use of Hive & HBase.

UNIT 1 INTRODUCTION TO BIG DATA
Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce, Challenges for processing big data, Using big data in businesses.

Unit-2 Introduction to Hadoop
Introduction to Hadoop, why we use Hadoop, History of Hadoop, Use cases of Hadoop, Big Data – Apache Hadoop – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

Unit-3 HADOOP Architecture
Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., Name Node, Secondary Name Node, and Data Node, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

Unit-4 Hadoop Ecosystem and YARN
Learning MapReduce concepts and framework, Testing and Debugging Map Reduce Applications, Background of YARN; Hadoop YARN architecture; advantages of YARN, working with YARN, backward compatibility with YARN, YARN Commands, log management etc.

Unit-5 HIVE and HBASE
Introduction to Hive and HBASE, HIVE: Architecture, Managing tables, data types, schemas, partitions, HBASE: Architecture, Schema design; Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper., HBASE commands, HIVE Vs RDMS, HBASE Vs RDMS.

REFERENCES
1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk deroos et al. , “Understanding Big data ”, McGraw Hill, 2012.
3. Tom White, “HADOOP: The definitive Guide” , O Reilly 2012. 6 IT2015 SRM(E&T)
4. Vignesh Prajapati, “Big Data Analytics with R and Haoop”, Packet Publishing 2013.
5. Tom Plunkett, Brian Macdonald et al, “Oracle Big Data Handbook”, Oracle Press, 2014.

6. http://www.bigdatauniversity.com/
7. Jy Liebowitz, "Big Data and Business analytics",CRC press, 2013.

MCA-259 A	Data Mining and Data Warehousing Lab	L T P	Cr
		0 0 4	2

List of Experiment

1	Study Of Tanagra As A Data-Mining Tool :
2	Study Of Weka As A Data-Mining Tool:
3	Importing and viewing data in TANAGRA:
4	Defining status of data using Tanagra
5	Program to apply instance selection on given data using Tanagra.
6	Program to apply clustering algorithms on given data by using Tanagra tool.
7	Program to apply A Priori algorithms on given data using Tanagra:
8	Program to generate decision tree using Weka tool:
9	Program to use Weka tool to perform clustering:
10	Program to visualize all attributes of Preprocess using Weka
11	Program for processing the data using Weka
12	Program for Classification of Data using Neural Network
13	Program for Classification of Data using Bayesian Network
14	What attributes do you think might be crucial in making the analysis of diabetes? Come up with some simple rules in plain English using your selected attributes using diabetes. arff database
15	What attributes do you think might be crucial in making the analysis of contact-lenses? Come up with some simple rules in plain English using your selected attributes using contact Lenses.

MCA-271A	Big Data Analysis LAB	L T P	Cr
		002	2

Objective: The objective of this lab is to learn how to set up an environment for running Distributed Hadoop applications.

1. Implement the following Data structures in Java
   a)Linked Lists
   b) Stacks
   c) Queues
   d) Set

2. Perform setting up and Installing Hadoop in its three operating modes:
   Standalone • Pseudo distributed • fully distributed.

3. Perform Frequently used Hadoop shell commands.

4. Implement the following file management tasks in Hadoop:
   Adding files and directories
   Retrieving files
   Deleting files

5. Implement the following file management tasks in Hadoop:
   Adding files and directories• Retrieving files• Deleting files

6. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

7. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

8. Implement Matrix Multiplication with Hadoop Map Reduce.

9. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

10. Install and Run Hive then use Hive to create, alter, and drop databases & tables.

Cloud computing lab

This laboratory course will comprise as exercises to supplement what is learnt under paper MCA-216A.

Syllabus

of

MCA

3rd Year

5th Semester

MCA-301A	ARTIFICIAL INTELLIGENCE	L-T-P	Cr
		3-1-0	4

PRE-REQUISITES: Knowledge of data structures, mathematics, algorithm

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning

CO2: Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

CO3: Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.

CO4: Demonstrate proficiency in applying scientific method to models of machine learning.

CO5: Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

UNIT I

INTRODUCTION TO AI AND SEARCH TECHNIQUES: Foundation and history of AI; data, information and knowledge; agents, AI problems and techniques – AI programming languages, problem space representation with examples; blind search strategies, breadth first search, depth first search, heuristic search techniques: hill climbing: best first search, A * algorithm AO* algorithm, Means-ends analysis.

UNIT II

KNOWLEDGE REPRESENTATION ISSUES AND STRUCTURE: predicate logic; logic programming; constraint propagation; representing knowledge using rules, semantic nets, partitioned nets, parallel implementation of semantic nets; frames, common sense reasoning and thematic role frames; architecture of knowledge based system; rule based systems; forward and backward chaining; frame based systems.

UNIT III

REASONING UNDER UNCERTAINITY: Reasoning under uncertainty, non monotonic reasoning; review of probability; Bayes' probabilistic interferences and Dempster Shafer theory; symbolic reasoning under uncertainty; statistical reasoning, fuzzy reasoning.

UNIT IV

PLANNING & GAME PLAYING: Minimax search procedure; goal stack planning; non linear planning, hierarchical planning, planning in situational calculus; representation for planning; partial order planning algorithm

UNIT V

LEARNING AND APPLICATIONS OF ARTIFICIAL INTELLIGENCE:: Basic concepts; rote learning, learning by taking advices, learning by problem solving, learning from examples, discovery as learning, learning by analogy; explanation based learning; neural nets; genetic algorithm ,Principles of natural language processing; expert systems, knowledge acquisition concepts; AI application to robotics, and current trends in intelligent systems

REFERENCE BOOKS

1. Rich Elaine and Knight Kevin, "Artificial Intelligence", 3rd Edition, Tata McGraw Hill,1991
2. Nilson Nils J., "Artificial Intelligence", McGraw-Hill, New York 1971
3. Russell Stuart and Norvig Peter, "Artificial Intelligence: A Modern Approach", Prentice Hall of India, 1998
4. Negnevitsky, "Artificial Intelligence: A Guide to Intelligent System", Pearson Education, 2004.
5. Patterson O. W., "Introduction to Artificial Intelligence & Expert Systems", Prentice Hall of India, 1996.
6. Winston Patrick Henry, "Artificial Intelligence", 3rd Edition, Addition Wesley, 1992
7. Clockson & Mellish, "Programming PROLOG", 3rd Edition, Narosa Publications, 2002.

MCA-303 A	INTRODUCTION TO ERP	L T P	Cr
		3-1 0	4

OBJECTIVE

To provide knowledge about the enterprise resource planning tools, models and techniques

PRE-REQUISITES

Knowledge of internet and web development, data mining, computer networks, software engineering.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Make basic use of Enterprise software, and its role in integrating business functions

CO2: Analyze the strategic options for ERP identification and adoption.

CO3: Design the ERP implementation strategies

CO4: Identify and describe typical functional modules in ERP system.

CO5: Describe the process of developing and implementing ERP systems

UNIT I

ENTERPRISE RESOURCE PLANNING AND ITS RELATED TECHNOLOGIES: ERP overview; need of ERP; growth of ERP; benefit; Proper and improper ERP implementation; data ware housing; data mining;

UNIT II

ERP AND RELATED TECHNOLOGIES: data warehousing, data mining; online analytical processing (OLTP); supply chain management (SCM); customer relationship management (CRM).

UNIT III

ERP MODULES AND VENDORS: Finance; production planning, control & maintenance, sales & distribution- General Ledger and Normal Ledger; human resource management (HRM); inventory control system; quality management; ERP market.

UNIT IV

ERP IMPLEMENTATION LIFE CYCLE& FUTURE DIRECTIVES IN ERP: evaluation and selection of ERP package ;project planning; implementation team training & testing ; end user training & going live; post evaluation & maintenance; introduction to hidden costs, vendors, consultant employees, Critical factors guiding selection and evaluation, strategies for successful implementation, critical success and failure factors.

UNIT V

ERP MARKET AND ERP CASE STUDIES: Market place; Study of Open Source and commercial ERP tools Study (Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards. Post implementation review of ERP packages in manufacturing, services, and other organizations; using ERP tool: either sap or oracle format to case study.

TEXT BOOK

1. Leon, Alexis, "Enterprise Resource Planning", Tata McGraw-Hill, 1999

REFERENCE BOOKS

2. Garg, V.K. ,&Venkitakrishnan, N.K. , "ERP Ware: ERP Implementation Framework"
3. Leon, Alexis, "ERP Concepts and Planning", Tata McGraw-Hill
4. Motiwalla, Luvai F. , Thompson, Jeff, "Enterprise System for Management", Pearson Education
5. Mary Sumner, "Enterprise Resource Planning", Pearson Education, 2007

CS-407B	NATURAL LANGUAGE PROCESSING	L T P	Cr
		3-0-0	3

OBJECTIVE

To make the students knowledgeable about the natural Language Processing

COURSE OUTCOMES

CO1: Understand approaches to syntax and semantics in NLP.

CO2: Understand approaches to discourse, generation, dialogue and summarization within NLP

CO3: Understand current methods for statistical approaches to machine translation

CO4: Understand machine learning techniques used in NLP, including hidden Markov models and probabilistic context-free grammars

CO5: Understand clustering and unsupervised methods, log-linear and discriminative models, and the EM algorithm as applied within NLP

UNIT I

INTRODUCTION TO NATURAL LANGUAGE PROCESSING: Why is NLP hard, Empirical Laws, Text Processing: Basics, Spelling Correction: Edit Distance, Weighted Edit Distance, Other Variations, Noisy Channel Model for Spelling Correction, N-Gram Language Models, Evaluation of Language Models, Basic Smoothing

UNIT – II

Language Modeling: Advanced Smoothing Models, Computational Morphology, Finite - State Methods for Morphology, Introduction to POS Tagging, Introduction to POS Tagging, Viterbi Decoding for HMM, Parameter Learning, Baum Welch Algorithm, Maximum Entropy Models – I,II, Conditional Random Fields

UNIT – III

SYNTAX: Introduction, Parsing I, CKY, PCFGs- Inside-Outside Probabilities, Dependency Grammars and Parsing – Introduction, Transition Based Parsing : Formulation, Learning , MST-Based Dependency Parsing-Learning

UNIT – IV

DISTRIBUTIONAL SEMANTICS – Introduction, Structured Models, Word Embeddings, Lexical Semantics – Wordnet, Word Sense Disambiguation, Novel Word Sense detection, Topic Models : Introduction, Latent Dirichlet Allocation : Formulation, Gibbs Sampling for LDA, Applications, LDA Variants and Applications , Entity Linking

UNIT - V

INFORMATION EXTRACTION - Introduction , Relation Extraction, Text Summarization – LEXRANK, Optimization based Approaches for Summarization, Text Classification, Sentiment Analysis- Affective Lexicons, Learning Affective Lexicons , Aspect - Based Sentiment Analysis

TEXT BOOKS

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and ImedZitouni, PearsonPublication.
2. Natural Language Processing and Information Retrieval: TanvierSiddiqui, U.S. Tiwary.
3. "Natural Language Understanding" James Allen, -1995Benjamin/cummings Pub. Comp. Ltd
4. "Language as a cognitive process", Terry Winograd 1983, AW
5. "Natural Language processing in prolog", G. Gazder, 1989, Addison Wesley.
6. " Introduction of Formal Language Theory", MdljArbib&Kfaury, 1988, Springer

REFERENCE

1. Speech and Natural Language Processing - Daniel Jurafsky& James H Martin, Pearson Publications.
2. https://nptel.ac.in/course.html/Natural Language Processing

MCA-305A	DATA SCIENCE USING PYTHON	L-T-P	Cr
		3 -0-0	3

OBJECTIVE

To give the students' knowledge about the Python programming language and its implementation in concepts of data science

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Create algorithms of moderate complexity, and can implement them in at least two languages appropriate for data science work.

CO2: Exploratory and inferential analysis, students can construct complex statistical models, assess the fit of such models to the data, and apply the models in real-world contexts.

CO3: Recognize that different models fit and perform better than others, and can measure fit and performance appropriately.

CO4: Performing exploratory and inferential procedures, students can fit complex models using dedicated statistical software

CO5: choose appropriate data management strategies, can carry out relevant analyses, can interpret and apply the results to inform understanding and solve specific problems in context, and can communicate the work to a technical audience.

UNIT I

Python data structures, Control statements, Functions, Object Oriented programming concepts using classes, objects and methods, Exception handling, Implementation of user-defined Modules and Package, File handling in python.

UNIT II

Knowledge domains of Data Analysis, Understanding structured and unstructured data, Data Analysis process, Dataset generation, Importing Dataset: Importing and Exporting Data, Basic Insights from Datasets, Cleaning and Preparing the Data: Identify and Handle Missing Values.

UNIT III

Data Formatting, Exploratory Data Analysis, Filtering and hierarchical indexing using Pandas. Data Visualization: Basic Visualization Tools, Specialized Visualization Tools, Seaborn Creating and Plotting Maps

UNIT IV

Numpy and Scipy Package, Understanding and creating N-dimensional arrays, basic indexing and slicing, Boolean indexing, fancy indexing, Universal functions, Data processing using arrays, File input and output with arrays.

UNIT V

Data wrangling, Web scrapping, Combing and merging data sets, Reshaping and pivoting, Data transformation, String Manipulation, case study for web scrapping.

TEXT-BOOKS

1. David Ascher and Mark Lutz, Learning Python, Publisher O'Reilly Media.
2. Reema Thareja, "Python Programming using Problem Solving approach", Oxford University press
3. Wes Mckinney "Python for Data Analysis", First edition, Publisher O'Reilly Media.

REFERENCE-BOOKS

1. Allen Downey , Jeffrey Elkner ,Chris Meyers,: Learning with Python, Dreamtech Press
2. David Taieb ,"Data Analysis with Python: A Modern Approach " 1st Edition, Packt Publishing

MCA-310A	SOFTWARE PROJECT MANAGEMENT	L T P	Cr
		3-0-0	3

OBJECTIVE

To provide the foundation required for becoming a good software project manager by means of planning, evaluation and estimation, risk management, allocation and monitoring of resources, controlling software quality

PRE-REQUISITES

Knowledge of software engineering and the basic principles of management.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Identify the different project contexts and suggest an appropriate management strategy.
CO2: Practice the role of professional ethics in successful software development.
CO3: Identify and describe the key phases of project management.
CO4: Acquire the knowledge of managing, economics for conventional, modern and future software projects.
CO5: Determine an appropriate project management approach through an evaluation of the business context and scope of the project.

UNIT I

INTRODUCTION: Definition of a Software Project (SP), SP vs. other types of projects activities covered by SPM; categorizing SPs; project as a system; management control, requirement specification; information and control in organization

STEPWISE PROJECT PLANNING: Introduction, selecting a project; identifying project scope and objectives; identifying project infrastructure, analyzing project characteristics; identifying project products and activities; estimate efforts each activity; identifying activity risk; allocate resources; review/ publicize plan

UNIT II

PROJECT EVALUATION AND ESTIMATION: Cost benefit analysis; cash flow forecasting; cost benefit evaluation techniques; risk evaluation; Selection of an appropriate project report; Choosing technologies, choice of process model, structured methods: rapid application development, water fall, V-process-, spiral- models; Prototyping; delivery; Albrecht function point analysis

UNIT III

ACTIVITY PLANNING AND RISK MANAGEMENT: Objectives of activity planning; project schedule; projects and activities; sequencing and scheduling activities, network planning model; representation of lagged activities; adding the time dimension, backward and forward pass; identifying critical path; activity throat, shortening project; precedence networks; Risk Management: Introduction, the nature of risk, managing risk, risk

identification, risk analysis, reducing the risks, evaluating risks to the schedule, calculating the z values.

UNIT IV

RESOURCE ALLOCATION AND MONITORING THE CONTROL: Introduction, the nature of resources, identifying resource requirements; scheduling resources creating critical paths; counting the cost; being specific; publishing the resource schedule; cost schedules, the scheduling sequence; Monitoring the control: Introduction, creating the frame work, collecting the data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control

MANAGING CONTRACTS AND PEOPLE: Introduction, types of contract, stages in contract, placement, typical semesters of a contract, contract management, acceptance, Managing people and organizing semesters: Introduction, understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures, conclusion, further exercises

UNIT V

SOFTWARE QUALITY: Introduction; the place of software quality in project planning; the importance of software quality; defining software quality, ISO 9126; Practical software quality measures; product versus process quality management; external standards; techniques to help enhance software quality; Study of any software project management software: viz Project 2005 or equivalent

REFERENCE BOOKS

1. Bob Hughes and Mike Cotterell, "Software Project Management", 2nd Edition, Tata McGraw Hill, 1999
2. Futrell, "Software Quality & Project Management", Pearson Education, 2002.
3. Jalote Pankaj, Software Project Management, Pearson Education, 2002.
4. Gopalaswamy Ramesh, "Managing Global Software Projects", Tata McGraw Hill, 2001
5. Pressman Roger S., "Software Engineering – A Practitioner's Approach", 5th Edition, McGraw Hill, 2001
6. Walker Royce, "Software Project Management", Addison Wesley, 1998
7. Maylor, "Project Management", Third Edition, 2003.
8. Demarco Tom, "Controlling Software Project Management and Measurement", Prentice Hall, 1982
9. Glib Tom and Susannah Finzi, "Principles of Software Engineering Management", Addison Wesley, 1998.

MCA-351A	ARTIFICIAL INTELLIGENCE LAB	L T P 0-0-2	Cr 1

COURSE OUTCOMES

CO1: Explain artificial intelligence, its characteristics and its application areas.
CO2: Formulate real-world problems as state space problems, optimization problems or constraint satisfaction problems
CO3: Select and apply appropriate algorithms and AI techniques to solve complex problems.
CO4: Design and develop an expert system by using appropriate tools and techniques.
CO5: Understanding of web scraping data wrangling.

LIST OF EXPERIMENTS

1. Study of Python programming language.
2. Write a program to find out route distance between two cities using Python.
3. Write a program to implement Tower of Hanoi using Python.
4. Write a program to calculate factorial of a number using Python.
5. Write a program to print the list of customer having different colored cars with price and model available using Python.
6. Write a program to implement water jug problem using Python.
7. Write a program to implement Breadth First Search using Python
8. Write a program to implement Depth First Search using Python
9. Write a program to solve 8-Queens problem using Python.
10. Write a program to solve Monkey Banana problem using Python.

MCA-355A	DATA SCIENCE USING PYTHON LAB	L-T-P	Cr
		0-0-2	1

COURSE OUTCOMES

CO1 To Access the .txt file by using Python Libraries.
CO2 Demonstrate the output of data in .txt file.
CO3 Practical Knowledge of Data Analysis, Understanding structured and unstructured data
CO4 Importing and Exporting Data, Basic Insights from Datasets, Cleaning and Preparing the Data
CO5 implementation of web scraping, data wrangling.

LIST OF EXPERIMENTS

1. Python data structures, Control statements,
2. Functions, Object Oriented programming concepts using classes, objects and methods,
3. Exception handling, Implementation of user-defined Modules and Package, File handling in python.
4. Knowledge domains of Data Analysis, Understanding structured and unstructured data
5. Data Analysis process, Dataset generation, Importing Dataset
6. Importing and Exporting Data, Basic Insights from Datasets, Cleaning and Preparing the Data: Identify and Handle Missing Values.
7. Data Formatting, Exploratory Data Analysis
8. Filtering and hierarchical indexing using Pandas. Data Visualization
9. Basic Visualization Tools, Specialized Visualization Tools, Seaborn Creating and Plotting Maps.
10. Numpy and Scipy Package, Understanding and creating N-dimensional arrays
11. Basic indexing and slicing, Boolean indexing, Fancy indexing, Universal functions
12. Data processing using arrays, File input and output with arrays.
13. Data wrangling, Web scrapping, Combing and merging data sets, Reshaping and pivoting
14. Data transformation, String Manipulation, case study for web scrapping.

Syllabus

of

MCA

3rd Year

6th Semester

CA-1307A	ELECTIVE-II NEURAL NETWORKS	L T P	Cr
		3 0 0	3

OBJECTIVE

To study various algorithms and their implementation in real life and in different domains**.**

PRE-REQUISITES

Knowledge of Applied Mathematics and basic calculation techniques of matrices.

COURSE OUTCOMES

CO1: Model Neuron and Neural Network, and to analyze ANN learning, and its applications
CO2: Perform Pattern Recognition, Linear classification.
CO3: Develop different single layer/multiple layer Perception learning algorithms
CO4: Design of another class of layered networks using deep learning principles.
CO5: Understanding of single layer and neural networks.

UNIT I

OVERVIEW OF BIOLOGICAL NEURONS: Structure of biological neurons relevant to ANNs.

UNIT II

FUNDAMENTAL CONCEPTS OF ARTIFICIAL NEURAL NETWORKS: Models of ANNs; Feed forward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner lake all learning rule, etc.

UNIT III

SINGLE LAYER PERCEPTION CLASSIFIER: Classification model, Features & Decision regions; training & classification using discrete perception, algorithm, single layer continuous perception networks for linearly separable classifications.

UNIT IV

MULTI-LAYER FEED FORWARD NETWORKS: linearly non-separable pattern classification, Delta learning rule for multi-perceptron layer, generalized delta learning rule, Error back propagation training, learning factors, Examples.

UNIT V

SINGLE LAYER FEED BACK NETWORKS: Basic Concepts, Hopfield networks, Training & Examples, associative memories

TEXT BOOKS

Introduction to artificial neural systems by Jacek M. Zurada, 1994, Jaico Publ.House.

REFERENCE BOOKS

1. Neural Networks :A Comprehensive formulation , Simon Haykin, 1998, AW
2. Neural Networks , Kosko, 1992, PHI.
3. Neural Network Fundamentals N.K. Bose , P. Liang, 2002, T.M.H

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SCHEME FOR CSE (BCA)

BCA			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CA-1101A	Computer Programming	4	0	0	4
2	CA-1108A	Internet and Web Development	4	0	0	4
3	MA-1104A	Mathematics-I	4	0	0	4
4	BEN-101A	Communication skill	3	0	0	3
5	CA-1107A	Computer Fundamental and Emerging Technology	3	0	0	3
6	BA-247A	Accounting and Financial Management	4	0	0	4
7	CA-1151A	Computer Programming Lab	0	0	2	1
8	CA-1157A	PC Software Lab	0	0	2	1
9	CA-1158A	Internet and Web Development Lab	0	0	2	1
10	PDP-101	Induction & Nurturing hobbies	0	0	2	1
		Total---->	**22**	**0**	**8**	**26**

SCHEME FOR CSE (BCA)

BCA			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CA-1102A	Data Structures using C	4	0	0	4
2	CA-1104A	Object Oriented Programming using C++	4	0	0	4
3	CA-1106A	Discrete structure	3	0	0	3
4	EC-1101A	Basics of Digital Electronics	4	0	0	4
5	MA-1105A	Mathematics-II	4	0	0	4
6	CE-101A	Environmental Science and Ecology	2	0	0	2
7	CA-1152A	Data Structures Using C Lab	0	0	2	1
8	CA-1154A	Object Oriented Programming using C++ Lab	0	0	2	1
9	PD-251A	MAT LAB	0	0	4	2
10	PDP-102	People Connect	0	0	2	1
		Total---->	**21**	**0**	**10**	**26**

BCA			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CA-1201A	Operating Systems	4	0	0	4
2	CA-1202A	Computer Architecture & Organization	4	0	0	4
3	CA-1206A	Multimedia Technologies	4	0	0	4
4	CA-1210A	Computer Networks	3	0	0	3
5	CA-1212A	Core Java	4	0	0	4
6	CA-1213A	Database Management System	4	0	0	4
7	CA-1256A	Multimedia Technologies Lab	0	0	2	1
8	CA-1262A	Core java Lab	0	0	2	1
9	CA-1263A	Database Management System Lab	0	0	2	1
10	PDP-201	Personality Development & Grooming	0	0	2	1
		Total---->	**23**	**0**	**8**	**27**

SCHEME FOR CSE (BCA)

BCA			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CA-1204A	Computer Graphics	4	0	0	4
2	CA-1205A	Design and Analysis of Algorithms	4	0	0	4
3	CA-1207A	Linux and Shell Programming	3	0	0	3
4	CA-1208A	Applied Numerical Techniques	3	0	0	3
5	CA-1209A	IT Management	3	0	0	3
6	CA-1211A	Rapid Application Development	3	1	0	4
7	CA-1254A	Computer Graphics Lab	0	0	2	1
8	CA-1257A	Linux and Shell Programming Lab	0	0	2	1
9	CA-1261A	Rapid Application Development Lab	0	0	2	1
10	PDP-202	Life Skill	0	0	2	1
		Total---->	**20**	**1**	**8**	**25**

SCHEME FOR CSE (BCA)

BCA			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CA-1302A	Software Engineering Principles	4	0	0	4
2	CA-1303A	Programming Using C#	4	0	0	4
3	CA-1304A	Artificial Intelligence	4	0	0	4
4	CA-1305A	Introduction to E-commerce	3	0	0	3
5	CA-1309A	Elective – I (Network Security Management)	3	0	0	3
6	CA-1353A	Programming Using C# Lab	0	0	2	1
7	CA-1354A	Artificial Intelligence Lab	0	0	2	1
8	CA-1381A	Minor project -I	0	0	10	5
9	PDP-301	Leadership & Entrepreneurship Development	0	0	2	1
10		**Total---->**	**18**	**0**	**16**	**26**

SCHEME FOR CSE (BCA)

BCA			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CA-1306 A	Software Project Management	3	0	0	3
2	CA-1307 A	Neural Network	4	0	0	4
3	CA-1325	Cryptography and Data Compression	3	0	0	3
4	CA-1310A	Python Programming	3	0	0	3
5	CA-1329A	Elective -2 (Big Data Analysis)	3	0	0	3
6	CA-1382	Project	0	0	8	4
7	CA-1357A	Neural network lab	0	0	2	1
8	CA-1360 A	Python Programming Lab	0	0	2	1
9	PDP-302	Problem Solving Skills	0	0	2	1
10		**Total---->**	**16**	**0**	**14**	**23**

CA-1101A	COMPUTER PROGRAMMING	L-T-P	Cr
		4-0-0	4

OBJECTIVE

To introduce the students the basic of C and Logic behind the implementation of different features of C like different data types , function, array, control statements, pointers, structures, file processing and recursion.

COURSE OUTCOMES

The student after undergoing this course will be able:

CO1: To know the different programming languages
CO2: To learn the basic concepts of C programming language
CO3: To learn the concepts of different control statements
CO4: To know about different data types and the ways of handling
CO5: To store the data in a file type and how to maintain it

UNIT I

COMPUTER FUNDAMENTALS AND OVERVIEW OF C PROGRAMMING: Computer Fundamentals: Algorithm, Flow charts and their symbols. Types of programming languages (Machine Language, Assembly Languages, High level Languages), Introduction to Compiler, Assembler, and Interpreter, Introduction to C, Structure of C program, C character set, Identifier and Keywords, Data types, constants, variables, Declaration, expressions, Types of operators, Input and output functions in C, header files

UNIT II

CONTROL STATEMENTS: Control Statements & loops: Sequencing, Selection: if. If-Else, Nesting and switch statements, iteration: for loop, while loop, do while loop, break & continue statements

UNIT III

ARRAYS AND STRING HANDLING: Declaring, Referencing and initializing arrays, array subscript, using for loop for sequential access, Using array element as a function argument, multi-dimensional array, String basics string library functions, assignment and substring, concatenation, string comparison.

UNIT IV

FUNCTION AND POINTERS: Defining a function, accessing a function, function prototypes, passing arguments to a function, call by value and reference, Types of storage classes, Scope of variable: Global, local, static variables, Recursion. Pointer variables, Declaring & initializing pointers, operations on pointers, pointer expressions, pointers and arrays, pointer and functions, C's dynamic allocation functions.

UNIT V

STRUCTURE, UNION AND FILE PROCESSING: Declaration and Initialization of structure, accessing members of a structure, Union, Pre-processor directives, file processing: Introduction, streams and file types, opening and closing a data file, input and output operations, text mode versus binary mode, formatted input output operations with files, structures read and write in files

TEXT BOOK

1. Computer Fundamentals, P.K Sinha, 5th Edition, BPB Publications.
2. Yashwant kanitkar," Let Us C", by BPB Publication.

REFERENCE BOOKS

1. Dennis, M. Ritchie and Brian, W. Kernigham, "The C Programming Language, Prentice Hall of India, 2nd Edition, 1988
2. Hanly Jeri R, & E. B. Koffman , "Problem Solving and Program Design in C", Pearson Publication, 5th Edition, 2008.
3. Byron, C. Gottfried, "Theory and Problem of Programming with C", Tata McGraw Hill
4. E.Balagurusamy "C – programming" Tata McGray Hill.
5. Schildt, Herbert "The Complete Reference C", 4th Edition, Tata McGraw Hill, 2004

CA-1108A	INTERNET AND WEB DEVELOPMENT	L-T-P	Cr
		4-0-0	4

OBJECTIVE

It aims to provide students will be familiarized with Internet Structure and with the basic protocols which provides knowledge of a proficiency in basic techniques for the development of Web-based applications.

Pre-Requisites:

Knowledge of Web, and basics of Computer and Internet.

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know about the web and web hosting

CO2: To create their own website using HTML

CO3: To learn to make the dynamic website using CSS

CO4: To understand the client side programming using Javascript

CO5: To aware about the search engine and its optimization

UNIT I

INTRODUCTION TO WEB AND HOSTING: The idea of hypertext and hyper media; how the browser works: MIME types, plug-ins and helper applications; XML, XHTML, XSLT and the W3C,Hosting and Domains: *Choosing a domain name, Selecting a hosting company ,Blog hosting services and how they could work for your website; Hosting management tools through the browser such as cPanel.*

UNIT II

HYPERTEXT MARKUP LANGUAGE: *The anatomy of an HTML document; marking up for structure and style: ordered and unordered lists, Structuring content with HTML using natural divisions ,* Marquee, *Anchor Tag, Email Link; embedding images and controlling appearance, table creation: Frames and Nesting, iframes, forms, Semantic elements of HTML5, HTML5 Form elements, Media tags in HTML5, HTML5 Data Storage*

UNIT III

POWER OF CSS: Introduction to Cascading Style Sheet: Selector, Declaration and declaration block. Types of CSS: Inline, Internal and Internal style specifications within HTML. Types of Selector; Building & Applying Class Selectors; ID Selector using Div Tags; CSS Properties: Table, List, Fonts, Link, Margins, Background Colors.

UNIT IV

CLIENT SIDE PROGRAMMING: Introduction to JavaScript syntax: output, Comments, variables, functions, operators, conditions, switch, loop; JavaScript object model: Window, Location and History object model; HTML DOM: Introduction to DOM: methods, event handling, JavaScript Functions, Forms validation and regular expressions.

UNIT V

SEARCH ENGINE OPTIMIZATION: *What is Search Engine Optimization? Natural vs. paid search and a look at how Google and other search engines work. Maximizing natural search with page titles, meta tags and page content; importance of inbound links in search rankings. Search engine marketing.*

Textbook:

Uttam K. Roy, "Web Technology", Oxford Publication

References Books:

1. Musciano Chuck, "HTML & XHTML: The Definitive Guide", Bill Kennedy, 4th Edition, 2000.
2. Holzner Steven, "XHTML Black Book", Paraglyph Press, 2000.
3. Guy W.Lecky-Thompson, "Web Programmin", Cengage Learning, 2008.
4. Kamal Raj, "Internet and Web Technologies", Tata McGraw Hill, 2002

Web References:

1. http://W3schools.com.
2. http://www.uniweb.be/
3. http://www.sagaciousindia.com/

MA-1104A	MATHEMATICS-I	L-T-P	Credits
		4-0-0	4

OBJECTIVE

To introduce the basics concept of mathematics

COURSE OUTCOMES

The students undergoing this course will able:

CO1: To learn about limit, continuity as well as discontinuity

CO2: To state about the matrices and its applications

CO3: To learn about the infinite series

CO4: To know about the differentiation, partial differentiation and its applications

CO5: To aware about the different concepts of integration

UNIT I

LIMIT & CONTINUITY: The real line and its geometrical representation; e-δ treatment of limit and continuity; Properties of limit and classification of discontinuities; Properties of continuous functions.

UNIT II

MATRICES AND ITS APPLICATIONS: Elementary transformations; inverse of the matrix using elementary transformation; normal form of a matrix; rank of a matrix; solution of simultaneous linear equations; linear dependence and independence of vectors; linear and orthogonal transformations; eigen values, eigen vectors and properties; Cayley-Hamilton theorem and its applications; diagonalization of matrices.

UNIT III

INFINITE SERIES: Convergence and divergence; comparison test; D'Alembert's ratio test; Cauchy's root test; Raabe's test; logarithmic test; Gauss test; Cauchy's integral test; Leibnitz's alternate series test; absolutely convergent; conditionally convergent.

UNIT IV

APPLICATIONS OF DIFFERENTIATION & PARTIAL DIFFERENTIATION: Asymptotes; Concavity, convexity and points of inflection; Curvature; Extrema; elementry curves, tangent and normal in parametric form; Polar Coordinates. Limits and continuity of functions of two variables; Partial derivatives; Taylor's theorem and Maclaurin's Theorem for function of two variable.

UNIT V

MULTIPLE INTEGRATIONS: Double and triple integrals; Change of order in double integrals.

APPLICATIONS OF INTEGRAION: length of a curve; Arc length as a parameter; Evoute & Envelope; Volumes and surface areas of solids of revolution.

TEXT BOOK:

Grewal, B.S., "Higher Engineering Mathematics", 41st Edition,2010,Khanna Publishers.

REFERENCE BOOKS

1. Kreyszig, E., "Advance Engineering Mathematics", 10th Edition, 2011,Wiley India Publishers, New Delhi
2. Weir, M. D., Hass, J. and Giordano, F. R., "Thomas Calculus", 11th Edition, 2012, Pearson Education.
3. Jain, R.K. and Iyengar, S.R.K., " Advance Engineering Mathematics" ,3rd Edition,2002, Narosa Publishing House New Delhi.
4. H. Anton, I. Bivens and S. Davis, *Calculus,* 7th Ed., John Wiley and Sons (Asia) P. Ltd., Singapore, 2002.
5. G.B. Thomas and R.L. Finney, *Calculus*, 9th Ed., Pearson Education, Delhi, 2005.

BEN-101A	COMMUNICATION SKILL	L-T-P	Cr.
		3-0-0	3

OBJECTIVE
To make students understand the concepts related to language development communication skills.

COURSE OUTCOMES
The students undergoing the course will be able:
CO1: To know the basic structure of speech
CO2: To learn about oral communication and role of speech organs in it
CO3: To get knowledge about the writing skills
CO4: To be skillful in writing different applications as well as letters
CO5: To know all about comprehension

UNIT I
REMEDIAL ENGLIGH: Parts of Speech; Tenses and their application; Verbs and their various forms.

UNIT II
ORAL COMMUNICATION: Introduction to oral communication; Importance of pronunciation; Phonetics; Importance of phonetics; Basic introduction to speech organs, articulation and phonetic symbols.

UNIT III
WRITING SKILLS: Introduction to various types of writings including general writing, technical writing, picture composition, Slogan making; Movie review etc.

UNIT IV
LETTER WRITING: Types of letter writing; Structure & layout; Leave application; Letter of enquiry & response with respect to educational & official matters; Informal letter expressing or discussing social or educational issues.

UNIT V
COMPREHENSION: Listening comprehension & reading comprehension; Listening to recorded speeches, TV news and other audio materials to test listening comprehension; comprehension of unseen passages through reading.

TEXT BOOK:
Pal Rajendra, Korlaha, Hi, J,S., “Essentials of Business Communication”, Sultan Chand & Sons

REFERENCE BOOKS

1. Rutherford, Andrea, J., "Basic Communication Skills for Technology", Pearson Education Asia.
2. Prasad, V., "Advanced Communication Skills", Atma Ram Publications, New Delhi.
3. Madhukar, R., K, "Business Communication", Vikas Publishing House Pvt. Ltd.

CA-1107A	COMPUTER FUNDAMENTALS & EMERGING TECHNOLOGY	L-T-P	Credits
		3-0-0	3

OBJECTIVE

To introduce the basic concepts of computers as well as different emerging technologies.

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the history, different types came into existence via generations of the computer

CO2: To understand the different hardware and their usage

CO3: To learn the different number systems and their conversions

CO4: To learn about the operating system and its need

CO5: To know about the different technologies to be emerged in different areas

UNIT 1

INTRODUCTION TO COMPUTERS: Basics of Computers What is Computer? Characteristics of Computer Data Processing Cycle (Data -Process -Information) Classification of Computer by Data Processed Analog, Digital and Hybrid Computers History and Generation of Computers First to Fifth Generation Computers Classification of Computers by Processing Capabilities Micro, Mini, Mainframe and Super Computer Simple Model of Computer Input Devices CPU (Central Processing Unit) Arithmetic & Logic Unit Control Unit Internal Memory Output Devices Secondary Storage Devices, Input and output devices

UNIT II

Internal / External parts used with Computer cabinet ,Introduction to Mother board ,Type of Processors Dual Core, Core 2 Duo, i2, i3, etc. ,Memory structure and Types of Memory ,RAM (SRAM, DRAM, SD, DDR, etc.) ,ROM (ROM, PROM, EPROM, EEPROM, etc.) ,Slots ,ISA Slots /PCI Slots / Memory Slots, Sockets ,Cables, Serial Cable / Parallel Cable / USB Cable. ,Ports, USB / Serial / Parallel / PS2, Graphic Cards., Data Storage :Introduction, Type of Magnetic Storage Devices, Floppy Disk / Hard Disk / Magnetic Tape / Magnetic Disks, Storage Mechanism of Magnetic Storage Devices, Tracks / Sectors / Clusters / Cylinders, Reading / Writing Data to and from Storage Devices, Seek Time / Rotational Delay – Latency / Access Time / Response Time, Other Storage Devices, USB – Pen Drive / CD / DVD / Blu-Ray Disk etc.

UNIT III

Numbering System and Codes, Introduction to Binary Codes, Nibble / Bit / Byte / Carry Bit / Parity Bit / Sign Bit, KB / MB / GB / TB / HB / etc., Type of Numbering System, Binary / Octal / Decimal / Hexa-Decimal, Conversion, Binary to Octal, Decimal and Hexa-Decimal, Decimal to Binary, Octal and Hexa-Decimal, Octal to Binary, Decimal and Hexa-Decimal, Hexa-Decimal to Binary, Octal and Decimal, Binary Arithmetic, Addition, Subtraction (1's Compliment and 2's Compliment), Division, Multiplication, Type of Code, ASCII / BCD / EBCDIC / Unicode, Parity Check, Event Parity System / Odd Parity System

UNIT IV

Languages, Operation System and Software Packages, Introduction, Types of Languages (Assembler / Compiler / Interpreter), Machine Level Language, Assembly Level Language, High Level Language (3GL, 4GL, 5GL, etc.), Type of Operation Systems, Batch Operating System, Multi-Processing Operating System,. Time Sharing Operating System, Online and Real Time Operating System, Type of Software Packages, Word Processing Package,s, Spread Sheet Packages, Graphical Packages, Database Packages, Presentation Packages, Animation / Video / Sound Packages

UNIT V

Emerging Technologies and Virus, Introduction, Different Communication Methods, GIS / GPS / CDMA / GSM, Communication Devices, Cell Phones / modem / Infrared / Bluetooth / Wi-Fi, Virus, Introduction to Virus and related terms, Origin and History, Types of Virus, Problems and Protection from Virus,. Important Terms and Acronyms, ATM, Backup / Restore, Hard Copy / Soft Copy, Bus / Data Bus, Buffer and Types / Spooling, Cursor / Pointer / Icon, E-Mail / Attachment, CLI / GUI, Compiler and its types, Drive / Directory (Folder) / File / Path, Menu / Popup Menu / Toolbar, Shutdown / Reboo, / Restart, Syntax / Wild Card Characters, Optical Fibre (Fibre Optics), Net Meeting, UPS, Printing Speed (CPS, CPM, LPM, DPI, PPM) Peripherals

TEXT BOOKS

1. Computer Fundamentals By P.K.Sinha
2. Fundamental of IT for BCA By S.Jaiswal Engineering Physics

REFERENCE BOOKS

By V.K.Gaur 4 Teach Yourself Assembler By Goodwin. Web site References : ♣

WEB REFERENCES

1. https://www.javatpoint.com/computer-fundamentals-tutorial
2. https://www.tutorialspoint.com/computer_fundamentals/index.htm
3. https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf
4. http://www.kvadilabad.org/admin/downloads/1788662251computer_fundamentals_tutorial.pdf

		L	T/SDA	P	Credit
BA-247A	Accounting and Financial Management	**3**	**0**	**0**	**3**

COURSE OBJECTIVES:

1. To give an insight into the basics of Accounting Concepts
2. To study the principles of accounts.
3. To enable the students to prepare different kinds of Financial Statements
4. To learn to manage the financial accounts

PROGRAM OUTCOMES (POs):

Upon successful completion of this course, the student will be able to:
PO1: Acquire conceptual knowledge of basics of accounting
PO2: Identify events that need to be recorded in the accounting records
PO3: Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP
PO4: Describe the role of accounting information and its limitations
PO5: Equip with the knowledge of accounting process and preparation of final accounts of sole trader
PO6: Identify and analyze the reasons for the difference between cash book and pass book balances
PO7: Recognize circumstances providing for increased exposure to errors and frauds
PO8: Determine the useful life and value of the depreciable asset

UNIT I

Introduction to Accounting: Definition of Accounting and its advantages & limitations, Scope of accounting. Branches of Accounting - Financial Accounting - Cost Accounting - Management Accounting, users of Accounting information, Methods of Accounting, Double Entry Accounting System Types of Accounts and Rules for Debit and Credit Preparation of Journal, Ledger and Trial Balance.

UNIT II

Final Accounts: Preparation of Final Accounts (Sole Proprietorship only), Preparation of Trading A/c, Profit & Loss A/c and Balance Sheet covering simple adjustments.

UNIT III

Accounting Ratios: Meaning, Advantages and Limitations of Accounting ratios, Computation of profitability, liquidity, solvency, and turnover ratios. Cost Accounting: Meaning and definition of Cost Accounting – its Advantages & Limitations Marginal Costing: Meaning-Advantages- Limitations, Break Even Point, Margin of Safety, Profit Volume Ratio.

UNIT IV:

Introduction to Financial Management: Meaning of financial management, functions and objectives of financial management- Profit Maximization and wealth maximization, basic finance decisions, changing role of finance.

TEXT BOOKS

1. S.N. Maheswari, & S.K. Maheshwari, "Advanced Management Accounting", Vikas Publishing House, 2010
2. M.Y. Khan and P.K. Jain, "Management Accounting", Tata McGraw Hill, 2009
3. M Y. Khan and P.K. Jain , "Cost Accounting", Tata McGraw Hill, 2008

REFERENCE BOOKS

1. Vijay Kumar , "Accounting for Management", Tata McGraw Hill, 2015
2. Anthony, N. Robert, Hawkins and Merchant ,"Accounting: Text and Cases(SIB)", McGraw Hill, 2013
3. Weston, John. Fred. Thomas, E.Copeland , "Managerial finance", Dryden press, 1988

CA-1151A	COMPUTER PROGRAMMING LAB	L-T-P	Cr.
		0-0-2	1

OBJECTIVE

To implement different aspects of C Language using different control statements and loops as well as different storage structures like arrays, strings and files.

COURSE OUTCOMES

The student after undergoing this course will be able:

CO1: To implement the different control statements like sequential, conditional & loops
CO2: To learn the basic concepts of C programming language
CO3: To learn the concepts of different control statements
CO4: To know about different data types and the ways of handling
CO5: To store the data in a file type and how to maintain it

List of Experiments

SEQUENTIAL CONTROL STATEMENTS

1. Write a program to Print HELLO
2. Write a program to add two numbers
3. Write a program to calculate simple interest
4. Write a program to calculate average of three numbers
5. Write a program to swap two numbers
6. Write a program to illustrate mixed data types
7. Write a program to calculate area and circumfrence of circle
8. Write a program to evaluate a polynomial expression
9. Write a program to add digits of a four digit number
10. Write a program to check whether the person if eligible for voting or not

CONDITIONAL CONTROL STATEMENTS

11. Write a program to find gratest of two numbers
12. Write a program to find out which type of triangle it is
13. Write a program to find out greatest of three numbers
14. Write a program to evaluate performance of the student
15. Write a program to make a basic calculator

LOOP CONTROL STATEMENTS

16. Write a program to print fibonacci upto the given limit
17. Write a program to find the sum of digits of a number
18. Write a program to find factorial of a number
19. Write a program to print table of any number

ARRAYS AND STRINGS

20. Write a program to enter the elements in a one dimensional array
21. Write a program to find the sum and average of five numbers
22. Write a program to sort the array elements
23. Write a program to enter the marks of 50 students an calculate the average
24. Write a program to add 2 matrix
25. Write a program to multiply 2 matrices
26. Write a program to calculate the length of string

27. Write a program to concatenate 2 strings
28. Write a program to reverse the string
29. Write a program to count the numbers of characters in a string
30. Write a program that converts lower case characters to upper case
31. Write a program without using predefined functions to check weather the string is palindrome or not

FUNCTIONS

32. Write a program using function to find the largest of three numbers
33. Write a program using function to swap two numbers using call by value
34. Write a program using function to swap two numbers using call by refrence
35. Write a program using function to sum the digits of a number
36. Write a program to calculate factorial of a number using recursive function
37. Write a program to print first n fibonacci using recursive function

POINTERS

38. Write a program to illustrate the concept of chain of pointers
39. Wrie a program to calculate the area and perimeter of circle using pointers
40. Wrie a program to find largest of three numbers

STRUCTURES

41. Write a program to read an employee record using structure and print it
42. Write a program to prepare salary chart of employee using array of structures

CA-1157A	PC SOFTWARE LAB	L-T-P	Cr
		0-0-2	1

OBJECTIVE

To make the students computer savvy via introducing different basic applications like MS-office

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To learn all windows based commands

CO2: To expertise in making documents using MS- Word

CO3: To handle in handling database by creating spreadsheets using MS-Excel

CO4: To manage the data via sorting, filtering etc.

CO5: To be expert in presentations using MS-Powerpoint

CA-1158A	INTERNET AND WEB DEVELOPMENT LAB	L-T-P	Cr
		0-0-2	1

OBJECTIVE:

It aims to make students to make them skillful in creating and handling web based applications like websites etc.

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know and use different HTML tags

CO2: To create different lists in a webpage or website

CO3: To create their own website

CO4: To learn to make the dynamic website using CSS

CO5: To understand the client side programming using Javascript

List of Practicals

1. Design a web page using: Physical and Logical tags of HTML.
2. Design a web page using
   - 2.2 Ordered List
   - 2.3 Unordered Lists
   - 2.4 Nested Lists
3. Design a web page to show the use of image as a hyperlink.
4. Design a web-page using frames and linking.
5. Code to create a bookmark.
6. Design a web-page showing the use of forms using HTML 4.01 and HTML 5 Tags.
7. Design a page using basic tags of HTML 5.0.
8. Design a web-page using style sheets (External, Internal and Inline)
9. Write a Program to print if the no is even or odd using JavaScript.
10. Input a number and find the difference of the sum of factors and non-factors.
11. WAP in JavaScript to print the pattern

    12345
    1234
    123
    12
    1
12. WAP to Accept an Array of 10 numbers and display the sum of elements.
13. WAP to find greatest of all elements of an array.
14. Design a web-page to show different validation checking using Java Script.
15. WAP in PHP code for calculating S.I.
16. WAP to Calculate factorial of a number.
17. WAP to print the table of 10.
18. WAP to print the sum of diagonal elements.
19. WAP to enter 5

LIST OF EXPERIMENTS/EXERCISES

1. All commands specified using windows
2. Introduction to MS-Word: introduction to word processing, its features.
3. MS Word: formatting documents, paragraph formatting, indents.
4. Page formatting, header and footer, bullets and numbering.
5. MS-Word: tabs, tables, formatting the tables, finding and replacing text, mail merging etc.
6. Introduction to MS-Excel, introduction to electronic spreadsheets, feature of MS-Excel
7. Entering data, entering series, editing data, cell referencing, ranges, formulae, functions, auto sum, copying formula
8. MS Excel: formatting data, creating charts, creating database, sorting data, filtering etc.
9. Introduction to MS PowerPoint, PowerPoint, features of MS-PowerPoint clipping, slide animation, slide shows, formatting etc.
10. MS-PowerPoint presentation (10-15 slides) on (i) evolution of computers (ii) search engines

PDP-101	HOLIDAY CLUB (ACTIVITY BASED)	L-T-P	Cr
		0-0-2	1

COURSE OUTCOMES: Students will be able to :

CO1: Attain vocabulary to comprehend reading and listening texts.
CO2: Apply correct form of the words in their oral and written language production
CO3: Participate in activities encouraging team spirit

1. ENGLISH CLUB

Activities:

Self-introduction, Spin a Yarn, , Slogan Writing/Poster Making, Word Building exercises, Treasure Hunt, Symposium, The Buck stops here (Debate), Titanic Ship Wreck- Rewind to 15th April 1912. (Titanic is sinking. Life Boats are limited and the time is short. Make your point, be persuasive and you might make it alive), Gender Bender- Write the turns of events if the gender of the protagonist is switched, Idioms and Praises, Conducting Interviews, Medley 'o' Mania- Convert medieval writing into modern writing, Poets Galore- Recitation and analysis of poems written by a favourite poet/poetess

2. SCIENCE CLUB

3. CREATIVE ELECTRONICS CLUB

4. YOGA CLUB

5. NSS (National Service Scheme)

6. CODER'S CLUB

7. BUSINESS CLUB

Note: Each club to have a Faculty In charge

Syllabus

of

BCA

1st Year

2nd Semester

CA-1102A	DATA STRUCTURES USING C	L-T-P	Cr
		4-0-0	4

OBJECTIVE

To relay the theoretical and practical fundamental knowledge of most commonly used Data Structures.

PRE-REQUISITES

Knowledge of basic computer programming

COURSE OUTCOMES

CO1: Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
CO2: Understand basic data structures such as arrays, linked lists, stacks and queues.
CO3: Describe the hash function and concepts of collision and its resolution methods
CO4: Solve problem involving graphs, trees and heaps
CO5: Apply Algorithm for solving problems like sorting, searching, insertion and deletion of
data

UNIT I

INTRODUCTION TO DATA STRUCTURES AND RUNNING TIME: Definition of data structures and abstract data types; linear vs. non-linear data types; primitive vs. non-primitive data types; Static and Dynamic implementations; Arrays:1,2-dimensional arrays, search, insertion, deletion in 1-D.Time Complexity; Big – Oh - notation; Running Times; Best Case; Worst Case; Average Case; Introduction to Recursion.

UNIT II

STACKS AND QUEUES: The Stacks: Definition; Array based implementation of stacks; Examples: Infix; postfix; prefix representation; Conversions; definition of Queues; Array based implementation of Queues. Circular queue.

UNIT III

LINKED LISTS: Lists; Types of Linked list, Operations on Linked list; Circular Linked list; Linked List based implementation of stacks; Linked List implementation of Queues; Applications.

UNIT IV

TREES AND GRAPHS: Definition of trees and Binary trees; Properties of Binary trees and Implementation; Binary Traversal pre-order; post order; In- order traversal; Binary Search Trees. Definition of Undirected and Directed Graphs; The Array based

implementation of graphs; Adjacency matrix; path matrix implementation; The Linked List representation of graphs; Graph Traversal – Breadth first Traversal; Depth first Traversal.

UNIT V

SORTING AND SEARCHING ALGORITHMS: Introduction; Sorting by exchange; selection; insertions; bubble sort; Merge sort; Quick sort; Searching Algorithms: Straight Sequential Search; Binary Search (recursive & non–recursive Algorithms).

TEXT BOOK

Aho, A.V, Hopcroft, J. E., Ullman, T. D., "Data Structures and Algorithms", Original Edition, Addison-Wesley, Low Priced Edition, 1999

REFERENCE BOOKS

1. M. Tenenbaum, Langsam, Moshe J. Augentem, "Data Structures using C", Prentice Hall of India
2. Ellis, Horowitz, SartajSahni, "Fundamentals of Data Structures", Addison-Wesley Pub, 1983
3. Mark Allen Weiss, "Data Structures and Algorithms Analysis in C",Pearson Education, 2000

CA-1104A	OBJECT ORIENTED PROGRAMMING USING C++	L-T-P	Cr
		4-0-0	4

OBJECTIVE

To build programming logic and thereby developing skills in problem solving using C++ programming language; Introduce the concept of object orientation and on how to handle data in different forms; Emphasize the concepts and constructs rather than on language features.

COURSE OUTCOMES

CO1: Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.
CO2: Understand dynamic memory management techniques using pointers, constructors, destructors, etc
CO3: Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
CO4: Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
CO5: Demonstrate the use of various OOPs concepts with the help of programs.

UNIT I

OBJECT ORIENTED CONCEPTS: Introduction to objects and object oriented programming; Difference between procedural oriented and objected oriented paradigm ,features of objected oriented programming: encapsulation (information hiding); Abstraction, Inheritance, Polymorphism, dynamic binding, access modifiers: introduction to C++, simple C++ programs, function overloading, Inline function, reference type, default arguments, concept of namespace

UNIT II

CLASSES AND DATA ABSTRACTION: Introduction; structure definitions; accessing members of structures; class scope and accessing class members; controlling access to a class; method; or variable (public; protected; private; separating interface from implementation; controlling access function and utility functions; initializing class objects: constructors; default, parameterized and copy constructor; using destructors; classes : const(constant) object and const member functions; object as member of classes; friend function and friend classes; using this pointer; dynamic memory allocation with new and delete; static class members;

UNIT III

OPERATOR OVERLOADING& TEMPLATES: Introduction; fundamentals of operator overloading; restrictions on operators overloading; operator functions as class members vs. as friend functions; overloading; <<; >> overloading unary operators; overloading binary operators. Concept of Templates & generic programming, Function Templates, class templates

UNIT IV

INHERITANCE; VIRTUAL FUNCTIONS AND POLYMORPHISM: Introduction; inheritance: base classes and derived classes; protected members; single, multiple, multilevel, hierarchical, inheritance; overriding base–class members in a derived class; public; protected and private inheritance; using constructors and destructors in derived classes. casting base-class pointers to derived-class pointers;, virtual function & dynamic binding

UNIT V

FILES, I/O STREAMS& EXCEPTION HANDLING: Files and streams; stream input/output classes and objects file modes, opening a file, creating & writing to a sequential access file; reading data from a sequential access file; updating sequential access files; unformatted I/O (with read and write);,reading & writing objects, file pointers and related functions, stream manipulators. Basics of C++ exception handling: try; throw; catch; throwing an exception; catching an exception.

TEXT BOOK

Balagurusamy, E., "Object Oriented Programming with C++", Prentice Hall of India, 2008.

REFERENCE BOOKS

1. Kamthane, "Object Oriented Programming with ANSI and Turbo C++", Pearson Education
2. Lafore, Robert, "Object Oriented Programming in Turbo C++", The WAITE Group Press, 1994
3. Schildt, Herbert "C++: The Complete Reference", Tata McGraw Hill, 3rd Ed, 2008
4. Bhave, "Object Oriented Programming with C++", Pearson Education

CA-1106A	DISCRETE STRUCTURE	L T P	Cr
		3 0 0	3

OBJECTIVE

To lay mathematical foundation for the fundamentals of various computational structures such as Boolean algebra, propositional logic, graph and trees.

PRE-REQUISITES: Knowledge of Data Structure

COURSE OUTCOMES

CO1: Perform operations on various discrete structures such as sets, functions, relations, and sequences.
CO2: Ability to solve problems using Counting techniques, Permutation and Combination, Recursion and generating functions.
CO3: Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems.
CO4: Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems.
CO5: Understand the various properties of algebraic systems like Rings, Monoids and Groups.

UNIT I

SET THEORY: Introduction to set theory; set operations; algebra of sets: duality, finite and Infinite sets, classes of sets, power sets, multi sets, Cartesian product, representation of relations, Types of relation, equivalence relations and partitions, partial ordering relations and lattices; Function and its types, composition of function and relations; cardinality and inverse relations

UNIT II

PROPOSITIONAL CALCULUS: Basic operations: AND (Λ), OR (V), NOT (~), truth value of a Compound statement, propositions, tautologies, contradictions.

UNIT III

TECHNIQUES OF COUNTING: Permutations with and without repetition, combination.

UNIT IV

ALGEBRIC STRUCTURES: Definition and examples of a monoid, semi group, groups and Rings; homomorphism, isomorphism and auto Orphism; subgroups and normal subgroups; cyclic groups, integral domain and fields; co-sets; Lagrange's theorem

UNIT V

GRAPHS: Introduction to graphs, directed and undirected graphs; homomorphic and isomorphic Graphs; sub graphs; cut points and bridges; multigraph and weighted graph; paths and circuits, shortest path in weighted graphs; Eulerian path and circuits, Hamilton paths and circuits; planar Graphs; Euler's formula, Spanning tree

TEXT BOOK

Liu C. L., "Elements of Discrete Mathematics", McGraw Hill, 1989

REFERENCE BOOKS

1. Johnson Bough R., "Discrete Mathematics", 5th Edition, Pearson Education, 2001
2. Graham Ronald, Knuth Donald E. and Patashik Oren, "Concrete Mathematics: A Foundation for Computer Science", Addison-Wesley, 1989
3. Gersting Judith L., "Mathematical Structures for Computer Science", Computer Science Press, 1993
4. Chtewynd A. and Diggle P., "Discrete Mathematics", Modular Mathematics Series,Edward Arnold, London, 1995
5. Lipshutz S., "Schaums Outline series: Theory and problems of Probability", McGraw Hill Singapore,1986.
6. Kolman B. and Busby R. C., "Discrete Mathematical Structures", Prentice Hall of India, 1996
7. Trembley and Manohar, "Discrete Mathematical Structures with Applications to Computers" McGraw Hill, 1995

EC-1101A	BASICS OF DIGITAL ELECTRONICS	L T P	CR
		4 0 0	4

OBJECTIVE

Modern world deals with digital conditioning of various signals. Digitally manipulating signals or using digital circuits have a lot of advantages in terms of accuracy etc. This subject introduces concept of basic digital electronics: gates; combinational and sequential circuits and their designing.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.

CO2: To understand and examine the structure of various number systems and its application in digital design.

CO3: The ability to understand, analyze and design various combinational and sequential circuits.

CO4: Ability to identify basic requirements for a design application and propose a cost effective solution.

CO5: The ability to identify and prevent various hazards and timing problems in a digital design.

UNIT I

INTRODUCTION OF GATES, COMBINATIONAL DESIGN BY USING GATES AND SIMPLIFICATION: Digital signal; logic gates: AND; OR; NOT; NAND; NOR; EX-OR; EX-NOR; Boolean algebra. Review of Number systems. Binary codes: BCD; Excess- 3; Gray; EBCDIC; ASCII; Error detection and correction codes; Design using gates; Karnaugh map and Quine Mcluskey methods of simplification.

UNIT II

COMBINATIONAL DESIGN USING MSI DEVICES: Multiplexers and Demultiplexers and their use as logic elements; Decoders; Adders/Subtractors; BCD arithmetic circuits; Encoders; Decoders/Drivers for display devices.

UNIT III

SEQUENTIAL CIRCUITS: Flip Flops : S-R; J-K; T; D; master-slave; edge triggered; shift registers; sequence generators; Counters; Asynchronous and Synchronous Ring counters and Johnson Counter; Design of Synchronous and Asynchronous sequential circuits.

UNIT IV

DIGITAL LOGIC FAMILIES: Bipolar logic families: RTL; DTL; DCTL; HTL; TTL; ECL; MOS; and CMOS logic families. Tristate logic; Interfacing of CMOS and TTL families.

UNIT V

A/D AND D/A CONVERTERS & PLD: Sample and hold circuit; weighted resistor and R -2 R ladder D/A Converters; specifications for D/A converters. A/D converters: successive approximation; counting type; ROM; PLA; PAL; FPGA and CPLDs.

TEXT BOOK

Jain, R.P., "Modern Digital Electronics", 4th Ed.; Tata McGraw Hill, 2003

REFERENCE BOOKS

1. Taub and Schilling, "Digital Integrated Electronics" Tata McGraw Hill,1997
2. Malvino and Leach; "Digital Principles and Applications", 6th Edition, Tata McGraw Hill, 2006
3. Mano, Morris, "Digital Design", 3rd Edition, Prentice Hall of India,1994
4. Gupta and Singhal, "Digital Electronics", 2nd Edition, Dhanpat Rai and Sons, 2000.
5. Wakerly, John F, "Digital Design Principles and Practices", 4th Edition, Prentice Hall of India,2005

MA-1105A	MATHEMATICS-II	L T P	CR
		4-0-0	4

UNIT I

MEASURES OF CENTRAL TENDENCY: Concept and properties of mathematical averages including arithmetic mean, geometric mean and harmonic mean, Mode and Median (and other partition values - quartiles, deciles, and percentiles) with graphic presentation.

UNIT II

MEASURES OF DISPERSION: Range, Quartile deviation, mean deviation, standard deviation, and their coefficients; Properties of standard deviation/variance, Moments: Calculation and significance;.

UNIT III

THEORY AND APPROACHES OF PROBABILITY: Theory and approaches of probability, Probability Theorems: Addition and Multiplication (Proof not required). Conditional probability and Bayes' Theorem (Proof not required), Binomial distribution: Probability distribution function, Poisson distribution: Probability function (including Poisson approximation to binomial distribution)

UNIT IV

LINEAR PROGRAMMING PROBLEM: Introduction to Linear Programming Problem, Some definitions, mathematical formulation Linear Programming Problem, Graphical method of solving of Linear Programming Problem. Corner Point method.

UNIT V

GAME THEORY: Two-person-zero sum games, Games of pure strategies and games of mixed strategies, Rule of dominance, Graphic solutions to games, Applications in computer science.

RECOMMENDED BOOKS

1. G.M. Clarke and D Cooke, A Basic Course in Statistics, Arnold, (2004).
2. W. Filler, An introduction to Probability theory and its applications, John Wiley, (1968)
3. A.M. Goon, M.K. Das and B. Dasgupta, Fundamentals of Statistics, World Press, (1997)
4. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand and sons, 2002.
5. E.N. Barron, Game Theory: An Introduction, Wiley Student Addition, 2009
6. S. Tijs, INtroduction to Game Theory, Hindustan Book Agency.

CE-101A	ENVIRONMENTAL SCIENCE & ECOLOGY	L T P	CR
		2-0-0	2

OBJECTIVES

- The aim of the course is to make everyone aware of environment issues like continuing problems of pollution, loss of forest, solid waste disposal and degradation of environment.
- Issues like economic productivity and national security, global warming, the depletion of ozone layer and loss of biodiversity are other serious concerns before the mankind.

COURSE OUTCOMES

CO1: Conceptualize the processes and various factors involved in the formation of environment.
CO2: Recognize the importance of environment and the sustainable of natural resources.
CO3: Analyze interaction between social and environmental processes.
CO4: Use scientific reasoning to identify and understand environment problems and evaluate potential solutions.
CO5: Visualize the impacts of human activities on environment and role of society in these impacts.

UNIT I

THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: Definition, scope and importance, Need for public awareness, Environment Impact Assessment.

UNIT II

NATURAL RESOURCES

RENEWABLE AND NON-RENEWABLE RESOURCES:

A. Natural resources and associated problems.

- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes caused by agriculture and
- overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water

- logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non-renewable energy
- sources, use of alternate energy sources, case studies.
- Land resources: Land as a resource, land degradation, man induced landslides,
- soil erosion and desertification.

B. Role of an individual in conservation of natural resources.
C. Equitable use of resources for sustainable lifestyles.

UNIT III: ECOSYSTEMS

A. Concept of an ecosystem
B. Structure and function of an ecosystem
C. Producers, consumers and decomposers
D. Energy flow in the ecosystem
E. Ecological succession
F. Food chains, food webs and ecological pyramids
G. Introduction, types, characteristic features, structure and function of the following ecosystem:
   - Forest ecosystem
   - Grassland ecosystem
   - Desert ecosystem
   - Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries).

UNIT IV

BIODIVERSITY AND ITS CONSERVATIONS

A. Introduction – Definition: genetic, species and ecosystem diversity
B. Biogeographical classification of India
C. Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values.
D. Biodiversity at global, national and local levels
E. India as a mega-diversity nation
F. Hot-spots of biodiversity
G. Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
H. Endangered and endemic species of India
I. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT V: ENVIRONMENTAL POLLUTION

A. Definition
B. Causes, effects and control measures of:
   - Air pollution
   - Water pollution
   - Soil pollution
   - Marine pollution
   - Noise pollution
   - Thermal pollution
   - Nuclear pollution

C. Solid waste management: Causes, effects and control measures of urban and industrial wastes.
D. Role of an individual in prevention of pollution
E. Pollution case studies
F. Disaster management: floods, earthquake, cyclone and landslides

CA-1152A	DATA STRUCTURES USING C LAB	L-T-P	Cr
		0-0-2	1

COURSE OUTCOMES

CO1 Be able to design and analyze the time and space efficiency of the data structure
CO2 Be capable to identity the appropriate data structure for given problem
CO3 Have practical knowledge on the applications of data structures

LIST OF EXPERIMENTS/EXERCISES

1. Write a program to search an element in an array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on matrices using functions only
   a) Addition
   b) Subtraction
   c) Multiplication
   d) Transpose
4. Write a program for static implementation of Stack
5. Write a program for static implementation of Queue
6. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list
7. Write a program to create a linked list & perform operations such as insert, delete in the Circular link list
8. Write a program to implement binary search tree. (Insertion and Deletion in Binary Search Tree)
9. Write a program which simulates the various tree traversal algorithms.
10. Write a program to implement bubble sort
11. Write a program to implement selection sort
12. Write a program to implement insertion sort
13. Write a program to implement quick sort
14. Write program to implement merge sort

CA-1154A	OBJECT ORIENTED PROGRAMMING USING C++ LAB	L-T-P	Cr
		0-0-2	1

COURSE OUTCOMES

CO1: Develop solutions for a range of problems using objects and classes.

CO2: Programs to demonstrate the implementation of constructors, destructors and operator overloading.

CO3: Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism.

CO4: Understand generic programming, templates, file handling.

LIST OF EXPERIMENTS/EXERCISES

1. Write a program for Basic/Simple logic building in C++
2. Write a program to implement function overloading
3. Write a program to implement the concept of class and object
4. Write a program to implement the concept of friend function
5. Write a program to implement the concept of static data member
6. Write a program using the concept of constructor & destructor
7. Write a program to Implement operator overloading
8. Write a program to Implement single inheritance
9. Write a program to Implement Multiple inheritance
10. Write a program to Implement Virtual function
11. Write a program to create, read & write sequential file
12. Write a program to create, read & write random access file
13. Write a program to implement function template
14. Write a program to implement class template
15. Write a program for exception handling

REFERENCE BOOK

1. Barkakati, Nabajyoti, "Object Oriented Programming in C++", Prentice Hall of India, 2001.
2. Schildt, Herbert, "C++: The Complete Reference", Tata McGraw Hill, 4th Edition, 2003

PD-251A	MATLAB	L T P	Cr
		0-0-2	1

OBJECTIVE

MATLAB is a powerful language for technical computing. It is widely used in universities and colleges for courses in mathematics, science and especially in engineering. In industry the software is used in research, development and design. This course is intended for students who are using MATLAB for the first time and have little or no experience in computer programming.

COURSE OUTCOMES

After undergoing this course, the students will be able to:

CO1: Know the basic concepts of MATLAB
CO2: Learn about the arrays as well as strings
CO3: Handle the script files and different output commands used in running a script file
CO4: State the plotting as well as draw a graph
CO5: Handle different function files

UNIT I

BASIC STRUCTURE AND FEATURES OF MATLAB: Command window; figure window; editor window and help window; arithmetic operations with scalars, order of precedence; using MATLAB as a calculator; display formats; elementary math built-in functions; scalar variables, assignment operator; predefined variables; useful commands for managing variables; applications in problem solving.

UNIT II

CREATING ARRAYS: One dimensional, two dimensional; array addressing; built-in functions for handling arrays; mathematical operations with matrices; strings and strings as variables; generation of random numbers; examples of MATLAB applications.

UNIT III

SCRIPT FILES: Creating and saving a script file, current directory; output commands

UNIT IV

TWO – DIMENSIONAL PLOTS: Plot command; line specifiers plot of a given data; plot of a function; plotting multiple graphs in the same plot.

UNIT V

FUNCTIONS AND FUNCTION FILES: Creating a function file; input and output arguments; function body; comment lines; saving a function files; using a function file; programming in MATLAB.

TEXT BOOK

Gilat Amos, "MATLAB: An Introduction with Applications", John Wiley & Sons, Inc (Wiley Student Edition), 2008

REFERENCE BOOK

Herniter, E. Marc, "Programming in MATLAB", Brooks/Cole, Thomson Learning

PDP-102	PEOPLE CONNECT	L T P	Cr
		0-0-2	1

COURSE OUTCOMES: Students will be able to:

- CO1: Demonstrate an understanding of academic conventions in different writing situations and apply the same
- CO2: Discover ways in which individuals can enhance their own creative potential
- CO3: Develop professional skills using ethical communication and body language
- CO4: Identify articulatory & presentation skills needed to participate in oral presentations in various professional settings
- CO5: Identify parts of speech, verb forms and tenses

UNIT I

WRITTEN COMMUNICATION : A) Memorandum B) Minutes of Meeting C) Email Composing & Writing D) Report Writing E) Resume – Types and practice sessions for writing

UNIT II

TECHNIQUES FOR IMPROVING COMMUNICATION

A) MTI - Removal exercises B) Business Idioms & Phrases, Rapid Reading C) Writing Drafts and revising

UNIT III

COMMUNICATION SKILLS

A) Inter personal skills- do's and don'ts (B) Spoken English- Common mistakes , dos and don'ts C) Interpersonal Communication and Relations (D) Striking the 1st Conversation- who, what , when, where and how? (E) Team Building & Public Speaking (F) Practice Sessions

UNIT IV

PUBLIC SPEAKING

A) Group Discussion B) Oral Presentations & Interviews C) Presentation Aids and their usage

D) Graphic Presentation E) Project proposal, manuals, brochures, technical articles

UNIT V

Grammar- Parts of Speech, Letter Writing (Formal) – Components, format & Sample Letter, Idioms & Phrases

CA-1201A	OPERATING SYSTEMS	L T P	Cr
		4-0-0	4

OBJECTIVE

To provide the knowledge of internals, different types and purpose of operating systems

PRE-REQUISITES

Knowledge of computer organization and architecture, programming skills

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To get familiar with the basic concepts of operating system
CO2: To know about the multiprocessing, synchronization & deadlocks
CO3: To learn the strategy to manage the memory available
CO4: To learn the concepts of files, their accession and disk scheduling
CO5: To know about the hardware devices and drivers used for them

UNIT I

PROCESS MANAGEMENT: Functionalities and Objectives of OS, historical evolution of operating systems, types of operating system, O/S service system calls, system programs, Process States, Process Control Block, Processor Scheduling, CPU scheduling, scheduling criteria, scheduling algorithms

UNIT II

PROCESS-SYNCHRONIZATION & DEADLOCKS: Critical Section; Mutual exclusion, Process cooperation,; Deadlocks: deadlock prevention; avoidance and detection; deadlock recovery;: Dining philosophers problem; semaphores.

UNIT III

MEMORY MANAGEMENT: Logical & Physical Address Space; swapping; contiguous memory allocation; non-contiguous memory allocation paging and segmentation techniques; segmentation with paging; virtual memory management - Demand Paging & Page-Replacement Algorithms;.

UNIT IV

FILE SYSTEM: Different types of files and their access methods; directory structures; various allocation methods; disk scheduling and management.

UNIT V

I/O SYSTEMS: I/O Hardware; Device Controllers; Interrupt Handlers; Device Drivers; Application I/O Interface; Kernel; Transforming I/O requests; Performance Issues.

TEXT BOOK

Silberchatz et al, ―Operating System Concepts‖, 5th edition, Addison-Wesley, 1998

REFERENCE BOOKS

1. Tanenbaum A., ―Modern Operating Systems‖, Prentice-Hall, 1992
2. Stallings William, ―Operating Systems Internals and Design P rinciples‖ , 4th edition, Prentice-Hall, 2001

3. Dhamdhere D. M., —Operating System‖, 2nd Edition, Tata McGraw Hill, 1999
4. Kernighan Brian and Pike Rob, —The Unix Programming Environment‖, Prentice Hall of India, 1984
5. Bach Maurich, —Design of the Unix Operating System ‖, Prentice Hall of India, 1986
6. Muster John, —Introduction to UNIX and LINUX‖, Tata McGraw Hill, 2003
7. Ritchie Colin, —Operating System Incorporating Unix & Windows‖, Tata McGraw Hill, 1974
8. Madnick Stuart and Donovan John, —Operating Systems‖, Tata McGraw Hill, 2001

CA-1202A	COMPUTER ORGANIZATION AND ARCHITECTURE	L T P	Cr
		4-0-0	4

OBJECTIVE
To provide basic knowledge of internals of microprocessor, its architecture, components, terminologies, etc. at minute level and ultimately about the working of a digital computer hardware as a whole.

PRE-REQUISITES
Knowledge of data structures, microprocessors and interfacing

COURSE OUTCOMES
The students undergoing this course will be able:
CO1: To learn the basic architecture of the computer
CO2: To learn about the different addresses and instructions passed for
CO3: To know about the different types of architecture & instruction cycle
CO4: To get knowledge about the different types of memories and their hierarchies
CO5: To know about the parallel processing

UNIT I
GENERAL SYSTEM ARCHITECTURE: k-map, number system, FF, Boolean algebra, design of logic gates. Functions and block diagram of computer, store program control concept, Flynn's classification of computers (SISD, MISD, MIMD); multilevel viewpoint of a machine: digital logic, operating systems, high level language; structured I/O; performance metrics; MIPS, MFLOPS, GFLOPS and TFLOPS.

UNIT II
INSTRUCTION SET ARCHITECTURE: Instruction codes, instruction set formats (fixed, variable, hybrid); types of instructions, memory reference, register reference, I/O reference; addressing modes: register, immediate, direct, indirect, indexed; operations in the instruction set; arithmetic and logical, data transfer, control flow; types of interrupts; timing and control; instruction set based classification of processors (RISC, CISC, and their comparison).

UNIT III
BASIC NON PIPELINED CPU ARCHITECTURE: CPU Architecture types (accumulator, register, stack, memory/ register) detailed data path of a typical register based CPU, fetch-decode-execute cycle (typically 3 to 5 stage); micro-instruction formats, implementation of control unit: hardwired and micro-programmed, control memory, microinstruction sequencing.

UNIT IV
MEMORY HIERARCHY & I/O TECHNIQUES: Need for a memory hierarchy (Locality of Reference Principle, memory hierarchy in practice: cache, main memory and secondary memory, memory parameters: access/ cycle time, cost per bit); main memory (semiconductor RAM & ROM organization, memory expansion, static & dynamic memory types); cache memory: associative &direct mapped cache organizations. .Internal memory, High speed memory.

UNIT V

INTRODUCTION TO PARALLELISM: Goals of parallelism (exploitation of concurrency, throughput enhancement); Amdahl's law; instruction level parallelism (pipelining, super scaling-basic features); processor level parallelism (multiprocessor systems overview), parallel processing concept, processing power and buses of a microprocessor, components of microprocessor; I/O ports.

TEXT BOOK

1. Carpinelli, —Computer Organization & Architecture‖ Tata McGraw Hill, 2001

REFERENCE BOOKS

1. Stallings. W, —Computer Organization &Architecture: Designing For Performance‖, 6th Edition, Prentice Hall of India, 2002/ Pearson Education Asia, 2003
2. Mano M Morris, —Computer System Architecture‖, 3rd Edition, Prentice Hall of India Publication, 2001 / Pearson Education Asia, 2003
3. Rajaraman V. and Radhakrishnan T, —Introduction to Digital Computer Design‖, 4th Edition, Prentice Hall of India 2004.
4. Stalling William, —Computer Organization and Architecture‖, 7th Edition, Prentice Hall of India, 2005.

CA-1206A	MULTIMEDIA TECHNOLOGIES	L T P	Cr
		4-0-0	4

OBJECTIVE

To provide basic knowledge of image compression, audio, video, sound, virtual reality, intelligent multimedia systems etc.

PRE-REQUISITES

Knowledge of computer graphics, programming, 3D geometry

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To get familiar with different types of media
CO2: To know about the network of multimedia distribution as well as animations
CO3: To learn about different types of images, color models etc.
CO4: To learn about different signals and digital sound
CO5: To know how to add motion in pictures leads to a video

UNIT I

BASICS OF MULTIMEDIA TECHNOLOGY: Introduction and application of multimedia, framework for multimedia systems; multimedia authoring tools, concept of multimedia project, stages, interactive and non-interactive multimedia, different storage device

UNIT II

MULTIMEDIA Distribution: Internet; World Wide Web & multimedia distribution network: ATM & ADSL; multimedia servers & databases;

Animation: Introduction types of animation, morphing, color modes, importance of text, Unicode.

UNIT III

IMAGE COMPRESSION & STANDARDS: Making still images; editing and capturing images; scanning images; computer color models; color palettes; vector drawing; 3D drawing and rendering; JPEG: objectives and architecture; DCT encoding and quantization; statistical coding; predictive lossless coding; performance; overview of other image file formats as GIF; TIFF; BMP; PNG; etc.

UNIT IV

AUDIO: Digital representation of sound; time domain sampled representation; method of encoding the analog signals; sub-band coding; Fourier method; transmission of digital sound; digital audio signal processing; stereophonic and quadraphonic signal processing; editing sampled sound; MPEG Audio; audio compression and decompression; brief survey of speech recognition and generation; audio synthesis; musical instrument digital interface

UNIT V

VIDEO: digital video and image compression; MPEG motion video compression standard; DVI technology; time base media representation and delivery. Video on demand. VIRTUAL REALITY: Applications of multimedia; intelligent multimedia system; desktop virtual reality; VR operating system; virtual environment displays and orientation making; visually coupled system requirements; intelligent VR software systems.

TEXT BOOK

Villamil and Molina, "An Introduction to Multimedia", MacMillan, 1997

REFERENCE BOOKS

1. Lozano, "Multimedia: Sound & Video", Prentice Hall of India (Que), 1997
3. Ranjan Parekh, "Principle of Multimedia", Tata McGraw Hill
4. Villamil and Molina, "Multimedia: Production, Planning and Delivery", Que, 1997
5. Sinclair, "Multimedia on the PC", BPB Publications
6. Tay Vaughan, "Multimedia: Making It Work", Fifth edition, Tata McGraw Hill, 1994
7. James E Shuman, "Multimedia in Action", Wadsworth Publications, 1997
8. Jeff Coate Judith, "Multimedia in Practice", Prentice Hall of India, 1995
9. John F. Koegel, "Multimedia Systems", Addison Wesley Ltd.

CA-1210A	COMPUTER NETWORKS	L T P	Cr
		3-0-0	3

OBJECTIVE

To have a fundamental understanding of the design, performance and state of the art of wireless communication systems, Topics covered include state of the art wireless standards and research and thus changes substantially form one offering of this course to the next

PRE-REQUISITES

Knowledge of computers hardware and software

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know different types of networks and basic architecture of network
CO2: To learn about different network models
CO3: To know deeply about the local area network
CO4: To know deeply about the wide area network
CO5: To aware about application layer of network models

UNIT I

OSI REFERENCE MODEL AND NETWORK ARCHITECTURE: Introduction to Computer Networks; Example networks ARPANET; Internet; Private Networks; Network Topologies: Bus-; Star-; Ring-; Hybrid-; Tree -; Complete -; Irregular –Topology, Types of Networks: Local Area Networks; Metropolitan Area Networks; Wide Area Networks; Layering architecture of networks; OSI model; Functions of each layer; Services and Protocols of each layer.

UNIT II

TCP/IP: Introduction; History of TCP/IP; Layers of TCP/IP; Protocols; Internet Protocol; Transmission Control Protocol; User Datagram Protocol; IP Addressing; IP address classes; Subnet Addressing; Internet Control Protocols; ARP; RARP; ICMP; Application Layer; Domain Name System; Email – SMTP; POP; IMAP; FTP; NNTP; HTTP; Overview of IP version 6.

UNIT III

LOCAL AREA NETWORKS: Introduction to LANs; Features of LANs; Components of LANs; Usage of LANs; LAN Standards; IEEE 802 standards; Channel Access Methods; Aloha; CSMA; CSMA/CD; Token Passing; Ethernet; Layer 2 & 3 switching; Fast Ethernet and Gigabit Ethernet; Token Ring; LAN interconnecting devices: Hubs; Switches; Bridges; Routers; Gateways.

UNIT IV

WIDE AREA NETWORKS: Introduction of WANs; Routing; Congestion Control; Quality of Service, WAN Technologies; Synchronous Digital Hierarchy (SDH)/ Synchronous Optical Network (SONET); Asynchronous Transfer Mode (ATM); Frame Relay.

UNIT V

APPLICATION LAYER: Remote Logging, Electronic Mail, SMTP, POP, IMAP FTP, WWW, HTTP, SNMP, Network Security: Services, Message Confidentiality, Authentication, Integrity, Firewalls.

TEXT BOOK

1. Forouzan Behrouz A., "Data Communications and Networking", Tata McGraw Hill 2006.

REFERENCE BOOKS

1. Tanennbaum Andrew S, "Computer Networks", 4th Edition, Pearson Education/Prentice Hall of India, 2003.
2. Stallings William, "Data and Computer Communication", 5th Edition, Prentice Hall of India, 1999

CA-1212A	CORE JAVA	L T P	Cr
		4-0-0	4

OBJECTIVE

To relay the theoretical and practical knowledge of Java programming language

PRE-REQUISITES

Basic Knowledge of programming language and object oriented programming

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To learn about the basics of objects, object behavior & storage of different objects

CO2: To know about the basics of Java programming language

CO3: To learn how to create a package as well as handling of exceptions

CO4: To learn about the multithreading as well as synchronization of threads to ovoid deadlocks

CO5: To aware about the database connectivity using JDBC as well as other APIs

UNIT I

INTRODUCTION TO JAVA & PRINCIPLES OF OBJECT ORIENTED PROGRAMMING: Basic Concepts of OOP and itS Benefits, Application of OOP, Features of Java. Data types & Operators available in java; Control Structures: if, while, do while, for, switch; Break & Continue Statement; Arrays and Strings: Arrays, Arrays of Characters; String handling Using String Class; Operations on String Handling Using; String Buffer Class.

UNIT II

OBJECT-ORIENTATION: Object-Oriented Programming in Java, Java Program Structure. Defining of a Class, Definition of Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, The keyword "this", Defining and Using a Class, Automatic Garbage Collection. Extending Class and Inheritance: Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, the Universal Super class-Object Class.

UNIT III

PACKAGE & EXCEPTION: Understanding Packages, Defining a Package, Packaging up your Classes, Adding Classes from a Package to your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface. Exception Handling: The Idea behind Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions, Checked and Unchecked Exceptions.

UNIT IV

MULTITHREADING PROGRAMMING: The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread: extending Thread and implementing Runnable, Creating Multiple Threads, Thread Priorities, Synchronization, Deadlocks inter-thread communication, Deadlocks. Input/Output in Java: I/O Basic, Byte and Character Structure, I/O Classes, Reading Console Input, Writing to Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File. Stream Benefits.

UNIT V

JAVA DATA BASE CONNECTIVITY (JDBC): Database Connectivity- Relation Databases; JDBC API; Reusing Database Objects; Transactions; Advance Techniques. Java Utilities (java.util Package) The Collection Framework : Collections of Objects; Collection Types; Sets Sequence Map; Understanding Hashing; Use of Array List & Vector.

TEXT BOOK:

Balaguruswamy , E., ""Programming with Java", Tata Mcgraw Hill.

REFERENCE BOOKS

1. Horetmann Cay and Cornell Gary, "Core JavaTM 2, Volume II – Advanced Features", 7th Edition, Pearson Publisher, 2004.
2. Horetmann Cay and Cornell Gary, "Core Java Volume – I", Pearson Education.
3. Callway Dustin R., "Inside Servlets", Pearson Education.
4. Goodwill James and Bryan Morgan, "Developing Java Servlets", Techmedia.
5. "Java Server Programming, Volume I and II", Wrox Press

CA-1213A	DATABASE MANAGEMENT SYSTEM	L-T-P	Cr
		4-0-0	4

OBJECTIVE

To provide knowledge about various organizations and management information systems, keeping in view the aspects of shareability, availability, evolvability and integrity.

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the basics of database & its architecture
CO2: To aware about the existing data models, entities as well as constraints
CO3: To learn about the different anomalies of the data and ways to normalize it
CO4: To know about the storage of data in the files & organization of files
CO5: To learn about the transactions and its ways done on the database

UNIT I

INTRODUCTION: Purpose of database system; characteristics of database approach; advantages of using DBMS; database concept and architecture; data abstraction, data models; instances and schema; data independence; schema architecture; database languages; database manager; database administrator; database users.

UNIT II

DATA MODELING: Introduction to Hierarchical model, Network model. Relational model, E-R Model, Entity sets attributes and keys; relationships (ER); database modelling using entity; type role and structural constraints; weak and strong entity types; entity-relationship diagram-basic concepts; Enforcing Data Integrity Constraints; Relational-Algebra Operations; Introduction on views; Codd's Rules.

UNIT III

NORMALIZATION& SQL: Database design process; relational database design; relation schema; anomalies in a database; functional dependencies; 1NF, 2NF, 3NF and BCNF. ; Reduction of an E-R schema to Tables; Introduction to SQL; basic queries in SQL; advanced queries in SQL; functions in SQL; basic data retrieval; updates in SQLs, views in SQL.

UNIT IV

FILE ORGANIZATION: indexing and hashing; overview of file organization techniques; secondary storage devices; operations in files; heap files and sorted files; ; Indexing and Hashing- Basic concepts; Static Hashing; Dynamic Hashing; ordered indices; single level ordered index; multi-level index.

UNIT V

TRANSACTION PROCESSING & QUERY PROCESSING: Desirable properties of transactions; implementation of atomicity and durability; schedules and recoverability; serializability of schedules; concurrency control. Deadlock handling - detection and resolution.

TEXT BOOK

1. Silberschatz A., Korth H. F. and Sudarshan S., "Database System Concepts", 3rd edition, McGraw-Hill, International Edition, 1997

REFERENCE BOOKS

1. Date C. J., "An Introduction to Database Systems", 7th edition, Addison- Wesley, Low Priced Edition, 2000 .
2. Desai Bipin, "Introduction to Database Management System", Galgotia Publications, 1991
3. Elmasri R. and Navathe S. B., "Fundamentals of Database Systems", 3rd edition, Addison-Wesley, Low Priced Edition, 2000

CA-1256A	MULTIMEDIA TECHNOLOGIES LAB	L T P	Cr
		0-0-2	1

OBJECTIVE

To provide practical knowledge of concepts of different medias.

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To get familiar with different types of media
CO2: To implement the motion in still images
CO3: To learn about shape tweening of objects & alphabets
CO4: To use the macromedia flash
CO5: To know how to add text in the file

List of Experiments

1. Create Motion Tweening using Macromedia Flash (Moving Ball).
2. Design a moving ball in V-shape
3. Design a moving ball in W-shape
4. Design shape tweening – Object to Object
5. Design shape tweening – Object to Alphabet
6. Design shape tweening – Alphabet to Object
7. Create Spot Light using Macromedia Flash.
8. Implement Splitting of Ball
9. Create Animated Pool Table.
10. Create Bow & Arrow hitting a Ball.
11. Write any Text with the illusion of pen writing letters.

CA-1262 A	CORE JAVA LAB	L T P	Cr
		0-0-2	1

OBJECTIVE

To relay the practical knowledge of Java programming language

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To learn about operators used in Java Programming
CO2: To know about loops implemented in Java programming language
CO3: To implement the arrays and strings
CO4: To learn about the inheritance, packages & exception handling
CO5: To aware about the database connectivity using JDBC

LIST OF EXPERIMENTS

The following programs on different topic are to be done in this lab.

1. **Sample Program**
   (a) Write a Java program to print "Hello Java"
2. **Operators and Expressions**
   (a) Write a java program to find the area of a rectangle.
   (b) To write a java program to find the result of the following expressions
      (i) (a<<2) +(b>>2)
      (ii) (b>0)
      (iii) (a+b*100)/10
      (iv) a & b
      Assume a=10, b=5

   (c) To write a java program to print the individual digits of a 3 digit number using Command line arguments.
3. **Decision making statements**
   (a) Write a java program to read two integers and print the larger number. followed by the words "is larger". If the numbers are equal print the message "These numbers are equal"
   (b) Write a java program to read an integer and find whether the number is odd or even.
   (c) Write a java program to find the number of and sum of all integers greater than 100 and less than 200 that are divisible by 7.
4. **Looping Statements**
   (a) Write a Java program to find the sum of digits of a given number.
   (b) Write a java program to find the first 15 terms of Fibonacci sequence.
   (c) Write a java program to print the Armstrong numbers.
   (d) Given a number, write a program using while loop to reverse the digits of the number.

      For example, the number

      12345

should be written as 54321.

5. **Array & Strings**
   (a) Write a java program to find the largest and smallest number in an array.
   (b) Write a java program to multiply two matrices.
   (c) Write a java program to sort the following numbers in descending order.
   {55, 40, 80, 65, 71}
   (d) Write a java program that creates a string object and initializes it with your name and performs the following operations
      (i) To find the length of the string object using appropriate String method.
      (ii) To find whether the character 'a' is present in the string. If yes find the number of times 'a' appear in the name and the location where it appears.
   (e) Write a java program to arrange the following word in alphabetical order
   {Madras, Delhi, Ahmadabad, Calcutta, Bombay}
   (f) Write a java program to create a StringBuffer object and illustrate how to append characters and to display the capacity and length of the StringBuffer.
6. **Classes & Objects**
   (a) Write a java program to display total marks of 5 students using student class. Given the following attributes: Regno(int), Name(string), Marks in subjects(Integer Array), Total (int).
   (b) Write a java program to find the area of a room using constructor.
   (c) Write a java program to implement method overloading.
   (d) Write a java program to show the use of "static" members.
   (e) Write a java program to implement the nesting of methods.

7. **Inheritance**
   (a) Write a java program to implement single inheritance using "super" keyword.
   (b) Write a java program to implement method overriding.
   (c) Write a java program to implement multiple inheritances.

8. **Package & Multithreading**
   (a) Write a program to create your own package and use that package in another program to print " Hello package".
   (b) Write a program to implement multithreading using the system function like yield(), stop(), sleep().
9. **Exception Handling & File handling**
   (a) Write a java program to implement multiple try/catch statements.
   (b) Write a program to copy the content of one file into another using character stream classes.
   (c) Write a program to copy the content of one file into another using byte stream classes
10. **Database Connectivity**
   (a) Write a programme to connect java application GUI with database.(JDBC)
   (b) Write a program to select all the information of a table named as "Student".

TEXT BOOK

Herbert Schildt , "The Complete Reference Java 2 fifth edition, McGraw Hill.

REFERENCE BOOKS

1. Balaguruswamy , E., ""Programming with Java", Tata Mcgraw Hill.
2. Horetmann Cay and Cornell Gary, "Core Java Volume – I", Pearson Education.

CA-1263A	DATABASE MANAGEMENT SYSTEM LAB	L-T-P	Cr
		0-0-2	1

OBJECTIVE

To provide knowledge about implementation of practical aspects of database i.e. creation of tables and applying queries using SQL queries

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the basics of structured query language
CO2: To aware about applying different queries on database structured in the form of tables
CO3: To learn about the different SQL queries performed using operators as well as constraints
CO4: To create views from created table to further organize the data
CO5: To learn about the basic operations of relational algebra

LIST OF EXPERIMENTS/EXERCISES

1. Introduction to SQL.
2. Write a query for:
   (i) Creation of table.
   (ii) Insertion of data into table
   (iii) Displaying the data of table.
   (iv) Deletion of data from table
   (v) Updating the data
   (vi) Modifying the structure of a table.
3. Finding unique names of all salesmen, deletion of the structure of a table, use of delete command with conditions, updating records of a table with conditions, altering structure of a table and changing size of existing column in the table
4. Arithmetic operators, logical operators and pattern matching operator.
5. Key constraints: primary key constraints, foreign key constraints, not null constraints and unique constraints; use of check constraints.
6. Aggregate and mathematical functions: count, count(*), Avg, max, min, sum, lower, upper, power , sqrt.
7. Creating views from single and multiple tables, drop views and creating index on the table and drop them.
8. Binary operations in Relational Algebra: Union, Intersection, Set Difference, Join, Cartesian product.
9. Grouping of data into tables and listing records in ascending order or descending order.
10. Creation of sequences and explain use of sequences.
11. Access permissions in SQL.

PDP-201	PERSONALITY DEVELOPMENT & GROOMING	L-T-P	Cr
		0-0-2	1

COURSE OUTCOMES
Students will be able to:

- CO1: Demonstrate interpersonal skills in day-to-day communication
- CO2: Develop the ability to generate ideas, take risks, and recognize opportunities in problem-solving, relationships, or self-expression
- CO3: Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research and non-classroom activites
- CO4: Interpret the three components of business etiquette - appearance, communication, and behaviour
- CO5: Develop a positive attitude towards life

UNIT I
Interpersonal Skills - Meaning, components, techniques to develop IS & its benefits.

UNIT II
Creativity - Meaning, Creativity v/s Innovation, barriers, importance of creativity.

UNIT III
Human Values & Ethics - Importance, Professional/ Work Ethics & Becoming a Role Model.

UNIT IV
Etiquette & Manners - Meaning, Importance of Professional Etiquette.

UNIT IV
Corporate Dressing & Grooming – The Corporate Fit, Corporate Culture, Dress Cod, Clothing Do's & Don'ts, Interview Dress Code, Personal Hygiene, Hairstyles etc.

UNIT VI
Attitude - Concept, Significance, Types, Importance of Positive Attitude.

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choose to know

SCHOOL OF COMPUTER SCIENCES

Syllabus

Of

BCA

2nd Year

4th Semester

CA-1204A	COMPUTER GRAPHICS	L T P	Cr
		4 0 0	4

OBJECTIVES

- Write programs Using C/C++/ OpenGL graphics environment.
- Use polygonal and other modelling methods to describe scenes.
- Understand and be able to apply geometric transformations.
- Create basic animations.

PRE-REQUISITES

Knowledge of computer programming

COURSE OUTCOMES

Students after undergoing this course will be able to:

CO1: Understand the basics of computer graphics, different graphics systems and applications of computer graphics.

CO2: Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.

CO3: Use of geometric transformations on graphics objects and their application in composite form.

CO4: Extract scene with different clipping methods and its transformation to graphics display device.

CO5: Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.

UNIT I

INTRODUCTION: What is computer graphics, computer graphics applications, computer graphics hardware and software, basic graphics system and standards; Raster Scan and Random Scan graphics; Raster-Scan Display System, Video Controller, Random-Scan Display processor, frame buffer.

UNIT II

ALGORITHMS: Two dimensional graphics primitives: points and lines, line drawing algorithms: DDA, Bresenham's; circle drawing algorithms: using polar coordinates, Bresenham's circle drawing, midpoint circle drawing algorithm.

UNIT III

TWO AND THREE DIMENSIONAL TRANSFORMATION: Two dimensional transformations: translation, scaling, rotation, reflection, shearing, transformation, Homogeneous coordinates system, 2D composite transformation: matrix Representation of 3-D transformations, composition of 3-D transformation;

UNIT IV

TWO DIMENSIONAL VIEWING AND CLIPPING: The 2-D viewing pipeline, windows, viewports, window to View port mapping; clipping: point, clipping line (algorithms): 4 bit code algorithm, Sutherland-Cohen algorithm, parametric line clipping algorithm (Cyrus Beck). Sutherland-Hodgeman polygon clipping algorithm

UNIT V

THREE DIMENSION VIEWING AND HIDDEN SURFACE REMOVAL: viewing in 3D: projections, types of projections; the mathematics of planner geometric projections; coordinate systems: Introduction to hidden surface removal; the Z- buffer algorithm, scan-line algorithm, area sub-division algorithm.

TEXT BOOK

Donald Hearn & M. Pauline Baker," Computer Graphics", Prentice Hall of India

REFERENCE BOOK

1. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill
2. Asthana, Sinha, "Computer Graphics", Addison Wesley Newman and Sproul, "Principle of Interactive Computer Graphics", McGraw Hill
3. Steven Harrington, "Computer Graphics", A Programming Approach, 2nd Edition
4. Rogar and Adams, "Mathematical Elements of Computer Graphics", McGraw Hill.

CA-1205A	DESIGN & ANALYSIS OF ALGORITHMS	L T P	Cr
		4 0 0	4

OBJECTIVE

To relay the theoretical and practical aspects of design of algorithms.

PRE-REQUISITES

Knowledge of fundamentals of basic computer programming for implementing algorithms.

COURSE OUTCOMES

CO1: Define the basic concepts of algorithms and analyze the performance of algorithms.
CO2: Discuss various algorithm design techniques for developing algorithms.
CO3: Discuss various searching, sorting and graph traversal algorithms.
CO4: Understand NP completeness and identify different NP complete problems.
CO5: Discuss various advanced topics on algorithms.

UNIT I

MATHEMATICAL PRELIMINARIES: Role of algorithm in computing; mathematical preliminaries; review of growth functions; solution of difference equations; analysis in terms of space and time complexity.

UNIT II

SORTING: Insertion sort; merge sort; heap sort; quick sort; radix sort, bucket sort, bubble sort, selection sort.

UNIT III

ADVANCED DATA STRUCTURES: Stack; queue; linked list; binary search trees; red black trees.

UNIT IV

DYNAMIC PROGRAMMING AND GREEDY ALGORITHM: Matrix multiplications; longest common subsequence, Huffman coding; task scheduling problem.

UNIT V

ELEMENTARY GRAPH ALGORITHM AND MINIMUM SPANNING TREE: Representation of graph; breadth-first search; depth first search; topological sort; strongly connected components, Growing a minimum spanning tree; Kruskal & Prims algorithms.

TEXT BOOK

Cormen Thomas H., Leiserson Charles E. and Rivest Ronald L., "Introduction to Algorithms", Tata McGraw Hill, 1990.

REFERENCE BOOKS

1. **V. Aho, J. E. Hopcroft, J. D. Ullman, "The Design and Analysis of Computer Algorithms", Addition Wesley, 1998.**
2. **Ellis Horowitz and Sartaz Sahani, "Computer Algorithms", Galgotia Publications, 1999.**
3. **E. Knuth, "The Art of Computer Programming", 2nd Ed., Addison Wesley, 1998**

CA-1207A	LINUX AND SHELL PROGRAMMING	L-T-P	Cr
		3-0-0	3

OBJECTIVE

The objective of the course aims to introduce about open source operating system as We can use Linux as Server OS or as standalone OS on our PC, Shell scripting & IPC etc.

COURSE OUTCOMES

CO1: Students will be able to understand the basic commands of Linux operating system and can write shell scripts

CO2: Students will be able to create file systems and directories and operate them

CO3: Students will be able to create processes background and fore ground etc.. by fork() system calls

CO4: Students will create shared memory segments, pipes, message queues and can exercise inter-process communication

UNIT I

UNIX UTILITIES: Introduction to UNIX file system; vi editor; file handling utilities; security by file permissions; process utilities; disk utilities; networking commands; cp; mv; In; rm; unlink; mkdir; rmdir; du; df; mount; umount; find; ps; who; w; finger; arp; ftp; telnet; rlogin; text processing utilities and backup utilities; detailed commands to be covered are cat; tail; head; sort; nl; uniq; gerep; egrep; fgrep; cut; paste; join; tee; pg; comm.; cmp; diff; tr; awk; tar; cpio.

UNIT II

PROBLEM SOVING APPROACHES IN UNIX: Using single commands; using compound commands; shell scripts; C programs; building own command library of programs; working with the Bourneshell: what is a shell; shell responsibilities; pipes and input redirection; output redirection; shell script examples.

UNIT III

UNIX FILES: UNIX file structure; directories; files and devices; system calls; library functions; usage of open; creat; read write; close; Ileek; stat; fstat; octl; umask; dup; dup2; the standard I/O (fopen; fclose; fflush; fseek; fgetc; getc; getchar; fputc; putc; putchar; fgets; gets); formatted I/O; strem errors; streams and file descriptors; file and directory maintenance (chmod; chown; unlink; link; symlink; mkdir; rmdir; chdir; getcwd).

UNIT IV

UNIX PROCESS AND SIGNALS AND INTER-PROCESS COMMUNICATION: what is process; process structure; starting new process; waiting for a process; zombie process; process control; process identifiers; system call interface for process management-fork; vfork; exit; wait; waitpid; exec; system.

INTRODUCTION TO IPC; IPC between processes on a single computer system; IPC between process on different systems; file and record locking; other UNIX locking techniques; pipes; FIFO; streams and messages

UNIT V

MESSAGE QUEUES AND SEMAPHORES: UNIX system-V messages; UNIX kernel support for message; UNIX APls for messages client/server example.UNIX system-V semaphores; UNIX kernel support for semaphores; Unix APls for semaphores; Shared Memory- UNIX system-V shared memory.

TEXT BOOKS

W. R. Stevens, "Unix Network Programming", Pearson/PHI.

REFERENCE BOOKS

Sumitabha Dass,"Unix Concepts and Application", 3rd Edition, Tata McGraw Hill.

CA-1208A	APPLIED NUMERICAL TECHNIQUES	L-T-P	Credits
		3-0-0	3

OBJECTIVE

To acquaint the students with the various concepts and tools of applied mathematics which will be very basic and the very soul and guide of various engineering subject.

COURSE OUTCOMES

Students undergoing this course will be able to:

CO1: It is used for solving a system of equations

CO2: To know how to find the roots of transcendental equations.

CO3: To learn how to interpolate the given set of values

CO4: To understand the curve fitting for various polynomials

CO5: To learn numerical solution of differential equations

UNIT I

SOLUTION OF NONLINEAR EQUATIONS : Introduction to numbers and their accuracy; absolute, relative and percentage errors and their analysis; Bisection method ; Regula- falsi method; secant method; fixed point iteration method; Newton- Raphson method; convergence criteria of methods.

UNIT II

SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS : Gauss elimination method; Gauss-Jordan method; UV factorization method; Jacobi's iteration method; Gauss-Seidal iteration method; .

UNIT III

INTERPOLATION AND CURVE FITTING: Introduction to interpolation; Newton's forward and backward interpolation formulae; Gauss's forward and backward interpolation formulae; Stirling formula; Lagrange interpolation; Newton's divided difference formula; Principle of least squares; curve fitting by least square method

UNIT IV

NUMERICAL DIFFERENTIATION AND INTEGRATION: Numerical differentiation formulae: differentiation by using forward interpolation formula; backward interpolation formula; Stirling formula; Newton-Cotes formula for numerical integration: Trapezoidal rule; Simpson's rules; Romberg' method.

UNIT V

SOLUTION OF ORDINARY DIFFERENTIAL EQUATION : ,Taylor series method; Euler method; Euler modified method; Runge kutta method; Milne's predictor - corrector method; Adams-Bashforth method for finding solution of differential equation.

TEXT BOOK

Grewal, B. S., "Numerical methods in Engineering and Science",9th Edition, 2010,Khanna publishers.

REFERENCE BOOKS

1. Jain, R.K. and Iyengar, S.R.K., "Numerical Methods for Scientific and Engg. Computations" ,5th Edition,2007, New Age International publishers.
2. Sastry, S.S.,"Introductory Methods of Numerical Analysis",3rd Edition,1999, Prentice Hall of India.
3. Applied Numerical Analysis" by Curtis F, Gerald and Patrik.
4. Numerical Methods by E. Balagurusamy T.M.H.

CA-1209A	IT MANAGEMENT	L T P	CR
		3 0 0	3

OBJECTIVE

The objective of the course aims to introduce about Information technology plays an important role in today's business world. Majority of the companies rely on this for the purpose of data processing, fast communications and acquiring market intelligence. Information technology helps business improve the processes of business it drives revenue growth, helps them achieve cost efficiency and more importantly, ensures they increase revenue growth while maintaining a competitive edge in the market place

COURSE OUTCOMES

CO1: Understand the concepts related to Business.

CO2: Demonstrate the roles, skills and functions of management.

CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.

CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.

UNIT I

INTRODUCTION: Evolution of computer, Computer basics, Network and internet, computing resources, information technology.

UNIT II

IT INFRASTRUCTURE: IT infrastructure management, infrastructure, IT Infrastructure management, challenges in IT infrastructure management, design issues of IT organizations and IT infrastructure, determining customers' requirements, IT systems management process, IT service management process, information system design process, patterns for IT systems management.

UNIT III

Service Delivery Process & Support Process: Service level management, financial management, IT service continuity management, capacity management, availability management. Support process: Configuration management, incident management, problem management.

UNIT IV

Storage Management: Introduction to storage, backup and storage, archive and re-trieve, disaster recovery, space management, database and application protection, Bare Machine Recovery (BMR), data retention.

UNIT V

Security Management & IT Ethics: Introduction, computer security, internet security, physical security, identity management, access control, intrusion detection ,IT Ethics: Introduction, intellectual property, privacy and law, computer forensics, ethics and internet, cyber crimes

TEXT BOOK

1. Phalguni Gupta, Surya Prakash, Umarani Jayaraman, IT Infrastructure and its Management, Tata McGraw Hill Education Private Limited, ISBN-13: 978-0070699793, 2009.

2. Simon Adams, ITIL V3 Foundation Handbook Updated Edition, Stationery Office Books (TSO) Publisher, 2009.

REFERENCES

1. Ivanka Menken, ITIL V3 Foundation Certification Exam Preparation Course in a Book for Passing the ITIL V3 Foundation Exam, Second Edition (The Art of Service), 2009.

2. Van Haren, Passing the ITIL Foundation, Van Haren Publishing, 2011.

CA-1211A	RAPID APPLICATION DEVELOPMENT	L T P	Cr
		3 1 0	4

OBJECTIVE

The course on RAD focuses on building applications within a very short time period. After successful completion of this course the students will be able to obtain a firm foundation on RAD concepts and methodologies and acquire sufficient working knowledge in RAD tools.

PRE-REQUISITES

Knowledge of programming in C, C++, JAVA

COURSE OUTCOMES

CO1: Understand various strategies for rapid application development (e.g. Agile, Extreme, Joint, Lean, Scrum, Spiral)

CO2: Understand the role of scalability in RAD and available solutions (e.g. cloud solutions from Google, Amazon, Microsoft)

CO3: Understand the advantages and disadvantages of using platform independent data storage techniques (e.g. Java Data Objects, Java Persistence API) and platform dependent data storage techniques (e.g. Google Datastore)

CO4: Proficiently use the programming language within the strategies for RAD.

CO5: Create a rapid prototype for the user interface of an IT application

UNIT I

RAPID APPLICATION DEVELOPMENT: Introduction to RAD Definition, history; importance strategy; constraints; advantages and disadvantages; customer oriented development;

UNIT II

Different RAD tools: Introduction of different RAD tools; open source versus licensed software builder; Easy Eclipse, Visual studio .net and its. Major components: Various applications build using visual studio; familiarity with IDE visual studio.

UNIT III

.NET Overview & Getting Started with Visual Basic.Net:: Building blocks of .NET framework, Architecture; .NET programming languages; MSIL, Metadata, Common Language Runtime, CTS,CLS, Managed code; what's new in VB.Net, building VB.Net Application, Operators, Methods, Properties, Conditionals and Loops.

UNIT IV

Implementing OOP using Visual Basic.Net: Structures, Object-Oriented features, Procedures, function & Collection, Exception Handling, SDI and MDI Application.

UNIT V

WindowsFormControls & Data Access: Form, Button, Textbox, Label, Linkbutton, Checkbox, Listbox, Combobox, Radiobutton, Calender, DateTimepicker

DialogBox: Font, Color, Openfile, Savefile, Print; Contextmenu, Picturebox, Progressbar, Richtextbox; OLE, DAO Introduction to data access with ADO.NET; components of ADO.NET. Two Applications in VB.NET

TEXT BOOK

The Complete Reference Visual Basic .NET, Tata McGRAW- Hill Edition, Jeffrey R. Shapiro

REFERENCE BOOKS

Visual Basic.Net Programming, Black Book, Dreamtech Press.

CA-1254A	COMPUTER GRAPHICS LAB	L T P	Cr
		0 0 2	1

COURSE OUTCOMES

CO1: Understand the basic concepts of computer graphics.
CO2: Design scan conversion problems using C++ programming.
CO3: Apply clipping and filling techniques for modifying an object.
CO4: Understand the concepts of different type of geometric transformation of objects in 2D and 3D.
CO5: Understand the practical implementation of modeling, rendering, viewing of objects in 2D.

LIST OF EXPERIMENTS

1. Write a program for 2D line as raster graphics display using Bresenhem line drawing algorithm
2. Write a program for 2D line drawing as raster graphics display using DDA line drawing algorithm
3. Write a program for circle drawing as raster graphics display using mid point circle drawing algorithm
4. Write a program for circle drawing as raster graphics display using Bresenhems circle drawing algorithm
5. Write a program for Transformation operations using
   a) 2D Translation Transformation
   b) 2D Scaling Transformation
   c) 2D Rotation Transformation
6. Write a program for line clipping
7. Write a program for polygon clipping
8. Write a program for display 3D object as 2D raster graphics display using perspective transformation
9. Write a program for rotation for 3D object about arbitrary axis
10. Write a program to create screen saver using graphics Commands

REFERENCE BOOKS

1. Pradeep Bhatia, "Computer Graphics", 2nd Edition, I K Publishers, 2009.
2. Computer Graphics by Donald Hearn and M. Pauline Baker, 2nd Edition, Prentice Hall of India, 1999
3. Procedural Elements for Computer Graphics, David F. Rogers, Tata McGraw Hill, Second Edition, 2001

CA-1257A	LINUX & SHELL PROGRAMMING LAB	L T P	Cr
		0 0 2	1

COURSE OUTCOMES

CO1 Demonstrate the installation process of various operating systems.
CO2 Implement virtualization by installing Virtual Machine software
CO3 Apply UNIX/LINUX operating system commands.
CO4 Understand different UNIX/LINUX shell scripts and execute various shell programs

LIST OF EXPERIMENTS

1. Study of Linux Operating System
2. Internal System commands and Control Structure in Linux OS
3. Processes and Threads in Linux Operating System
4. Systems and Function Calls in Linux OS
5. Writing of shell scripts in Linux OS
6. AWK Programming in Linux OS
7. Write a shell script to generate a multiplication table.
8. Write a shell script that copies multiple files to a directory.
9. Write a shell script that counts that number of lines and words present in a given file.
10. Write a shell script that displays the list of all files in the given directory.
11. Write a shell script (small calculator) that adds, subtracts, multiplies and divides the given two integers.
12. There are two division options: one returns the quotient and the other returns reminder. The script requires 3 arguments: The operation to be used and two integer numbers. The options are add (-a), subtract (-s), multiply (-m), quotient (-c) and reminder (-r).
13. Write a shell script to reverse the rows and columns of a matrix.

REFERENCE BOOK

Rochkind, M.J., "Advanced Unix Programming", 2nd Edition, Pearson Education.

CA-1261A	RAPID APPLICATION DEVELOPMENT LAB	L T P	Cr
		0 0 2	1

COURSE OUTCOMES

CO1: Implementation of the platform independent data storage techniques (e.g. Java Data Objects, Java Persistence API) and platform dependent data storage techniques (e.g. Google Datastore)
CO2: Proficiently use the programming language within the strategies for RAD.
CO3: Create a rapid prototype for the user interface of an IT application

LIST OF EXPERIMENTS/EXERCISES

1. Program to create 3 forms and perform the following tasks:
   a. Calculate addition of 5 numbers
   b. Calculate factorial of a number
   c. Find whether a given number is even or odd
2. Program to create an employee registration form.
3. Program to create a form and perform the following array operations:
   a. Sorting of elements of array
   b. Searching a number in an array
   c. Merging of 2 given arrays
4. Program to show error handling mechanism in vb.
5. Program to show common dialog control and menu based operations.
6. Program to show functioning of a calculator.
7. Program to create an employee registration form and save the employee records in random files.
8. Program to show employee record and department records using ado control.
9. Program to create data reports in VB
   a. Data report showing employee records stored in database.
   b. Data report showing employee list according to their respective departments.
10. Program to create a data report in VB to show the salary details of the employee whose id is entered

PDP-202	LIFE SKILL	L T P	Cr
		0 0 2	1

COURSE OUTCOMES

The students undergoing this course will be able to**:**

CO1: Develop and exhibit and accurate sense of self.

CO2: Assess and analyze the symptoms, causes and effects of personal and academic stressors in order to implement appropriate stress management techniques.

CO3: Analyze time management techniques

CO4: Assess Self and become better decision makers

CO5: Build stronger relationships and achieve career and personal goals.

UNIT I

PERSONALITY DEVELOPMENT & TA– Concept of PD- Significance of PD. The 4 OK States & PAC Concept

SWOT Analysis, Success & Failure, Dimensions of Personality – Theories of Freud & Erickson, Transactional Analysis – Dr. Eric Berne

UNIT II

STRESS MANAGEMENT – Meaning of Stress, Effects of Stress on Body & Mind. How to overcome stress

UNIT III

TIME MANAGEMENT – Concept of TM, Time Matrix, 24 hr Time tracker. How to manage time effectively?

UNIT IV

SELF -AWARENESS & SELF - ESTEEM – What is SA & SE? Importance of Self Awareness, Emotional Intelligence – Definition and significance

UNIT V

ART OF CONVERSATION – Conversational Skills - How to start, sustain and conclude conversation?

UNIT VI

MOTIVATION – Meaning, Internal & External Motivation, How to stay motivated? Self Motivation

Syllabus

of

BCA

3rd year

5th Semester

CA-1302A	SOFTWARE ENGINEERING PRINCIPLES	L T P	Cr
		4-0-0	4

OBJECTIVE

To provide basic knowledge of properties of software and its development processes, software quality, CASE tools, etc.

PRE-REQUISITES

Knowledge of computer programming, principles of management

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To learn the basic concepts of software engineering
CO2: To know about the requirements and process to engineer the software
CO3: To learn how to design a software & what are its strategies
CO4: To aware about the coding, testing & maintenance of software
CO5: To know about different metrics used for software evaluation

UNIT I

INTRODUCTION: Introduction to Software Engineering, Definition of Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Applications, Software Myths. Software Development Life Cycle Model: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

UNIT II

SOFTWARE REQUIREMENT SPECIFICATIONS: Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Control Flow Model, SRS Document, IEEE Standards for SRS, Data Dictionary.

UNIT III

SOFTWARE DESIGN: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Top-Down and Bottom-Up Design.

UNIT IV

CODING & SOFTWARE TESTING & MAINTENANCE: Top-Down and Bottom –Up programming, structured programming, Code Inspection, Compliance with Design and Coding Standards. Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up Testing Strategies: Test Drivers

and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Alpha and Beta Testing of Products. Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering.

UNIT V

SOFTWARE MEASUREMENT & MATRICES: Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management. , Quality Assurance, Quality Control, Software Quality Attributes, Software Quality Assurance (SQA): Verification and Validation

TEXT BOOK:

Pressman Roger S., "Software Engineering – A Practitioner's Approach", 6th Edition, McGraw Hill, 2004.

REFERENCE BOOKS

1. Aggarwal KK, Singh, Yogesh, "Software Engineering", New Age International, 2000.
2. Jalote Pankaj,"An Integrated Approach to Software Engineering", 3rd edition, Narosa, 2005.
3. Sommerville Ian, Pearson Education, "Software Engineering", 5th edition, Addison Wesley, 1999.

CA-1303A	PROGRAMMING USING C#	L-T-P	Cr
		4-0--0	4

OBJECTIVE

To equip students with C# programming Concepts

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the basics of Dot net programming language

CO2: To aware about different programming languages via differences & comparison

CO3: To learn about the basics of C# programming

CO4: To know about the different statements and controls in C# programming

CO5: To learn about different database connectivity's like ADO etc.

UNIT I

PHILOSOPHY OF .NET AND ITS MAJOR COMPONENTS: Origin of .NET technology; .NET platform; benefits and limitations of .NET; building blocks of .NET framework; .NET programming languages; .NET types and namespaces; Understanding CLR, CTS and CLS; developing C# Applications using Visual Studio .Net

UNIT II

EVOLUTION OF C#: comparison among C++; Java and C#; benefits of C#; object-oriented programming using C#

UNIT III

C# PROGRAMMING: introduction to C#; creating a C# program; types in C#; classes; inheritance and polymorphism; methods; statements and control; arrays and strings; interfaces; abstract and base classes.

UNIT IV

STATEMENTS AND CONTROL: properties and indexers; delegates and their usefulness; I/O in C#; exception and error handling in C#.

UNIT V

ADO .NET AND ASP.NET: comparison of ADO and ADO. NET; introduction to data access with ADO.NET components of ADO.NET; Comparison of ASP and ASP .NET; features of ASP .NET; features provided by ASP .NET; web forms and their components.

TEXT BOOK:

Balaguruswammy, E, "Programming in C#", Tata McGraw Hill

REFERENCE BOOKS

1. Jain, V K, "The Complete Guide to C# Programming", IDG Books India.
2. Pappas & Murray, "C# Essentials", Prentice Hall of India
3. Gunnerson Eric, "A programmer's Introduction to C#", IDG Books
4. Wakefield, "C# and .NET Web Developers Guide", IDG Books India.

CA-1304A	ARTIFICIAL INTELLIGENCE	L T P	Cr
		4-0-0	4

OBJECTIVE

To introduce about artificial intelligence approaches to problem solving, various issues involved and application areas

PRE-REQUISITES

Knowledge of neural networks, data structures

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the basics of artificial intelligence
CO2: To learn the different searching techniques of artificial intelligence
CO3: To learn about the representation of different information to produce a system
CO4: To know about different logics used
CO5: To aware about the uncertainties

UNIT I

INTRODUCTION: Definition of Artificial Intelligence (AI), Evolution of Computing History of AI, data, information and knowledge; AI problems and techniques – AI programming languages; problem space representation with examples, Applications of Artificial Intelligence.

UNIT II

SEARCH STRATEGIES GAME PLAYING: Breadth first search; Depth first search; heuristic search techniques: Hill climbing: Best first search; A* algorithm; AO* algorithm; Minimax search procedure.

UNIT III

PRODUCTION SYSTEM & KNOWLEDGE BASE REPRESENTATION: Production rules, the working memory, Recognize-act cycle, conflict resolution by Meta rules, Architecture of production system. Semantic net, Frames.

UNIT IV

PROPOSITIONAL LOGIC & PREDICATE LOGIC: Proposition, tautologies, Theorem proving, forward chaining, backward chaining, method of substitution, Alphabet of first order logic(FOL), predicate, well-formed formula, clause form, algorithm for writing sentence into clause form, Unification of predicates, unification algorithm, resolution Robinson's interface rule.

UNIT V

REASONING UNDER UNCERTAINITY: reasoning under uncertainty; non monotonic reasoning; review of probability; Baye's probabilistic interferences and Dempster Shafer theory; Heuristic methods; Fuzzy reasoning.

TEXT BOOK

Elaine Rich and Kevin Knight, "Artificial Intelligence", 3rd Edition, Tata McGraw Hill, 1991

REFERENCE BOOKS

1. Nils J Nilson, "Artificial Intelligence", Harcourt Asia Pvt. Ltd.
2. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall of India, 1998
3. O. W. Patterson, "Introduction to Artificial Intelligence & Expert Systems", Prentice Hall of India
4. Patrick Henry Winston, "Artificial Intelligence", 3rd Edition, Addition Wesley, 1992
5. Programming PROLOG, Clockson & Mellish, Narosa Publications

CA-1305A	INTRODUCTION TO E-COMMERCE	L T P	Cr
		3-0-0	3

OBJECTIVE

To give the students knowledge about the e-business and transactions done electronically

Pre-Requisites

Knowledge of internet and web development, data mining, computer networks, software engineering.

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To learn the basic concepts of e-commerce

CO2: To aware about the infrastructure required in e-commerce

CO3: To know about the payment system operated electronically

CO4: To aware about e-business and its related aspects

CO5: To learn about e-commerce

UNIT I

INTRODUCTION TO E-COMMERCE: Benefits; impact of e-commerce; classification of e-commerce; application of e-commerce technology; business models; framework of e-commerce.; business to business; business to customer; customer to customer; advantages and disadvantages of e-commerce; electronic commerce environment and opportunities: back ground – the electronic commerce environment – electronic market place technologies.

UNIT II

NETWORK INFRASTRUCTURE OF E-COMMERCE: Network infrastructure to e-commerce & internet; LAN; Ethernet (IEEE 802.3); WAN; internet; TCP/IP reference model; domain names; internet industry structure; FTP applications; protocols required for ecommerce; HTTP; CGI 3; firewalls; securing web service; secure payment system transaction security (SET); cryptology; digital signatures

UNIT III

ELECTRONIC PAYMENT SYSTEM & EDI: Introduction to electronic cash and electronic payment schemes – internet monitory payment; different models; framework; prepaid and post-paid payment model and security requirements – payment and purchase order process – online electronic cash. Search tools: directories; search engines; Meta search engines. EDI & E-content: Business Trade Cycle; EDI; EDI Fact, Electronic content.

UNIT IV

E-BUSSINESS: Business requirements – concepts; payment processing. launching your e business- marketing an e-business; public relations; consumer communication; news groups & forums; exchanging links; web rings; e-business back end systems; business record maintenance; back up procedures and disaster recovery plans.

UNIT V

M-COMMERCE, ADVERTISING & CRM: Introduction to mobile commerce; framework; applications; design methodology and advantages; future trends in m-commerce. Supply chain management in e-commerce. Internet Advertising; Models of Internet advertising; sponsoring content; Corporate Website; Weaknesses in Internet advertising; web auctions. E-retailing; Role of retailing in E-commerce; E-marketing and advertising. CRM in e-commerce.

CASE STUDY: Discussion on a corporate web site, E-commerce legal issues & cyber laws.

TEXT BOOK

Chaffey, Dave, "E-business and E-commerce Management", Pearson Education

REFERENCE BOOKS

1. Kalakota, Ravi, Whinston Andrew B . , "E-Commerce-A Manager's guide", Addison Wesley.
2. David Whetley; E-commerce concepts.

CA-1309 A	NETWORK SECURITY & MANAGEMENT	L T P	Cr
		3 1 0	4

OBJECTIVE

The main objective behind this course is to learn about the various network attacks and preventing attacks. This course is designed to cover Application security, Network security, Web security etc.

PRE-REQUISITES

Knowledge of data communications and computer networks, computer programming, data structures, mathematics, telecom network. Knowledge of digital signal processing is desirable

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the attacks and security issues related to work done on computer
CO2: To learn about different methods used for securing the data
CO3: To know about the strong and stringent methods used for the securing the data
CO4: To get the knowledge about the protocols of internet security
CO5: To aware about the checking authentication of the user

UNIT I

ATTACKS ON COMPUTERS & COMPUTER SECURITY: Introduction; The need of Security; Security Approaches; Principal of Security; Types of Attacks

UNIT II

CRYPTOGRAPHY: Introduction; Plain Text & Cipher Text; Substitution Techniques; Transposition Techniques; Types of Cryptography; Steganography; Symmetric Key Algorithm: Algorithm Types and Modes, DES; Asymmetric Key Algorithm: RSA, Digital Signatures

UNIT III

DIGITAL CERTIFICATES AND PUBLIC KEY INFRASTRUCTURE: Digital Certificates ; Private Key Management; The PKIX Model ; Public Key Cryptography Standards; Creating Digital certificates using Java

UNIT IV

INTERNET SECURITY PROTOCOLS: Introduction; Secure Socket Layer(SSL); Secure Electronic Transaction(SET); Electronic Money; Email security; Wireless application protocol (WAP);Security in GSM: Security in 3G

UNIT V

USER AUTHENTICATION AND KERBEROS: Introduction; Authentication Basics; Passwords; Authentication Tokens; Certificate Based Authentication; Biometric Authentication; Kerberos

REFERENCE BOOKS

Atuk Kahate , "Cryptography and Network Security", 3rd Edition, Tata Mcgraw Hill

REFERENCE BOOKS

1. Stallings William, "Cryptography and Network Security", 4th Edition, Prentice-Hall, Englewood Cliffs, 2006
2. Mani Subramanian, "Network Management Principles & Practices", Addison Wesley, 1999
3. Kauffman C., Perlman R. and Spenser M., "Network Security", 2nd Edition, Prentice Hall, 2002.
4. Menezes Alfred, van Oorschot Paul, and Vanstone Scott, "Handbook of Applied Cryptography", CRC Press, NY, 2004.
5. Bellovin S. and Chesvick W., "Internet Security and Firewalls", 2nd Edition, Addison Wesley, 1998.
6. Schneier Bruce, "Applied Cryptography", Wiley Student Edition, 2nd Edition

CA-1353A	PROGRAMMING USING C# LAB	L-T-P	Cr
		0-0-2	2

OBJECTIVE

To train the students with C# programming Concepts using implementation

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the basics of Dot net programming language
CO2: To implement operators used in C# Programming
CO3: To learn about constructors to be implemented
CO4: To know about the different functions & file operations in C# programming
CO5: To learn about different database connectivity's like ADO etc.

LIST OF EXPERIMENTS

1. Write a program in C# illustrating the use of sequence, conditional and iteration construct.
2. Write a program in C# illustrating various operators like logical, arithmetical, relational, etc.
3. Write a program in C# illustrating overloading of various operators.
4. Write a program in C# illustrating use of friend, inline and Static Member functions, default arguments.
5. Write a program in C# illustrating use of destructor and various types of constructor.
6. Write a program in C# illustrating various forms of inheritance.
7. Write a program in C# illustrating use of virtual functions, Virtual base class, delegates.
8. Write a program in C# illustrating file operations.
9. Write a program in C# illustrating simple web applications using ASP.net
10. Write a program in C# illustrating use of Active X Controls.

CA-1354A	ARTIFICIAL INTELLIGENCE LAB	L T P	Cr
		0-0-2	1

OBJECTIVE

To introduce about artificial intelligence approaches to problem solving, various issues involved and application areas

PRE-REQUISITES

Knowledge of neural networks, data structures

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the basics of prolog programming language
CO2: To learn the different iterative structures using prolog
CO3: To learn about different problems and solution by prolog
CO4: To know about different searching methods
CO5: To aware about the natural language processing

LIST OF EXPERIMENTS

1. Study of Prolog programming language
2. Write programs to use iterative structures using Prolog (at least 3 programs)
3. Write programs to demonstrate inferencing/ deductive logic using Prolog (at least 3 programs)
4. Write a program to solve 8 queens problem using Prolog.
5. Solve any problem using depth first search using Prolog.
6. Solve any problem using best first search using Prolog.
7. Solve 8-puzzle problem using best first search using Prolog
8. Solve Robot (traversal) problem using means End Analysis using Prolog.
9. Solve traveling salesman problem using Prolog.
10. Write program to exhibit the ability of building an Expert System using Prolog
11. Study the properties and issues of Natural Language Processing
12. Study the grammar mapping issues in language translation from English to Hindi and vice versa

REFERENCE BOOKS

1. Clockson & Mellish, "Programming PROLOG", Narosa Publications, 3rd Edition, 2002.
2. Winston Patrick Henry, "Artificial Intelligence", 3rd Edition, Addition Wesley, 1992

PDP-301	LEADERSHIP & ENTREPRENUERSHIP DEVELOPMENT	L T P	Cr
		0-0-2	1

COURSE OUTCOMES

Students will be able to:

- CO1: Demonstrate an ability to engage in critical thinking by analyzing situations and constructing and selecting viable solutions to solve problems.
- CO2: Identify own strengths and weaknesses and gain the ability to take better decisions
- CO3: Develop the skills to reflect on their learning and turn their understanding of their current knowledge and skills into a drive to learn more
- CO4: Develop an understanding of change processes and be able to think critically about obstacles to change

UNIT I

Leadership- Concept, styles of Leadership, Qualities to become a Leader. Case study on world renowned leaders

UNIT II

Teamwork & Team Building – Importance of Team Work, Stages of Team Formation, Benefits of Working in a Team.

UNIT III

Decision Making -7 steps of DM, Strategies to make good decisions

UNIT IV

Goal Setting – Difference between Goal & Dreams. SMART Technique of setting Goals, Types of Goals, Goal Tracker

UNIT V

Entrepreneurship – Concept of Entrepreneurship, Qualities of Entrepreneur,

Syllabus

of

BCA

3rd Year
6th Semester

CA-1306A	SOFTWARE PROJECT MANAGEMENT	L T P	Cr
		3 0 0	3

OBJECTIVE

To provide the foundation required for becoming a good software project manager by means of planning, evaluation and estimation, risk management, allocation and monitoring of resources, controlling software quality PRE-REQUISITES Knowledge of software engineering and the basic principles of management

COURSE OUTCOMES

The students after undergoing this course will be able to:

CO1: Identify the different project contexts and suggest an appropriate management strategy.

CO2: Practice the role of professional ethics in successful software development.

CO3: Identify and describe the key phases of project management.

CO4: Determine an appropriate project management approach through an evaluation of the business context and scope of the project.

CO5: Methods to Maintain the Software Quality Assurance

UNIT I

INTRODUCTION: Definition of a Software Project (SP), SP vs. other types of projects activities covered by SPM; categorizing SPs; project as a system; management control, requirement specification; information and control in organization

STEPWISE PROJECT PLANNING: Introduction, selecting a project; identifying project scope and objectives; identifying project infrastructure, analyzing project characteristics; identifying project products and activities; estimate efforts each activity; identifying activity risk; allocate resources; review/ publicize plan

UNIT II

PROJECT EVALUATION AND ESTIMATION: Cost benefit analysis; cash flow forecasting; cost benefit evaluation techniques; risk evaluation; Selection of an appropriate project report; Choosing technologies, choice of process model, structured methods: rapid application development, water fall, V-process-, spiral- models; Prototyping;

ACTIVITY PLANNING : Objectives of activity planning; project schedule; projects and activities; sequencing and scheduling activities, network planning model; representation of lagged activities; adding the time dimension, backward and forward pass; identifying critical path; activity throat, shortening project; precedence networks;

UNIT III

RESOURCE ALLOCATION AND MONITORING THE CONTROL: Introduction, the nature of resources, identifying resource requirements; scheduling resources creating critical paths; counting the cost; being specific; publishing the resource schedule; cost schedules, the scheduling sequence; Monitoring the control: Introduction, creating the frame work, collecting the data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control

UNIT IV

MANAGING CONTRACTS AND PEOPLE:, Introduction, types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: Introduction, understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures, conclusion, further exercises

UNIT V

SOFTWARE QUALITY: Introduction; the place of software quality in project planning; the importance of software quality; defining software quality, ISO 9126; Practical software quality measures; product versus process quality management; 46 external standards; techniques to help enhance software quality; Study of any software project management software: viz Project 2005 or equivalent.

TEXT BOOKS

Bob Hughes and Mike Cotterell, ―Software Project Manag em ent‖, 2nd Edition, Tata McGraw Hill, 1999

REFERENCE BOOKS

1. Futrell, ―Software Quality & Project Manag em ent‖, Pearson Education, 2002.
2. Jalote Pankaj, Software Project Management, Pearson Education, 2002.
3. Gopalaswam y Ramesh, ―Managing Global Software Projects‖, Tata McGraw Hill, 2001
4. Pressman Roger S., ―Software Engineering – A Practitioner‘s Approach‖, 5th Edition, McGraw Hill, 2001
5. Walker Royce, ―Software Project Manag em ent‖, Addison Wesley, 1998
6. Maylor, ―Project Manag em ent‖, Third Edition, 2003.
7. Demarco Tom, ―Controlling Software Project Management and Measurem ent‖, Prentice Hall, 1982 8. Glib Tom and Susannah Finzi, ―Principles of Software Engineering Management‖, Addison Wesley, 1998.

CA-1307A	NEURAL NETWORKS	L T P	Cr
		4 0 0	4

OBJECTIVE

To study various algorithms and their implementation in real life and in different domains**.**

PRE-REQUISITES

Knowledge of Applied Mathematics and basic calculation techniques of matrices.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Model Neuron and Neural Network, and to analyze ANN learning, and its applications

CO2: Perform Pattern Recognition, Linear classification.

CO3: Develop different single layer/multiple layer Perception learning algorithms

CO4: Design of another class of layered networks using deep learning principles.

UNIT I

Overview of biological neurons: Structure of biological neurons relevant to ANNs.

UNIT II

Fundamental concepts of Artificial Neural Networks: Models of ANNs; Feed forward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner lake all learning rule, etc.

UNIT III

Single layer Perception Classifier: Classification model, Features & Decision regions; training & classification using discrete perception, algorithm, single layer continuous perception networks for linearly separable classifications.

UNIT IV

Multi-layer Feed forward Networks: linearly non-separable pattern classification, Delta learning rule for multi-perceptron layer, generalized delta learning rule, Error back propagation training, learning factors, Examples.

UNIT V

Single layer feedback Networks: Basic Concepts, Hopfield networks, Training & Examples, associative memories

TEXT BOOKS

Introduction to artificial neural systems by Jacek M. Zurada, 1994, Jaico Publ.House.

REFERENCE BOOKS

4. Neural Networks :A Comprehensive formulation , Simon Haykin, 1998, AW
5. Neural Networks , Kosko, 1992, PHI.
6. Neural Network Fundamentals N.K. Bose , P. Liang, 2002, T.M.H

CA-1325	CRYPTOGRAPHY AND DATA COMPRESSION	L T P	Cr
		3 0 0	3

OBJECTIVE

The course will provide a down-to-earth overview of cryptographic techniques applicable in an IT environment, and outline the constraints and limitations of realistic secure systems. A running theme is the tradeoff between usability and security of a system. Also covered are a number of compression techniques - data compression and data encryption are, in some respects, closely related. A working knowledge of C is assumed and essential.

COURSE OUTCOMES

CO1: Understand and analyze public-key cryptography, RSA and other public-key cryptosystems

CO2: Analyze and design hash and MAC algorithms, and digital signatures.

CO3: Design network application security schemes, such as PGP, S/ MIME, IPSec, SSL, TLS, HTTPS, SSH, etc.

CO4: Understand key management and distribution schemes and design User Authentication Protocol

CO5: Know about Intruders and Intruder Detection mechanisms, Types of Malicious software, Firewall Characteristics, Types of Firewalls, Firewall Location and Configurations.

UNIT I

COMPRESSION: Packing; Huffman coding; run length encoding; Lempel-Ziv-Welch; Phil Katz's PKZIP; Delta modulation; JPEG.

UNIT II

ERROR DETECTION AND CORRECTION: Parity; 1, 2, n-dimensions, Hamming codes; p-out-of-q codes

UNIT III

CRYPTOGRAPHY: Vocabulary; history, steganography – visual, textual; cipher hiding; false errors; public key cryptography - authentication, signatures, deniability

UNIT IV

MATHEMATICS: Information; confusion; diffusion; modular arithmetic; inverses; Fermat's little theorem, Chinese remainder theorem; factoring; prime numbers; discrete logarithms

UNIT V

ALGORITHMS: DES; AES (Rijndael); IDEA; one time pad; secret sharing and splitting; RSA; elliptic curves; modes; random numbers

REFERENCE BOOKS

1. IEEE, "Integration of Data Compression and Cryptography: Another Way to Increase the Information Security", IEEE Computer Society
2. Schneier B., "Applied Cryptography: Protocols, Algorithms and Source Code in C", 2nd edition, Wiley, 1996.
3. Desai Suhag, "Security in Computing", Pearson Education
4. Trappe W. and Washington L., "Introduction to Cryptography", 2nd edition, Pearson Education, 2006

CA-1310A	PYTHON PROGRAMMING	L-T-P	Cr
		3-0-0	3

OBJECTIVE

To build programming logic and thereby developing skills in problem solving using Python programming language; To be able to do testing and debugging of code written in Python Emphasize the concepts and constructs rather than on language features.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: To learn and understand Python programming basics and paradigm.

CO2: To learn and understand python looping, control statements and string manipulations.

CO3: Students should be made familiar with the concepts of GUI controls and designing GUI applications.

CO4: To learn and know the concepts of Structure and Functions.

CO5: To learn and know the concepts of file handling, exception handling and database connectivity.

UNIT I

PLANNING THE COMPUTER PROGRAM AND PROBLEM-SOLVING TECHNIQUES: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation. Flow charting, decision table, algorithms, structured programming concepts, Programming methodologies viz. Top-down and bottom-up programming.

UNIT II

OVERVIEW OF PROGRAMMING & INTRODUCTION TO PYTHON: Structure of a Python Program, Elements of Python. Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic Operator, Relation a l operator, Logical or Boolean operator, Assignment, Operator, Ternary operator ,Bit wise operator, Increment or Decrement operator).

UNIT III

CREATING PYTHON PROGRAMS: Input and Output Statements, Control Statements(Looping- while Loop, for Loop ,Loop Control ,Conditional Statement-if...else, Difference between break ,continue and pass).

UNIT IV

STRUCTURES& FUNCTIONS: Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.

UNIT V

CLASSES, OBJECT-ORIENTED PROGRAMMING AND EXCEPTION: Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding, Handling exceptions

TEXT BOOKS

John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India

REFERENCE BOOKS

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.or2010
3. Allen Downey, Jeffrey Elkner, Chris Meyers ,How to think like a computer scientist :Learning with Python,Freelyavailableonline.2012
4. http://docs.python.org/3/tutorial/index.html
5. http://interactivepython.org/courselib/static/pythonds
6. http://www.ibiblio.org/g2swap/byteofpython/read/

CA-1329A	ELECTIVE – II (BIG DATA ANALYSIS)	L T P	Cr
		3 0 0	3

OBJECTIVE

The basics of Hadoop, the basics of Analytics – Concepts, Data preparation – merging, managing missing numbers sampling, Data visualization and Basic statistics.

COURSE OUTCOMES

The students undergoing this course will be able to:
CO1: Identify Big Data and its Business Implications.
CO2: List the components of Hadoop and Hadoop Eco-System
CO3: Access and Process Data on Distributed File System
CO4: Manage Job Execution in Hadoop Environment
CO5: Develop Big Data Solutions using Hadoop Eco System
CO6: Analyze Infosphere Big Insights Big Data Recommendations
CO7: Apply Machine Learning Techniques using R

UNIT I

INTRODUCTION TO BIG DATA : Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce, Challenges for processing big data, Using big data in businesses.

UNIT II

INTRODUCTION TO HADOOP: Introduction to Hadoop, why we use Hadoop, History of Hadoop, Use cases of Hadoop, Big Data – Apache Hadoop – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

UNIT III

HADOOP ARCHITECTURE: Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., Name Node, Secondary Name Node, and Data Node, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering – Monitoring & Maintenance.

UNIT IV

HADOOP ECOSYSTEM AND YARN: Learning MapReduce concepts and framework, Testing and Debugging Map Reduce Applications, Background of YARN; Hadoop YARN architecture; advantages of YARN, working with YARN, backward compatibility with YARN, YARN Commands, log management etc.

UNIT V

HIVE AND HBASE: Introduction to Hive and HBASE, HIVE: Architecture, Managing tables, data types, schemas, partitions, HBASE: Architecture, Schema design; Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper., HBASE commands, HIVE Vs RDMS, HBASE Vs RDMS.

REFERENCES

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.
3. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012. 6 IT2015 SRM(E&T)
4. Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.
5. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014.
6. http://www.bigdatauniversity.com/
7. Jy Liebowitz, "Big Data and Business analytics",CRC press, 2013.

CA-1357A	NEURAL NETWORK LAB	L T P	Cr
		0 0 2	1

COURSE OUTCOMES

CO1: Implement the Neuron and Neural Network, and to analyze ANN learning, and its applications

CO2: Implement and Perform Pattern Recognition, Linear classification.

CO3: Develop different single layer/multiple layer Perception learning algorithms

LIST OF EXPERIMENTS

1. Study of NN toolbox
2. Study of MATLAB functions
3. To perform basic matrix operations.
4. To plot the following
   (a) A straight line
   (b) A sine curve.
5. To generate a few activation functions that is used in neural networks in MATLAB.
6. To plot hard limit transfer function.
7. To generate XOR function using McCullock Pitts Neural Network in MATLAB.
8. To generate AND-NOT function using McCullock Pitts Neural Network in MATLAB.
9. To use Hebbian Network to classify 2-Dimentional input pattern.
10. Write a MATLAB program for perceptron net for and function with bipolar input and targets.

REFERENCE BOOKS

Haykin Simon, ―Neural Networks: A Comprehensive Formulation‖, Addison Wesley

CA-1360A	PYTHON PROGRAMMING LAB	L T P	Cr
		0 0 2	1

COURSE OUTCOMES

CO1 Define and demonstrate the use of built-in data structures "lists" and "dictionary".
CO2 Design and implement a program to solve a real-world problem
CO3 Design and implement GUI application and how to handle exceptions and files.
CO4 Make database connectivity in python programming language.

LIST OF PROGRAMS

Program 1: Programs using if else structure

a) Find the Largest Among Three Numbers
b) Python Program to Check Leap Year
c) Python Program to Take in the Marks of 5 Subjects and Display the Grade
d) Python Program to Check if a Date is Valid and Print next date

Program 2: Programs using for and while loop

a) Python Program to check whether given number is Prime Number or not
b) Python program to compute the GCD of two numbers
c) Python Program to Find the Sum of Digits in a Number
d) Python Program to convert binary number to decimal number
e) Python Program to Display Fibonacci sequence Using Recursion

Program 3: Program using List and String data structure

a) Write Python Program to input a list of integers, (1) display the no of elements in the list (2) display minimum and maximum element in the list (3) display sum of square of all the element in the list (4) (5) add a new element at end and display the list (6) add a new element at given index and display list (7) display the occurrence of given element in the list (8) remove the given element in the list (9) add element from a new list from given list (10) sort the given list & reverse the given list (11) also perform slicing, concatenation and multiplication operation
b) A fruit seller sells different type of fruits. Type of fruits and corresponding rates are stored in two different lists. Customer can order any type of fruit (one or more type) in any quantity. If total bill of customer is greater than 500, customer is given 10% discount. If any of the fruits required by the customer is not available in the store, then consider the bill amount to be -1. Write a Python program to calculate and display the bill amount

c) Write a Python program to display all the permutations of given string (don't use python permutation function)

d) Accept two strings 'string1' and 'string2' as input from the user. Generate a resultant string-1, such that it is a concatenated string of all upper case alphabets from both the strings in the order they appear. Generate a resultant string-2 that contain character which are in both string1 and 2 Print the actual resultant string-1 and resultant string-2

Program 4: Programs using concept of sets, tuple & dictionary

a) Write a Python program that take a string as input and store the character and occurrence of each character in a dictionary. Create two lists from dictionary first having each character in sorted order of their frequency and second having corresponding frequency.

b) A furniture seller sells different type of furniture, Type of Furniture and rates are stored in a dictionary. Customer can order any type of furniture (one or more type) in any quantity. If total bill of customer is greater than 10,000, customer is given 5% discount. 8% GST is charged on total bill. If any of the furniture required by the customer is not available in the store, then consider the bill amount to be -1. Write a Python program to calculate and display the bill amount

c) Consider a scenario from Lingayas Vidyapeeth. Given below are two Sets representing the names of students enrolled for a particular course: java_course = {"Anmol", "Rahul", "Priyanka", "Pratik"} python_course = {"Rahul", "Ram", "Nazim", "Vishal"}Write a Python program to list the number of students enrolled for:1)Python course2)Java course only3)Python course only4)Both Java and Python courses5)Either Java or Python courses but not both6)Either Java or Python

d) Students name and their corresponding marks are stored in a dictionary. Write a Python program to perform following (1) Display name and marks of each student (2) Display the names of top two scorer (3) display the class average for this course (4) check if the marks for given student is stored in dictionary or not, if not add the name and marks in the dictionary else display his/her marks (5) delete the name and marks of a given student in the dictionary (6) add name and marks from another dictionary and display combined dictionary

Program 5: Program using Function in Python:

a) Write Python functions using the concept of Keyword & default arguments and write a program to use them

b) Write python functions to use the concept of variable length argument & global variable. Write a program to use these functions

Program 6: Program using concept of Class, object, class variable, class method:

a) Create a class Account with name, account no and balance as attribute and no_of_accounts as class variable. Account no should be generated automatically (starting from 1) using the class variable no_of_account. Add the methods for displaying the account information, depositing given amount, withdrawing given amount and initializer method to initialize the object. Create objects of Account class and call different method to test the class

b) Create a class Employee with name , empid ,salary as attribute and no_of_ employee and annual_incr (% annual increment) as class variable. empid should be generated

automatically (starting from 1) using the class variable, no_of_employee. Add the instance methods for displaying the employee information, annually increasing the salary with help of class variable annual_incr , class method to change the value of annual_incr and initializer method to initialize the object. Create objects of employee class and call different method to test the class (program using class method)

c) Write a Program to showing the use of built in class attributes (__doc__, __dict__, __name__, __module__,__bases__) and special methods(__del__( ), __str__( )) and built in function isinstance()

Program 7: Program using the concept of Inheritance

a) Create a class Polygon to represent a polygon having no of sides and a list having magnitude of each side as attribute. Add the inputSides() to input sides and displaySides() to display sides as methods. Derive a class Triangle from Polygon and add an additional method displayArea() to display area. Create object of Triangle and call different methods to test the class

b) Create a class Person having name, age, as attributes, __init__() method to initialize the object and display() to display person information. Derive a class Student from Person having roll no, University name, branch as additional attributes and __init__(), display() to display student information and change_Branch() method. Create object of Student type and call different methods to test the class.

c) Write a program to show the concept of multiple inheritance in python

Program 8: Program using the concept of Polymorphism, Operator Overloading

a) In a retail outlet there are two modes of bill Payment (1) Cash : Calculation includes VAT(10%) Total Amount = Purchase amount + VAT (2) Credit card: Calculation includes processing charge and VAT Total Amount = Purchase amount + VAT (10%) + Processing charge (2%) The act of bill payment is same but the formula used for calculation of total amount differs as per the mode of payment. Can the Payment maker simply call a method and that method dynamically selects the formula for the total amount? Demonstrate this Polymorphic behaviour with code.

b) Write a program to create a class to represent length in feet and inch. Overload the "+" operator to add the two object of length type.

c) Write a program to overload comparison operator in python

Program 9: Program on file handling in Python

a) Write a python program to write few lines on a file, read it back and create a dictionary having each word in file as keys in dictionary and occurrence of these word as values and print the dictionary.

b) A file student.txt store student information. Information about each student is written on separate line in the form: roll-no student-name (student-name may consist of any number of words).Write a Python program that takes student roll no as input and print

the student name. If roll no is not present in the file it display : "roll no not present in the file"

c) Write a python program to read a file that contains email ids on the separate lines in the form: "personname@companyname.com. Create a new file that contain only company names, read the new file to print the company name

Program 10: Program on Exception handling

a) Write a function divide (arg1, arg2) to divide arg1 by arg2. Use the exception handling mechanism to handle all type of possible exceptions that may occur. Take the value of arg1 and arg2(of any type) from user as input and call the function divide to print the result of division or suitable message if any type of exception occurs(use also else and finally block)

b) Write a program to open a file in read only mode read data from file and then try to write data on file. Use the exception handling mechanism to handle all type of possible exception

c) Write a Python program that takes email id, mobile number and age as inputs from user. Validate each and raise user defined exceptions accordingly

Note:-

Email id: there must be only one @ and At least one "."

Mobile number must be 10 digits

Age must be a positive number less than 101

PDP-302	PROBLEM SOLVING SKILLS	L T P	Cr
		0 0 2	1

UNIT I

LOGICAL REASONING – Logical Deductions (Syllogism & Venn Diagrams) logical connectives

UNIT II

ANALYTICAL REASONING – Seating Arrangements, combinations, selections, comparisons, blood relations, directions etc.

UNIT III

NON – VERBAL REASONING (ALPHA NUMERIC & VISUAL PUZZLES) – To solve problems on numbers, alphabet, symbols, visuals, problem types and series, analogies, odd man out, coding, decoding and symbols & notations.

UNIT IV

HIGHER MATHS – Algebra & Mensuration

UNIT V

BUSINESS MATHS – Number system, ratios & averages, time & work, time & distance, percentages, profit & loss, simple & compound interest

UNIT VI

DATE INTERPRETATION & SUFFICIENCY – Tables, Bar Chart, Line Graph & Pie Chart

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SCHEME FOR CSE (B.Tech)

B.Tech			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BSC-101	Physics	3	1	0	4
2	BSC-103	Mathematics-I	3	1	0	4
3	ESC-101	Basic Electrical Engineering	3	1	0	4
4	ESC-103	Introduction To Computer Systems & Internet Basics	3	0	0	3
5	HSS-101	English	2	0	0	2
6	MC-101	Environmental Science	2	0	0	0
7	ESC-151	Basic Electrical Engineering Lab	0	0	2	1
8	ESC-153	Engineering Graphics & Design Lab	0	0	6	3
9	HSS-151	English Lab	0	0	2	1
	BSC-151	Physics Lab	0	0	2	1
11	PD-101	Introduction and Nurturing Hobbies	0	0	2	1
		Total---->	**16**	**3**	**14**	**24**

SCHEME FOR CSE (B.Tech)

B.Tech			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BSC-102	Chemistry	3	1	0	4
2	BSC-104	Mathematics-II	3	1	0	4
3	ESC-102	Programming for problem solving	3	0	0	3
4	HSS-102	Effective Technical Communication	3	0	0	3
5	MC-102	Constitution of India	2	0	0	0
6	ESC-154	Workshop/Manufacturing Practice	0	0	4	2
7	BSC-152	Chemistry Lab	0	0	2	1
8	ESC-152	Programming for problem solving lab	0	0	4	2
9	PD-102	People Connect	0	0	2	1
		Total---->	**14**	**2**	**12**	**20**

SCHEME FOR CSE (B.Tech)

B.Tech			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CS-201C	Data Structures& Algorithms	3	1	0	4
2	CS-203C	Discrete Mathematical Structures	3	0	0	3
3	CS-205C	Object Oriented Programming	3	1	0	4
4	EC-203C	Digital Electronics	3	0	0	3
5	BSC-201	Mathematics-III	3	1	0	4
6	HSS-201	Engineering Economics & Industrial Management	3	0	0	3
7	CS-251C	Data Structures & Algorithms Lab	0	0	2	1
8	CS-255C	Object Oriented Programming Lab	0	0	2	1
9	EC-253C	Digital Electronics Lab	0	0	2	1
10	CS-257C	MATLAB	0	0	2	1
11	PDP-201	Personality Development & Grooming	0	0	2	1
		Total---->	**18**	**3**	**10**	**26**

SCHEME FOR CSE (B.Tech)

B.Tech			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CS-202C	Operating Systems	3	0	0	3
2	CS-204C	Computer Architecture & Organization	3	0	0	3
3	CS-206C	Data Base Management System	3	0	0	3
4	CS-208C	Java Programming	3	1	0	4
5	CS-210C	Web & Internet Technologies	3	0	0	3
6	CS-212C	Design & Analysis of Algorithms	3	1	0	4
7	CS-252C	Operating Systems Lab	0	0	2	1
8	CS-256C	Data Base Management System Lab	0	0	2	1
9	CS-260C	Web & Internet Technologies Lab	0	0	2	1
10	CS-258C	Java Programming Lab	0	0	2	1
11	CS-282C	Minor Project-1/ Training	0	0	4	2
12	PDP-202	Life Skill	0	0	2	1
		Total---->	**18**	**2**	**14**	**27**

SCHEME FOR CSE (B.Tech)

B.Tech			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	EC-301C	Microprocessors & Microcontroller	3	0	0	3
2	CS-301C	Computer Network	3	0	0	3
3	CS-303C	Artificial Intelligence	3	0	0	3
4	CS-305C	Python Programming	3	0	0	3
5	CS-320C	Machine Learning	3	0	0	3
6	CS-309C	Formal Language & Automata Theory	3	1	0	4
7	EC-351C	Microprocessors & Microcontroller Lab	0	0	2	1
8	CS-353C	Artificial Intelligence Lab	0	0	2	1
9	CS-370C	Machine Learning Lab	0	0	2	1
10	CS-355C	Python Programming Lab	0	0	2	1
11	CS-381C	Minor Project-II/ Training	0	0	4	2
12	PDP-301	Leadership & Entrepreneurship Development	0	0	2	1
		Total---->	**18**	**1**	**14**	**26**

SCHEME FOR CSE (B.Tech)

B.Tech			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CS-302C	Statistical Learning Theory	3	0	0	3
2	CS-322C	Software Engineering	3	0	0	3
3	CS-306C	Artificial Neural Networks	3	0	0	3
4	CS-308C	Cryptography & Network Security	3	0	0	3
5	CS-324C	Computer Vision	3	0	0	3
6	CS-326C	Compiler Design	3	0	0	3
7	CS-352C	Statistical Learning Theory Lab	0	0	2	1
8	CS-374C	Computer Vision Lab	0	0	2	1
9	CS-356C	Artificial Neural Networks using Lab	0	0	2	1
10	CS-358C	Cryptography & Network Security Lab	0	0	2	1
11	CS-384C	Minor Project-III	0	0	4	2
12	PDP-302	Problem Solving Skills	0	0	2	1
		Total---->	**18**	**0**	**14**	**25**

SCHEME FOR CSE (B.Tech)

B.Tech			Semester			VII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CS-401C	Professional Elective-VI(R Programming)	3	0	0	3
2	CS-403C	Professional Elective-VII(Deep Learning)	3	0	0	3
3	CS-405C	Professional Elective-VIII(Pattern Recognition)	3	0	0	3
4	CS-407C	Professional Elective-IX(Speech and Natural language Processing)	3	0	0	3
5	EL-I	Open Elective-I	3	0	0	3
6	CS-451C	Program Elective- Lab VI(R Programming Lab)	0	0	2	1
7	CS-453C	Program Elective Lab VII(Deep Learning Lab)	0	0	2	1
8	CS-455C	Program Elective Lab VIII(Pattern Recognition Lab)	0	0	2	1
9	CS-481C	Major Project	0	0	8	4
10	PD-401	Campus to Corporate	0	0	2	1
		Total---->	**15**	**0**	**16**	**23**

SCHEME FOR CSE (B.Tech)

B.Tech			Semester			VIII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CS-402C	AIML Tools and Applications	3	0	0	3
2	CS-490C	Major Project-II/ Project Based on Internship	0	0	24	12
3	CS-492C	Seminar	0	0	10	5
		Total---->	**3**	**0**	**34**	**20**

BSC-101	PHYSICS	L T P	Cr
		3 1 0	4

OBJECTIVES

To familiar the students with the very basic knowledge of concepts and tools of applied physics and guide them to understand the various engineering subject.

COURSE OUTCOMES:

CO1: Examine the different phenomenon related with wave nature of light and significance in applications of engineering

CO2: Analyze the basics of laser and types of lasers & apply them to diverse engineering problems

CO3: Understand the concept of fundamental forces and apply the various laws in different engineering situations

CO4: Apply laws of the electrostatic and magnetostatic in different engineering situations

UNIT I

MECHANICS: Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction; Extension to cylindrical and spherical Coordinates.

UNIT II

WAVE OPTICS: Huygens' principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Mach-Zehnder interferometer.
Fraunhauffer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

UNIT III

LASERS: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO2), solid-state lasers (ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine.

UNIT IV

ELECTROSTATICS: Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential, Boundary conditions of electric field and electrostatic potential; method of images; energy of a charge distribution and its expression in terms of electric field.

UNIT V

MAGNETOSTATICS: Principle of work and energy for a particle and a rigid body in plane motion – Conservation of energy - Principle of impulse and momentum for a particle and a rigid bodies in plane motion – Conservation of momentum – System of rigid bodies –

Impact - direct and central impact – coefficient of restitution.

REFERENCES

1. David J. Griffiths Pati (2017), Introduction to Electrodynamics, Cambridge University Press. ISBN: 978-1-108-35714-2.
2. W H Hayt Jr, , J A Buck, M Jaleel Akhtar (2020), Engineering Electromagnetics, 9th Edition, McGraw-Hill International Edition. ISBN: 978-9-353-16973-2
3. Manoj K. Harbola (2009), Engineering Mechanics , 2nd Edition, Cengage Learning India Private Limited. ISBN: 978-8-131-50990-6
4. Mahendra K. Verma (2019), Introduction to Mechanics, Taylor & Francis Group. ISBN: 978-1-138- 11677-1
5. Robert Eisberg, Robert Martin Eisberg, Robert Resnick, David O. Caldwell, Edward Derringh (1985), Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles, Wiley Publishers. ISBN: 978-0-471-87373-0.

BSC-103	MATHEMATICS - I	L T P	Cr
		3 1 0	4

OBJECTIVES

The objective of this subject is to understand the major problems of differential and integral calculus and to appreciate how calculus allows us to solve important practical problems in an optimal way.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Calculate limits, derivatives and indefinite integrals of various algebraic and trigonometric functions of a single variable.

CO2: Use the fact that the derivative is the slop of the tangent line to the curve at a given Point.

CO3: Use the properties of limits and the derivative to analyze graphs of various functions of a single variable

CO4: Apply derivative tests in optimization problems appearing in social sciences, physical sciences, life Sciences and a host of other disciplines.

UNIT I

MATRIX ALGEBRA: Elementary operations and their use in getting the Rank, Inverse of a matrix and solution of linear simultaneous equations. Orthogonal, Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, Normal & Unitary matrices and their elementary properties. Eigen-values and Eigenvectors of a matrix, Cayley-Hamilton theorem, Diagonalization of a matrix.

UNIT II

DIFFERENTIAL CALCULUS: Limit, Continuity and differentiability of functions of two variables, Euler's theorem for homogeneous equations, Tangent plane and normal. Change of variables, chain rule, Jacobians, Taylor's Theorem for two variables, Error approximations. Extrema of functions of two or more variables, Lagrange's method of undetermined multipliers.

UNIT III

INTEGRAL CALCULUS: Review of curve tracing and quadric surfaces, Double and Triple integrals, Change of order of integration. Change of variables. Gamma and Beta functions. Dirichlet's integral. Applications of Multiple integrals such as surface area, volumes, centre of gravity and moment of inertia.

UNIT IV

VECTOR CALCULUS: Differentiation of vectors, gradient, divergence, curl and their physical meaning. Identities involving gradient, divergence and curl. Line and surface integrals. Green's, Gauss and Stroke's theorem and their applications.

REFERENCES

1. Shanti Narayan (2005), Differential Calculus, S. Chand Limited, ISBN 978-8-121-90471-4
2. P. K. Mittal (2005), Integral Calculus, S. Chand Limited, ISBN-13**:** 978-8-121-90681-4
3. Thomas (1996), Calculus and Analytical Geometry, Pearson Education, ISBN: 978-8-817- 758325-0.
4. Erwin Kreyszig, Herbert Kreyszig, Edward J. Norminton (2011), Advanced Engineering Mathematics, Wiley. ISBN: 978-0-470-45836-5.
5. R. K. Jain, S. R. K. Iyengar (2004), Advanced Engineering Mathematics, Alpha Science International. ISBN: 978-1-842-65185-8.

ESC-101	BASIC ELECTRICAL ENGINEERING	L T P	Cr
		3 1 0	4

OBJECTIVES

1. To understand and analyze basic electric and Electronics concepts.
2. To study the working principles of electrical machines and power converters.
3. To study the Network Theorems.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand and analyze basic electric and magnetic circuits
CO2: Understand the working principles of electrical machines and power converters.
CO3: Understand the components of low voltage electrical installations and power converters.

UNIT I

HISTORICAL BACKGROUND: Vacuum tubes; working of vacuum tube and their characteristics; vacuum diode; triode; tetrode and pentode. PN JUNCTION: Depletion layer; Barrier potential; Forward and reverse bias; Breakdown voltage; PIV; switching characteristics of p-n junction diode; knee voltage; load line; and operating Point Ideal p-n junction diode; junction capacitance; Zener diode.

UNIT II

RECTIFIERS AND FILTERS: Half wave; centre tap full wave and bridge rectifier; percentage of regulation; PIV; ripple factor; C; RC; LC and PI filter; voltage doubler; clipping and clamping circuit; voltage regulation. Bipolar Junction Transistor: Introduction; basic theory of operation of PNP ad NPN transistor-l characteristics; CB; CE and CC configuration; different biasing techniques.

UNIT III

FET: Introduction; Theory of operation; JFET Parameters; and JFET Amplifiers. MOSFET: Introduction; theory of operation; MOSFET parameters; application; graphical analysis of BJT and FET circuits; linear models of BJT and FET; pulse and large signal models of BJT and FET.

UNIT IV

DC CIRCUITS: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real Power, reactive power, apparent power, power factor. Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin, Norton and maximum power transfer Theorems.

UNIT V

ELECTRICAL MACHINES: Three phase balanced circuits, voltage and current relations in star and delta connections. Generation of rotating magnetic fields, Construction and working of a three-phase induction Motor, Significance of torque-slip characteristic, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of dc motor. Construction and working of synchronous generators.

REFERENCES

1. Millman and Halkias (2000), Electronic Devices and Circuits, 2nd Edition, Tata McGraw Hill Publication, ISBN: 978-0-070-42380-0.
2. D P Kothari, I J Nagrath (2020), Basic Electrical and Electronics Engineering,Second Edition, McGraw-Hill Education, ISBN: 978-9-389-81125-4.
3. W.A.J.Chapman (2001), Workshop Technology, Vol 1, 5th Edition, CBS Publishers, ISBN: 978-8-123-90401-6.
4. Boylestad and Nashelsky (1999) , Electronic Devices and Circuit , 4th Edition, Pearson Education, ISBN: 978-9-332-54260-0.

HSS-101	ENGLISH	L T P	Cr
		2 0 0	2

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Comprehend and summarize characteristics & various structural principles prerequisite to Technical Communication

CO2: Classify and formulate the elementary intricacies of Scientific and Technical Writing using applicative grammar construct

CO3: Create cohesive technical paragraphs & text

CO4: Paraphrase text(s) and use appropriate referencing styles

CO5: Design and present/publish technical documents

UNIT I

INTRODUCTION TO TECHNICAL WRITING: An overview of Technical Writing, Nature of Scientific English & Technical writing, Taxonomy of Technical writing, Examples of Technical Writing

UNIT II

TECHNICAL WRITING DESIGN & DEVELOPMENT: Linguistic know-how in Technical Writing, Techniques of precision, Organization of Technical contents

UNIT III

SIGNPOSTING PARAGRAPH STRUCTURE & DEVELOPMENT: Signposting with strong Topic Sentence, Writing for Purpose: Explanation, Instruction, Description, Definition, Comparison & Contrast, Classification, Narration, Hypotheses

UNIT IV

FINDING DATA & INCORPORATING SOURCES: Finding data & incorporating sources, Paraphrasing, Avoiding Plagiarism, Referencing styles

UNIT V

CREATING TECHNICAL DOCUMENTS: Creating Technical Documents – Report, Manuals, Brochures etc. (Selected), Technical Presentation in Groups

REFERENCES

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta
2. Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.
3. A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication, Delhi.

4. Rizvi, M.A. Academic Writing: A course in English for Science and Technology, Nabodaya
5. Price, Jonathan and Korman H., (1993) How to Communicate Technical Information: The Benjamin Cummings Publishing Company.
6. Muralikrishna and S. Mishra (2011) Communication Skills for Engineers, Pearson education. ISBN: 9788131733844.
7. Murphy, R. (2007) Essential English Grammar, CUP. ISBN: 8175960299.
8. Essential English Grammar by Raymond Murphy, CUP, 2011.
9. Intermediate English Grammar by Raymond Murphy, CUP, 2011.
10. Practical English Usage by Michael Swan, OUP, 2013.
11. Dignen, Bob. Presentation Skills in English. Orient Black Swan, 2007.

ESC-151	BASIC ELECTRICAL ENGINEERING LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi – meter, oscilloscope. Resistors, capacitors and inductors.
2. To study V-I characteristics of diode; and its use as a capacitance.
3. Study of the characteristics of transistor in Common Base configuration.
4. Study of the characteristics of transistor in Common Emitter configuration.
5. Study of characteristics of MOSFET/JFET is CS configuration.
6. To verify the Thevenin's & Norton's theorem.
7. To verify the Superposition theorem.
8. To study frequency response of series & parallel RLC Circuit.
9. Demonstration of cut – out sections of machines:
10. Load test on D.C. Shunt generator

ESC-153	ENGINEERING GRAPHICS & DESIGN LAB	L T P	Cr
		0-0-4	2

OBJECTIVE

Engineering drawing is an effective language of engineers. It is the foundation block which strengthens the engineering and technological structure. Moreover, it's the transmitting link between ideas and realization. After learning the course the students should be able to understand conventions and the methods of engineering drawing and interpret engineering drawings, using fundamental technical mathematics, construct basic and intermediate geometric improve their visualization skills so that they can apply these skills in developing new projects improve their technical communication skill in the form of communicative drawings, comprehend the theory of projections and acquire basic knowledge of computer aided drafting**.**

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software. This course is designed to address:

- To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- to prepare you to communicate effectively
- to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Introduction to engineering design and its place in society
CO2: Exposure to the visual aspects of engineering design
CO3: Exposure to engineering graphics standards
CO4: Exposure to solid modelling

UNIT I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their significance, usage of drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Dimensioning

UNIT II

ORTHOGRAPHIC PROJECTIONS: Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes;

UNIT III

PROJECTIONS OF SOLIDS: Projections of planes inclined Planes - Auxiliary Planes; Projection of Regular Solids covering those inclined to both the planes, Auxiliary Views; Section of such solids and the true shape of the section.

UNIT IV

SECTIONS AND SECTIONAL VIEWS OF RIGHT ANGULAR SOLIDS: Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; objects from industry and dwellings (foundation to slab only) Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids Conversion of Isometric Views to Orthographic Views and Vice-versa

UNIT V

OVERVIEW OF COMPUTER GRAPHICS: Introduction to Computer Aided Drafting and CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

REFERENCE BOOKS:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech
5. Publishers (Corresponding set of) CAD Software Theory and User Manuals

HSS-151	ENGLISH LAB	L T P	Cr
		0-0-2	1

LIST OF TOPICS

1. Intro - Lab & Seating Plan/Ice-breaking
2. Basic Ear training & Listening Skills: Practice
3. Listening Skills Test: Graded Exercise
4. International Phonetic Alphabet & Mispronounced Words: Practice.
5. International Phonetic Alphabet-2: Practice
6. Group Discussion Techniques – Dos & Don'ts – Practice GD
7. Extempore based on Cue Cards
8. Individual Speaking Activity: Graded Exercise.
9. Reading Skills & Comprehension: Practice
10. Reading Skills & Comprehension - Graded Exercise
11. Creating Technical Posters
12. Technical Poster Presentation Graded Exercise

REFERENCES

1. Jones, D. (1909), "The Pronunciation of English", Cambridge: CUP; rpt in facsimile in Jones (2002).
2. Jones, D. (1918), "An Outline of English Phonetics", Leipzig: Teubner; rpt in Jones (2002).
3. Jones, D. (1909) "The Dictionary of English Phonetics" Cambridge: CUP (2002).
4. Bansal, R.K. The Intelligibility of Indian English, Monograph, 4 CIEFL, Hyderabad, Second abridged edition, 1976.
5. Jones, Daniel, English Pronouncing Dictionary, revised by A.C. Gimson, 14th Edition, The English Language Book Society and JM Dent Sons Ltd. London 1977.

6. Senthi. J and P.V. Dhamija, A Course in Phonetics and Spoken English Prentice Hall of India Private Ltd. New Delhi, 1989.
7. Taylor, Ken, Telephoning and Teleconferencing Skills. Orient Black Swan, 2008.
8. Dignen, Bob. Presentation Skills in English. Orient Black Swan, 2007.
9. Murphy, R. (2007) Essential English Grammar, CUP. ISBN: 8175960299.
10. C. Muralikrishna and S. Mishra (2011) Communication Skills for Engineers, Pearson education. ISBN: 9788131733844.
11. Essential English Grammar by Raymond Murphy, CUP, 2011
12. Intermediate English Grammar by Raymond Murphy, CUP, 2011
13. Practical English Usage by Michael Swan, OUP, 2013

BSC-151	PHYSICS LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

1. To study response curve of a series LCR circuit.
2. To determine the Planck's constant using LEDs.
3. To determine the Rydberg's constant of Hydrogen atom.
4. To find the refractive index and Cauchy's constants of a prism.
5. To find the wavelength of light by Newton's rings experiment.
6. To determine the thickness of a thin wire by interference.
7. To determine the wavelength of LASER using diffraction grating.
8. To determine the resolving power of a telescope.
9. To find the numerical aperture of an optical fiber cable.
10. To find the wavelength of light using Michelson's interferometer.

Syllabus

Of

B.Tech(CSE)

1st Year

2nd Semester

BS-102	CHEMISTRY	L T P	Cr
		3-1-0	4

UNIT I

THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: Basic definitions related to environment; Scope, vis-à-vis environmental science and environmental engineering; a uses of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principals involved in environmental education, environmental awareness, Environmental ethics, environmental organization and their involvement.

UNIT II

NATURAL RESOURCES: Renewable and non-renewable resources; forest resources, over-exploitation, and deforestation / afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; Food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non-renewable energy sources, solar energy, wind energy, hydro energy, biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT III

ECOSYSTEMS: Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids; characteristic features, structure and function of the following ecosystem -forest ecosystem, grassland ecosystem desert ecosystem and aquatic ecosystems.

UNIT IV

BIODIVERSITY AND ITS CONSERVATION: Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT V

ENVIRONMENTAL POLLUTION: Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution; solid waste management, e-waste management; disaster management –floods, earthquake, cyclone and landslides.

UNIT VI

SOCIAL ISSUES AND THE ENVIRONMENT: Water conservation, rain water harvesting, watershed management; climate change, global warming, acid rain, ozone layer depletion; Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act.

UNIT VII

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, population explosion –family welfare programmes; role of information technology in environment and human health; case studies, Chipko movement, Sardar Sarovar dam, mining and quarrying in Udaipur, salinity and water logging in Punjab, Haryana and Rajasthan, Bhopal gas tragedy, Chernobyl nuclear disaster, arsenic pollution in ground water.

TEXT BOOK

Kaushik, Anubha, and Kaushik, C.P., "Perspectives in Environmental Studies", 4th Edition,

New Age International Publishers, 2004

REFERENCE BOOKS

1. Agarwal, K.C., "Environmental Biology", 2nd Edition, Nidhi Publ. Ltd., Bikaner, 2001.
2. Bharucha Erach, "The Biodiversity of India", 2nd Edition, Mapin Publishing Pvt. Ltd., 2006.
3. Brunner R. C., "Hazardous Waste Incineration", 1st Edition McGraw Hill Inc., 1989.
4. Clark R.S., "Marine Pollution", 1st Edition Clanderson Press Oxford,1989
5. .Cunningham, W.P., Cooper, T.H. Gorhani, E. & Hepworth, M.T., Environmental Encyclopedia", 2nd Edition, Jaico Publ. House, 2001.
6. De, A. K., "Environmental Chemistry", 2nd Edition, Wiley Eastern, 1989
7. Jadhav, H. and Bhosale, V.M ., "Environmental Protection and Laws", 1st Edition, Himalaya Pub. House, Delhi, 1995.

8. Mckinney, M.L. and Schocl. R.M., "Environmental Science Systems & Solutions", 2nd Edition, Web enhanced edition, 1996.
9. Rao M.N. and Datta, A.K.,"Waste Water Treatment", 2nd Edition, Oxford & IBH Publ.Co., 1987.
10. Sharma B.K., "Environmental Chemistry", 2nd Edition, Goel Publ. House, Meerut, 2001
11. Trivedi R.K. and Goel, P.K., "Introduction to Air Pollution", 2nd Edition, Techno-science Publications, 1996

BSC-104	MATHEMATICS-II	L T P	Cr
		3-1-0	4

UNIT I

SEQUENCE, POWER SERIES AND FOURIER SERIES : Sequence, Convergentce of Sequence, Series, geometric series, Convergence of series, comparision test, p-test, Leibnits Test, Periodic Function, Fourier series, Dirichlet's condition for Fourier series, Determination of Fourier coefficients (Euler's formulae), Fourier series for discontinuous, even, and odd functions.

UNIT II

COMPLEX VARIABLE: Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm), Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof) singularities, Laurent's series; Residues, Cauchy Residue theorem.

UNIT III

ORDINARY DIFFERENTIAL EQUATIONS (ODS): First order ordinary differential equations, Separation of varables, Exact, Linear and Bernoulli's equations, Second order differential equation with constant coefficients, Cauchy-Euler equation, Sturm-Liouville's problems.

UNIT IV

PARTIAL DIFFERENTIAL EQUATIONS (PDES): Formation and classification of first-order PDEs, Linear first-order PDEs, Lagrange's method, Nonlinear first-order PDEs, Charpit's method, Linear partial differential equations with constant coefficients, Method of separation of Variables, Heat Equation, Wave Equation.

UNIT V

INTEGRAL TRANSFORMS: Definition and properties of Laplace Transform, Transform of a periodic function, Dirac delta Function, Laplace Transform, Fourier Transforms, Properties of Fourier Transforms, Convolution Theorem for Fourier Transforms Application of Laplace and Fourier transform in finding the solution of differential equations.

TEXTS BOOKS

1. Advanced Engineering Mathematic By D. G. Zill and W. S. Wright.
2. Advanced Engineering mathematics by Erwin Kreyszig.

REFERENCE BOOKS

1. Higher Engineering mathematics By B.S. Grewal.
2. Mathematical Analysis. By S.C. Malik and Savita Arora.
3. Higher Engineering Mathematics By H.K. Dass and Er. Rajnish Verma

CS-101	PROGRAMMING FOR PROBLEM-SOLVING USING C	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Know the basic concepts of programming languages as well as operating system

CO2: Learn the basics of programming using C

CO3: undergo the functions and pointers

CO4: Learn about the structures, unions as well as functions using recursion

CO5: Know about the dynamic programming as well as file handling

UNIT I

INTRODUCTION TO COMPUTER SYSTEMS, PROGRAMMING LANGUAGES, OPERATING SYSTEM, NETWORKING, AND SECURITY: Overview of Computer Systems: Characteristics of Computer- speed, storage, Accuracy, Categories of computer- Micro Computers, Mini Computers, Main Frames, Super Computers, Computer Organization- Central processing unit, Arithmetic and Logic Unit, Control Unit, Memory System- Primary memory, secondary memory. Data Representation in a Computer System- Number system - decimal, Binary, Octal, Hexadecimal representation and conversion.

SOFTWARE BASICS: Application software, System Software, Programming languages: Low level languages, Machine language, Assembly language, High Level languages, Translator, Assembler, Interpreter, Compiler, Operating System: Need of Operating System, Function of Operating System, Types of Operating System, Introduction to Networking: Local and Wide Area Networks.

SECURITY THREATS: Intruders, Password Cracking, Types of malicious Software- Virus, Worms, Trojan Horse, Prevention from malicious Software- Antivirus

UNIT II

BASICS OF PROGRAMMING USING C: Problem definition, Representation of Algorithms: Flow charts/ Pseudocode with example, Types of programming languages, Translators, From algorithms to programs; source code, variables and memory location, Introduction to C: Structure of C program, C character set, Identifier and Keywords, Data types, constants, variables, Declaration, Arithmetic expressions & precedence , statements, Symbolic constants, type conversion, Types of operators, Input and output functions in C, header files, common programming errors, Control Statements, Sequencing, Selection, Condition and iteration, Arrays and Strings: Declaring, Referencing and initializing arrays, array subscript, using for loop for sequential access, multi-dimensional array, String basics string library functions, assignment and substring, concatenation, string comparison.

UNIT III

FUNCTIONS AND POINTERS: Definition of function, function prototype, Purpose of main function, passing parameters, Scope of function, recursion, Call by value and reference, Types of storage classes, Scope of variable: Global and local, static variables, Recursion. Pointer variables, initializing pointers, pointer operators, pointer expressions, pointers and arrays, pointer and functions.

UNIT IV

STRUCTURES, UNIONS & RECURSION: Defining a structure, Declaring structure variables, Structure initialization, Copying and Comparing Structure variables, Array of structures, Arrays within structure, nested structures, Unions. Recursion as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

UNIT V

DYNAMIC ALLOCATION, AND FILE HANDLING: C's dynamic allocation functions. Streams and file types, opening and closing a data file, input and output operations, text mode versus binary mode, formatted input output operations with files, random access to files.

REFERENCES

4. Pradeep K. Sinha, Priti Sinha (2004), Computer Fundamentals, BPB Publications, ISBN: 9788176567527.
5. Byron S. Gottfried(1996), Programming with C, McGraw-Hill Education, ISBN:9780070240353.
6. E. Balagurusamy (1990), Programming in C, Tata McGraw-Hill Publishing ISBN: 9780074600474

HSS-101	EFFECTIVE TECHNICAL COMMUNICATION	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Comprehend and summarize characteristics & various structural principles prerequisite to Technical Communication

CO2: Classify and formulate the elementary intricacies of Scientific and Technical Writing using applicative grammar construct

CO3: Create cohesive technical paragraphs & text

CO4: Paraphrase text(s) and use appropriate referencing styles

CO5: Design and present/publish technical documents

UNIT I

INTRODUCTION TO TECHNICAL WRITING: An overview of Technical Writing, Nature of Scientific English & Technical writing, Taxonomy of Technical writing, Examples of Technical Writing

UNIT II

TECHNICAL WRITING DESIGN & DEVELOPMENT: Linguistic know-how in Technical Writing, Techniques of precision, Organization of Technical contents

UNIT III

SIGNPOSTING PARAGRAPH STRUCTURE & DEVELOPMENT: Signposting with strong Topic Sentence, Writing for Purpose: Explanation, Instruction, Description, Definition, Comparison & Contrast, Classification, Narration, Hypotheses

UNIT IV

FINDING DATA & INCORPORATING SOURCES: Finding data & incorporating sources, Paraphrasing, Avoiding Plagiarism, Referencing styles

UNIT V

CREATING TECHNICAL DOCUMENTS: Creating Technical Documents – Report, Manuals, Brochures etc. (Selected), Technical Presentation in Groups

REFERENCES

12. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta
13. Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.
14. A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication,

Delhi.
15. Rizvi, M.A. Academic Writing: A course in English for Science and Technology, Nabodaya
16. Price, Jonathan and Korman H., (1993) How to Communicate Technical Information: The Benjamin Cummings Publishing Company.
17. Muralikrishna and S. Mishra (2011) Communication Skills for Engineers, Pearson education. ISBN: 9788131733844.
18. Murphy, R. (2007) Essential English Grammar, CUP. ISBN: 8175960299.
19. Essential English Grammar by Raymond Murphy, CUP, 2011.
20. Intermediate English Grammar by Raymond Murphy, CUP, 2011.
21. Practical English Usage by Michael Swan, OUP, 2013.
22. Dignen, Bob. Presentation Skills in English. Orient Black Swan, 2007.

ME-151	WORKSHOP PRACTICE	L T P	Cr
		0-0-4	2

UNIT I: MACHINE SHOP

Step turning & Taper turning Operation

Exercise 1: To obtain required diameters (steps) on a cylindrical work piece with the given lengths.

Shoulder Turning

Exercise 2: To obtain required diameters on a cylindrical work piece with the given dimensions.

UNIT II: CARPENTARY SHOP

Dove Tail Lap Joint

Exercise 3: To make a dovetail lap joint Cross Half Lap

Joint Exercise 4: To make a Cross Half Lap Joint

UNIT III: SHEET METAL SHOP

Exercise 5: To make a funnel using G.I Sheet as per dimensions provided. Exercise 6: To make a Square box using G.I Sheet as per the dimension.

UNIT IV: WELDING SHOP

Exercise 7: To make a single v-butt joint, using the given mild steel pieces of and by arc welding.

Exercise 8: To make a T- joint using the given mild steel pieces and by arc welding.

UNIT V: FOUNDARY SHOP

Mould For A Solid

Exercise 9 To prepare a sand mould, using the given Single piece pattern.

Exercise 10. To prepare a sand mould, using the given Split piece pattern.

CS-151	PROGRAMMING FOR PROBLEM-SOLVING USING C LAB	L T P	Cr
		0-0-2	1

List of Topics (Students have to do at 3-4 programs from each section)

SEQUENTIAL CONTROL STATEMENTS

51. Write a program to Print HELLO
52. Write a program to add two numbers
53. Write a program to calculate simple interest
54. Write a program to calculate average of three numbers
55. Write a program to swap two numbers
56. Write a program to illustrate mixed data types
57. Write a program to calculate area and circumference of circle
58. Write a program to evaluate a polynomial expression
59. Write a program to add digits of a four digit number
60. Write a program to check whether the person if eligible for voting or not

CONDITIONAL CONTROL STATEMENTS

61. Write a program to find greatest of two numbers
62. Write a program to find out which type of triangle it is
63. Write a program to find out greatest of three numbers
64. Write a program to evaluate performance of the student
65. Write a program to make a basic calculator

LOOP CONTROL STATEMENTS

66. Write a program to print Fibonacci up-to the given limit
67. Write a program to find the sum of digits of a number
68. Write a program to find factorial of a number
69. Write a program to print table of any number
70. Write program for printing different pyramid pattern

ARRAYS AND STRINGS

71. Write a program to enter the elements in a one dimensional array
72. Write a program to find the sum and average of five numbers
73. Write a program to sort the array elements
74. Write a program to enter the marks of 50 students an calculate the average
75. Write a program to add 2 matrix
76. Write a program to multiply 2 matrices
77. Write a program to calculate the length of string
78. Write a program to concatenate 2 strings
79. Write a program to reverse the string
80. Write a program to count the numbers of characters in a string
81. Write a program that converts lower case characters to upper case
82. Write a program without using predefined functions to check whether the string is palindrome or not

FUNCTIONS & POINTERS

83. Write a program using function to find the largest of three numbers
84. Write a program using function to sum the digits of a number
85. Write a program to calculate factorial of a number using recursive function
86. Write a program to print first n Fibonacci using recursive function
87. Write a program to illustrate the concept of chain of pointers
88. Write a program using function to swap two numbers using call by reference
89. Write a program to calculate the area and perimeter of circle using pointers
90. Write a program to copy the contents of one array into another in the reverse order using pointers

STRUCTURES

91. Write a program to read an employee record using structure and print it
92. Write a program to prepare salary chart of employee using array of structures
93. Write a program to print the name and percentage of 20 students (array of structures andarrays within structures).
94. Write a program to demonstrate structure within structure.

FILE HANDLING

95. Write a program to create, open, and close files.
96. Write a program to demonstrate the purpose of different file opening modes.
97. Write a program to count the number of characters, spaces, tabs, new line characters in a file.
98. Write a program to receive strings from keyboard and write them to a file.
99. Write a program to copy a file to another.
100. Write a program to read strings from a file and display them on screen

Syllabus

Of B.Tech(CSE)

2nd Year

3rd Semester

CS-201C	DATA STRUCTURES AND ALGORITHMS	L T P	Cr
		3 1 0	4

OBJECTIVE
To relay the theoretical and practical fundamental knowledge of most commonly used algorithms.

PRE-REQUISITES
Knowledge of basic computer programming

COURSE OUTCOMES
CO1: Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
CO2: Understand basic data structures such as arrays, linked lists, stacks and queues.
CO3: Describe the hash function and concepts of collision and its resolution methods
CO4: Solve problem involving graphs, trees and heaps
CO5: Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

UNIT I
INTRODUCTION TO DATA STRUCTURES AND RUNNING TIME: Definition of data structures and abstract data types; linear vs. non-linear data structure; primitive vs. non-primitive data structure; static and dynamic implementations; arrays, 1,2-dimensional arrays, insertion & deletion in 1-D array; examples and real life applications. Time complexity; Big Oh notation; running times; best case, worst case, average case; factors depends on running time; introduction to recursion.

UNIT II
STACKS AND QUEUES: Stacks: definition, array based implementation of stacks, examples: infix, postfix, prefix representation; conversions, applications; definition of queues, circular queue; array based implementation of queues.

UNIT III
LINKED LISTS: Lists; different type of linked Lists; implementation of singly linked list, linked list implementation of stacks and queues; implementation of circular linked list; implementation of doubly linked list, applications.

UNIT IV

TREES AND GRAPHS: Definition of trees and binary trees; properties of binary trees and implementation; binary traversal pre-order, post-order, in-order traversal; binary search trees: searching, insertion & deletion. Definition of undirected and directed graphs; array based implementation of graphs; adjacency matrix; path matrix implementation; linked list representation of graphs; graph traversal: breadth first traversal, depth first traversal; implementations and applications.

UNIT V

SORTING AND SEARCHING ALGORITHMS: Introduction, selection, insertions, bubble sort, efficiency of above algorithms; merge sort, merging of sorted arrays and algorithms; quick sort algorithm analysis, heap sort, searching algorithms: straight sequential search, binary search (recursive & non–recursive algorithms)

TEXT BOOK

1. Langsam, Augentem M.J. and Tenenbaum A. M., Data Structures using C & C++‖, Prentice Hall of India, 2009.
2. R. S.Salariya, Data Structure and Algorithm, Khanna Publications.

REFERENCE BOOKS

1. Aho A. V., Hopcroft J. E. and Ullman T. D., ―Data Structures and Algorithms‖, Original Edition, Addison-Wesley, Low Priced Edition, 1983.
2. Horowitz Ellis and S ahni S artaj, ―Fundamentals of Data Structures‖, Addison-Wesley Pub, 1984.
3. Horowitz, S ahni and Rajasekaran, ―Fundamentals of Computer Algorithms‖ 2007.
4. Kruse Robert, ―Data Structures and Program Design in C‖, Prentice Hall of India, 1994
5. Lipschetz Jr. Seymour, ―Theory & Problems of Data Structures‖, S chaum ‘s Outline, Tata McGraw Hill
6. Weiss Mark Allen, ―Data Structures and Algorithms Analysis in C‖, Pearson Education, 2000
7. Corm en T . H . et al., ―Introduction to Algorithms‖, 2nd Edition, Prentice Hall of India, 2001.
8. Dasgupta Sanjay, Christos P. and Vazirani Umesh, ―Algorithms‖, Tata McGraw Hill, 2008

CS-203C	DISCRETE MATHEMATICAL STRUCTURES	L T P	Cr
		3 0 0	3

OBJECTIVES

To lay mathematical foundation for the fundamentals of various computational structures such as Boolean algebra, propositional logic, graph and trees.

PRE-REQUISITES: Knowledge of Data Structure

COURSE OUTCOMES

CO1: Perform operations on various discrete structures such as sets, functions, relations, and sequences.

CO2: Ability to solve problems using Counting techniques, Permutation and Combination, Recursion and generating functions

CO3: Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems.

CO4: Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems.

CO5: Understand the various properties of algebraic systems like Rings, Monoids and Groups

UNIT I

SET THEORY: Introduction to set theory; set operations; algebra of sets: duality, finite and infinite sets, classes of sets, power sets, multi sets, Cartesian product, representation of relations, types of relation, equivalence relations and partitions, partial ordering relations and lattices; function and its types, composition of function and relations; cardinality and inverse relations.

UNIT II

PROPOSITIONAL CALCULUS AND TECHNIQUES OF COUNTING: Basic operations: AND (Λ), OR (V), NOT (~), truth value of a compound statement, propositions, tautologies, contradictions, Permutations with and without repetition, combination.

UNIT III

RECURSION AND RECURRENCE RELATION: Polynomials and their evaluation; sequences, introduction to AP, GP and AG series, partial fractions; linear recurrence relation with constant coefficients; homogeneous solutions, particular solutions, total solution of a recurrence relation using generating functions.

UNIT IV

ALGEBRIC STRUCTURES: Definition and examples of a monoid, semigroup, groups and rings; homomorphism, isomorphism and auto morphism; subgroups and normal subgroups; cyclic groups, integral domain and fields; co-sets; Lag range‘s theorem

UNIT V

GRAPHS: Introduction to graphs, directed and undirected graphs; homomorphic and isomorphic graphs; subgraphs; cut points and bridges; multigraph and weighted graph; paths and circuits, shortest path in weighted graphs; Eulerian path and circuits, Hamilton paths and circuits; planar graphs; Euler's formula.

TEXT BOOK

Liu C. L., Elements of Discrete Mathem atics‖, McGraw Hill, 1989

REFERENCE BOOKS

8. Johnson Bough R., —Discrete Mathematics‖, 5th Edition, Pearson Education, 2001
9. Graham Ronald, Knuth Donald E. and Patashik Oren, —Concrete Mathematics: A Foundation for Computer Science‖ , Addison-Wesley, 1989
10. Gersting Judith L., —Mathematical Structures for Computer Science‖, Computer Science Press, 1993
11. Chtewynd A. and Diggle P.. , Discrete Mathem atics‖ , Modular Mathematics Series, Edward Arnold, London, 1995
12. Lipshutz S ., —S chaums Outline series: Theory and problems of Probability‖, McGraw Hill Singapore, 1982
13. Kolm an B. and Busby R. C., —Discrete Mathematical Structures‖, Prentice Hall of India,
14. 1996
15. Trembley and Manohar, —Discrete Mathematical Structures with Applications to Com puters‖, McGraw Hill, 1995

CS-205C	OBJECT ORIENTED PROGRAMMING	L T P	Cr
		3 1 0	4

OBJECTIVE

Providing a sound conceptual understanding of the fundamental concepts of computing hardware, software, networking and services; build programming logic and thereby developing skills in problem solving using C++ programming language; Introduce the concept of object orientation and on how to handle data in different forms; Emphasize the concepts and constructs rather than on language features.

COURSE OUTCOMES

CO1: Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.

CO2: Understand dynamic memory management techniques using pointers, constructors, destructors, etc

CO3: Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.

CO4: Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.

CO5: Demonstrate the use of various OOPs concepts with the help of programs

UNIT I

OBJECT ORIENTED CONCEPTS& INTRODUCTION TO C++: Introduction to objects and object oriented programming, difference between procedure oriented & Object oriented programming; main feature of Object oriented programming: Class, Object, encapsulation (information hiding); Polymorphism: overloading, inheritance, overriding methods, abstract classes, access modifiers: controlling access to a class; method, or variable (public, protected, private, package); other modifiers; Basics of C++,Simple C++ Programs, preprocessors directives, Namespace, Memory management operators in C++, Inline function, default arguments, & reference types

UNIT II

CLASSES AND DATA ABSTRACTION: Introduction; structure definitions; accessing members of structures; class scope and accessing class members; separating interface from implementation; controlling access function and utility functions, initializing class objects: constructors, using default arguments with constructors; using destructors; classes : const(constant) object and const member functions, object as member of classes, friend function and friend classes; using this pointer, proxy class, dynamic memory allocation with new and delete; static class members& function; container classes and integrators;.

UNIT III

OPERATOR OVERLOADING, TEMPLATE &EXCETION HANDLING: Introduction; fundamentals of operator overloading; restrictions on operators overloading; operator functions as class members vs. as friend functions; overloading, <<; >> overloading unary operators; overloading binary operators. Function templates; overloading template functions; class template; class templates and non- type parameters; basics of C++ exception handling: try, throw, catch, throwing an exception, catching an exception, re-throwing an exception

UNIT IV

INHERITANCE, VIRTUAL FUNCTIONS AND POLYMORPHISM: Introduction, inheritance: base classes and derived classes, protected members; casting base-class pointers to derived-class pointers; using member functions; overriding base–class members in a derived class; public, protected and private inheritance; using constructors and destructors in derived classes; implicit derived–class object to base-class object conversion; composition vs. inheritance; virtual functions; abstract base classes and concrete classes; polymorphism; new classes and dynamic binding; virtual destructors; polymorphism; dynamic binding.

UNIT V

FILES AND I/O STREAMS: Files and streams; creating a sequential access file; reading data from a sequential access file; updating sequential access files, random access files; creating a random access file; writing data randomly to a random access file; reading data sequentially from a random access file; stream input/output classes and objects; stream output; stream input; unformatted I/O (with read and write); stream manipulators; stream format states; stream error states.

TEXT BOOK

1. Balagurusam y , E., ―Object Oriented Programming with C++‖, Prentice Hall of India, 2008
2. Scheldt, Herbert ―C++: The Complete Reference‖, Tata McGraw Hill, 3rd Ed, 2008

REFERENCE BOOKS

1. Kamthane, ―Object Oriented Programming with ANSI and Turbo C++‖, Pearson Education
2. Lafore, Robert, ―Object Oriented Programming in Turbo C++‖, The WAITE Group Press, 1994
3. Balagurusam y , E., ―Object Oriented Programming with C++‖, Prentice Hall of India, 2008
4. Bhave, ―Object Oriented Programming with C++‖, Pearson Education.

EC-203C	DIGITAL ELECTRONICS	L T P	Cr
		3 0 0	3

OBJECTIVE

Modern world deals with digital conditioning of various signals. Digitally manipulating signals or using digital circuits have a lot of advantages in terms of accuracy etc. This subject introduces concept of basic digital electronics: gates; combinational and sequential circuits and their designing.

COURSE OUTCOMES

CO1: Convert different type of codes and number systems which are used in digital communication and computer systems.
CO2: Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.
CO3: Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
CO4: Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic, performance, efficiency, user friendly and environmental constraints.
CO5: Apply the fundamental knowledge of analog and digital electronics to get different types analog to digitalized signal and vice-versa converters in real world with different changing circumstances.

UNIT I

INTRODUCTION OF GATES, COMBINATIONAL DESIGN BY USING GATES AND SIMPLIFICATION : Digital signal; logic gates: AND; OR; NOT; NAND; NOR; EX-OR; EX-NOR; Boolean algebra. Review of Number systems. Binary codes: BCD; Excess- 3; Gray; EBCDIC; ASCII; Error detection and correction codes; Design using gates; Karnaugh map and Quine Mcluskey methods of simplification.

UNIT II

COMBINATIONAL DESIGN USING MSI DEVICES: Multiplexers and Demultiplexers and their use as logic elements; Decoders; Adders/Subtractors; BCD arithmetic circuits; Encoders; Decoders/Drivers fordisplay devices.

UNIT III

SEQUENTIAL CIRCUITS: Flip Flops : S-R; J-K; T; D; master-slave; edge triggered; shift registers; sequence generators; Counters; Asynchronous and Synchronous Ring counters and Johnson Counter; Design of Synchronous and Asynchronous sequential circuits.

UNIT IV

DIGITAL LOGIC FAMILIES: Bipolar logic families:RTL; DTL; DCTL; HTL; TTL; ECL; MOS; and CMOS logic families. Tristate logic; Interfacing of CMOS and TTL families.

UNIT V

A/D AND D/A CONVERTERS & PLD: Sample and hold circuit; weighted resistor and R -2 R ladder D/A Converters; specifications for D/A converters. A/D converters : successive approximation; counting type; ROM; PLA; PAL; FPGA and CPLDs.

TEXT BOOK

Jain, R.P., "Modern Digital Electronics", 4th Ed.; Tata McGraw Hill, 2003.

REFERENCE BOOKS

1. Taub and Schilling, "Digital Integrated Electronics" Tata McGraw Hill,1997
2. Malvino and Leach; "Digital Principles and Applications", 6th Edition, Tata McGraw Hill, 2006
3. Mano, Morris, "Digital Design", 3rd Edition, Prentice Hall of India,1994
4. Gupta and Singhal, "Digital Electronics", 2nd Edition, Dhanpat Rai and Sons, 2000.
5. Wakerly, John F, "Digital Design Principles and Practices", 4th Edition, Prentice Hall of India,2005.

BSC-201	MATHEMATICS-III	L T P	Cr
		3 1 0	4

COURSE OUTCOMES

CO1: Ordinary differential equations of first order. Applications and numerical methods.
CO2: Ordinary differential equations of higher order. Applications and numerical methods.
CO3: To learn how to interpolate the given set of values
CO4: To understand the curve fitting for various polynomials
CO5: Partial differential equations and their applications.

UNIT I

SOLUTION OF NONLINEAR EQUATIONS: Introduction to numbers and their accuracy; absolute, relative and percentage errors and their analysis; bisection method; regula- falsi method; secant method; newton- raphson method.

UNIT II

SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS: Gauss elimination method; gauss-jordan method; jacobi's iteration method; gauss-seidal iteration method.

UNIT III

INTERPOLATION: Introduction to interpolation; newton's forward and backward interpolation formulae; stirling formula; lagrange interpolation; newton's divided difference formula, central difference and average operators.

UNIT IV

NUMERICAL DIFFERENTIATION AND INTEGRATION EQUATION: Numerical differentiation formulae, differentiation by using forward interpolation formula; backward interpolation formula, newton-cotes formula for numerical integration: trapezoidal rule; simpson's 1/3 & 3/8th rules.

UNIT V

SOLUTION OF ORDINARY DIFFERENTIAL: Taylor series method, euler method; euler modified method; runge kutta method 2nd order & 4th order

TEXT BOOK

Grewal, B. S., "Numerical Methods In Engineering And Science",9th Edition, 2010, Khanna Publishers. And Higher Engineering Mathematics: B. S. Grewal

REFERENCE BOOKS

1. Jain, R.K. And Iyengar, S.R.K., "Numerical Methods For Scientific And Engg. Computations" ,5th Edition,2007, New Age International Publishers.

2. Sastry, S.S.," "Introductory Methods Of Numerical Analysis",3rd Edition,1999, Prentice Hall Of India.

HSS-201	ENGINEERING ECONOMICS & INDUSTRIAL MANAGEMENT	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

CO1: Analyze, understand and manage critical financial situations
CO2: Evaluate the economic potential of investment.
CO3: Understand the various parameters like resource availability, depreciation, cost accounting etc and analyze project economic feasibility
CO4: Comprehend procurement process and analyze the proper utilization of human resources.
CO5: Examine the importance of job satisfaction as well as integration and maintenance function.

UNIT I

INTRODUCTION TO ECONOMICS: Definitions, Nature, Scope, Difference Between Microeconomics & Macroeconomics Theory Of Demand & Supply; Meaning, Determinants, Law Of Demand, Law Of Supply, Equilibrium Between Demand & Supply Elasticity; Elasticity Of Demand, Price Elasticity, Income Elasticity, Cross Elasticity.

UNIT II

THEORY OF PRODUCTION: Production Function, Meaning, Factors Of Production (Meaning & Characteristics Of Land, Labour, Capital & Entrepreneur), Law Of Variable Proportions & Law Of Returns To Scale Cost; Meaning, Short Run & Long Run Cost, Fixed Cost, Variable Cost, Total Cost, Average Cost, Marginal Cost, Opportunity Cost. Break Even Analysis; Meaning, Explanation, Numerical.

UNIT III

MACRO-ECONOMIC INDICATORS: Macro-Economic Indicators, Changes In The Gross Domestic Product (Gdp), Gross National Product (Gnp), Inflation, Employment & Unemployment Indicators, Currency Strength, Interest Rates, Corporate Profits, Balance Of Trade, Agricultural Production, Current Account Balance, Foreign Exchange, Foreign Trade, Industrial Production Index, Wholesale Price Index (Wpi), Retail Price Index (Rpi), Consumer Price Index (Cpi)

UNIT IV

INTRODUCTION TO MANAGEMENT: Definitions, Nature, Scope Management & Administration, Skill, Types And Roles Of Managers Management Principles; Scientific Principles, Administrative Principles, Maslow's Hierarchy Of Needs Theory.

UNIT V

FUNCTIONS TO MANAGEMENT: Planning, Organizing, Staffing, Directing, Controlling (Meaning, Nature And Importance) Organizational Structures; Meaning, Principles Of Organization, Types-Formal And Informal, Line, Line & Staff, Matrix, Hybrid (Explanation With Merits And Demerits), Span Of Control, Departmentalization.

UNIT VI

INTRODUCTION TO MARKETING & PRODUCTION MANAGEMENT: Marketing Mix, Concepts Of Marketing, Demand Forecasting And Methods, Market Segmentation Introduction To Finance Management; Meaning, Scope, Sources, Functions.

UNIT VII

PRODUCTION MANAGEMENT: Definitions, Objectives, Functions, Plant Layout-Types & Factors Affecting It, Plant Location- Factors Affecting It. Introduction To Human Resource Management; Definitions, Objectives Of Manpower Planning, Process, Sources Of Recruitment, Process Of Selection.

REFERENCE BOOKS

1. Engineering Economics, R.Paneerselvam, Phi Publication
2. Fundamentals Of Management: Essential Concepts And Applications, Pearson Education, Robbins S.P. And Decenzo David A.
3. Economics: Principles Of Economics, N Gregory Mankiw, Cengage Learning
4. Principles And Practices Of Management By L.M.Prasad
5. Principles Of Management By Tripathy And Reddy
6. Modern Economic Theory, By Dr. K. K. Dewett & M. H. Navalur, S. Chand Publications
7. Samuelson, Nordhaus: Economics (2009)
8. N. Gregory Mankiew (2007): Macroeconomics, Sixth Edition
9. Bock Gyula (2001): Makroökonómia Feladatok, Tri-Mester
10. Actual Economic Articles From The Printed Media Or From The Internet.

CS-251C	DATA STRUCTURES AND ALGORITHMS LAB	L T P	Cr
		0 0 2	1

LIST OF EXPERIMENTS

ARRAY OPERATIONS

17. Write a program to insert an element at given position in linear array
18. Write a program to insert an element in sorted array.
19. Write a program to delete an element from given position in linear array
20. Perform following operations on matrices using functions only
    a) Addition b) Subtraction c) Multiplication d) Transpose

SEARCHING

21. Search an element in a linear array using linear search.
22. Using iteration and recursion concepts write programs for finding the element in the array using Binary Search Method

RECURSION

23. Write a program to compute factorial of given number using recursion
24. Write as program to solve Tower of Hanoi problem using recursion
25. Write a program to find power of given number using recursion

STACK & QUEUE

26. Write a program for static implementation of stack
27. Write a program for dynamic implementation of queue
28. Write a program for static implementation of circular queue
29. Write a program for dynamic implementation of queue
30. Write a program to evaluate a postfix operation

LINKED LIST

31. Create a linear linked list & perform operations such as insert, delete at end , at beg & reverse the link list
32. Create a circular linked list & perform search, insertion & delete operation
33. Create a doubly linked list & perform search, insertion & delete operation

TREE & GRAPH

34. Write program to implement binary search tree. (Insertion and Deletion in Binary Search Tree)
35. Write program to simulates the various tree traversal algorithms
36. Write program to simulate various graph traversing algorithms.

SORTING ALGORITHMS

37. Write program to implement Bubble, Insertion & selection sort.
38. Write program to implement quick sort
39. Write program to implement merge sort
40. Write a program to implement heap sort

TEXT BOOKS

1. A.K. Sharma – Data structure Using C, 2nd edition pearson 2013
2. Langsam, Augentem M.J. and Tenenbaum A. M., ―Data Structures using C & C++‖, Prentice Hall of India, 2009.

REFERENCE BOOKS

1. R. S. Salaria -Data Structure Using C
2. Kruse Robert, ―Data Structures and Program Design in C‖, Prentice Hall of India, 1994
3. Lipschitz Jr. Seymour, ―Theory & Problems of Data Structures‖, Schaum‘s Outline, 2nd Edition, Tata McGraw Hill

CS-255C	OBJECT ORIENTED PROGRAMMING LAB	L T P	Cr
		0 0 2	1

LIST OF EXPERIMENTS

BASIC CONCEPT OF C++

26. Write a program to show the concept reference type, call by reference & return by reference in C++
27. Write a program to show the concept of default arguments in C++
28. Write a program to show the concept of inline function
29. Write a program to show the concept of dynamic memory management in C++
30. Write a program to show the concept of function overloading

CLASS & OBJECTS

31. Write a C++ program to show the concept of class & object
32. Write A C++ program showing function taking objects as a arguments and function returning objects
33. Write C++ programs to show the concept of static data member & static member function
34. Write C++ program to show the concept of friend function
35. Write C++ program to show the concept of different type of constructor
36. Write C++ program to show the concept of destructor

OPERATOR OVERLOADING

37. Write a C++ program showing overloading of unary operator using member function & friend function
38. Write a C++ program showing overloading of binary operator using member function & friend function
39. Write a C++ program showing overloading of << and >> operators

INHERITANCE

40. Write a C++ program to show the concept of multilevel inheritance
41. Write a program to show the concept of multiple inheritance
42. Write a C++ program to show the concept of hybrid inheritance
43. Write a program to show the concept of virtual base class

DYNAMIC BINDING & VIRTUAL FUNCTION

44. Write a C++ to show the concept of virtual function to implement dynamic binding
45. Write a C++ program to show the concept of pure virtual function & abstract class

FILES HANDLING

46. Write C++ programs for creating, reading& writing sequential access file
47. Write C++ programs for creating, reading & writing random access file

TEMPLATES

48. Write a C++ program to show the concept of class template
49. Write a C++ program to show the concept of function template

TEXT BOOK

1. Balagurusam y , E., ―Object Oriented Programming with C++‖, Prentice Hall of India, 2008
2. Schildt, Herbert ―C++: The Complete Reference‖, Tata McGraw Hill, 3rd Ed, 2008

REFERENCE BOOKS

1. Kamthane, ―Object Oriented Programming with ANSI and Turbo C++‖, Pearson Education
2. Lafore, Robert, ―Object Oriented Programming in Turbo C++‖, The WAITE Group Press, 1994
3. Balagurusam y , E., ―Object Oriented Programming with C++‖, Prentice Hall of India, 2008
4. Bhave, ―Object Oriented Programming with C++‖, Pearson Education.

EC-253C	DIGITAL ELECTRONICS LAB	L T P	Cr
		0 0 2	1

LIST OF EXPERIMENTS

1. Study of TTL gates – AND; OR; NOT; NAND; NOR; EX-OR; EX-NOR.
2. Design and realize a given function using k-maps and verify its performance.
3. To verify the operation of multiplexer and demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R; J-K; T and D type flip flops.
6. To verify the operation of bi-directional shift register.
7. To design and verify the operation of 3-bit synchronous counter.
8. To design and verify the operation of synchronous up/down decade counter using JK flip-flops and drive a seven-segment display using the same.
9. To design and verify the operation of asynchronous up/down decade counter using JK flip-flops and drive a seven-segment display using the same.
10. To design and realize a sequence generator for a given sequence using J-K flip-flops.
11. Study of CMOS NAND and NOR gates and interfacing between TTL and CMOS gates.
12. Design a 4-bit shift-register and verify its operation. Verify the operation of a ring counter and a johnson counter.

CS-257C	MATLAB	L T P	Cr
		0 0 2	1

LIST OF EXPERIMENTS:

1. Introduction To MATLAB.
2. Introduction To Script Files And Matrices.
3. Programming In Matlab: Introduction, Branching Statements, Loops, Functions, Additional Data Types, Plots, Arrays, Inputs/Outputs.
4. Solving Linear Systems In MATLAB.
5. Program To Display A Matrix
6. Program To Addition Of Matrix
7. Program To Find The Linear Square Using MATLAB.
8. Introduce Some Of Root Finding Methods.
9. Program To Transpose Of A Matrix.
10. Introduction Regarding Usage Of Any Network Simulator.
11. Practical Implementation Of Queuing Models Using C/C++.

SYLLABUS
B.Tech(CSE)-
2nd Year
4th Semester

CS-202C	OPERATING SYSTEMS	L T P	Cr
		3 0 0	3

COURSE OBJECTIVE

To provide the knowledge of internals, different types and purpose of operating systems

PRE-REQUISITES

Knowledge of computer organization and architecture programming skills

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand the basics of operating systems like kernel, shell, types and views of operating systems

CO2: Describe the various CPU scheduling algorithms and remove deadlocks.

CO3: Explain various memory management techniques and concept of thrashing

CO4: Use disk management and disk scheduling algorithms for better utilization of external memory.

CO5: Recognize file system interface, protection and security mechanisms. Explain the various features of distributed OS like Unix, Linux, windows etc

UNIT I

INTRODUCTION: Introduction to operating system concepts (including multitasking, multiprogramming, multi user, multithreading, etc)., types of operating systems: batch operating system, time-sharing systems, distributed OS, network OS, real time OS, embedded and smart card OS, various operating system services, architecture, system programs and calls.

UNIT II

PROCESS MANAGEMENT: Process concept, Life cycle and implementation of process, Thread usage and implementation in user space and in kernel, process scheduling, operation on processes, CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), priority scheduling, Round Robin (RR), multilevel feedback queue scheduling. Deadlocks, Deadlock characteristics, prevention, avoidance using banker's algorithm, detection and recovery; Critical section problems, mutual exclusion with busy waiting, Process synchronization, semaphores: binary and counting semaphores, Classical IPC problems: dining philosophers' problem, readers-writers problem.

UNIT III

MEMORY MANAGEMENT: Logical & physical address space, swapping, contiguous memory allocation, non-contiguous memory allocation paging and segmentation techniques, segmentation with paging, virtual memory management - demand paging & page-replacement algorithms, demand segmentation.

UNIT IV

I/O AND FILE YSTEMS: I/O hardware, device controllers, interrupt handlers, device drivers, application I/O interface, kernel, transforming I/O requests, performance issues, Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms, introduction to distributed file system.

UNIT V

LINUX/UNIX SYSTEM: LINUX/UNIX architecture, UNIX system calls for processes and file system management, basic commands of LINUX/UNIX, shell interpreter, shell scripts.

TEXT BOOK

5. William Stallings, Operating System: Internals and Design Principles, Prentice Hall, 8th Edition, 2014, ISBN10: 0133805913 • ISBN13: 9780133805918
6. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley & Sons ,Inc., 9th Edition,2012, ISBN 9781118063330
7. Maurice J. Bach, "Design of UNIX Operating System", PHI
8. T1: Silberchatz et al, "Operating System Concepts", 5th edition, Addison-Wesley, 1998

REFERENCE BOOKS

15. Tom Adelstein and Bill Lubanovic, Linux System Administration, O'Reilly Media, Inc., 1st Edition, 2007.ISBN10: 0596009526 | ISBN13: 9780596009526
16. Harvey M. Deitel, Operating Systems, Prentice Hall, 3rd Edition,2003, ISBN10: 0131828274 | ISBN13: 9780131828278
17. Andrew S. Tanenbaum, Modern Operating System, Prentice Hall, 3rd Edition, 2007,ISBN10: 0136006639 | ISBN13: 9780136006633
18. Operating System in depth by Thomson
19. Tanenbaum A., "Modern Operating Systems", Prentice-Hall, 1992
20. Stallings William, "Operating Systems Internals and Design Principles", 4th edition, Prentice-Hall, 2001
21. Dhamdhere D. M., "Operating System", 2nd Edition, Tata McGraw Hill, 1999
22. Kernighan Brian and Pike Rob, "The Unix Programming Environment", Prentice Hall of India, 1984
23. Bach Maurich, "Design of the Unix Operating System", Prentice Hall of India, 1986
24. Muster John, "Introduction to UNIX and LINUX", Tata McGraw Hill, 2003
25. Ritchie Colin, "Operating System Incorporating Unix & Windows", Tata McGraw Hill, 1974
26. Madnick Stuart and Donovan John, "Operating Systems", Tata McGraw Hill, 2001
27. Deitel, "Operating Systems", Addison-Wesley, 1990
28. SinghalMukesh and Shivaratri N.G., "Operating Systems", Tata McGraw Hill, 2003

CS-204C	COMPUTER ARCHITECTURE & ORGANIZATION	L T P	Cr
		3 0 0	3

OBJECTIVE

To provide basic knowledge of internals of computer, its architecture, components, terminologies, etc. at minute level and ultimately about the working of a digital computer hardware as a whole.

PRE-REQUISITES

Knowledge of data structures, microprocessors and interfacing.

COURSE OUTCOMES

CO1: Understand the theory and architecture of central processing unit. Analyze some of the design issues in terms of speed, technology, cost, performance.

CO2: Design a simple CPU with applying the theory concepts. Use appropriate tools to design verify and test the CPU architecture.

CO3: Learn the concepts of parallel processing, pipelining and inter-processor communication.

CO4: Exemplify in a better way the I/O and memory organization.

CO5: Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.

UNIT I

GENERAL SYSTEM ARCHITECTURE & DIGITAL LOGIC: Functions and block diagram of computer, store program control concept, Flynn's classification of computers (SISD, MISD, MIMD); CPU, caches, main memory, secondary memory units & I/O; Computer registers; combinational logic blocks (adders, multiplexers, encoders, de-coder), sequential logic blocks (latches, flip-flops, registers, counters). Designing of counters.

UNIT II

INSTRUCTION SET ARCHITECTURE: Instruction codes, instruction set formats(fixed, variable, hybrid), types of instructions, memory reference, register reference, I/O reference; addressing modes: register, immediate, direct, indirect, indexed; operations in the instruction set; arithmetic and logical, data transfer, control flow; types of interrupts; timing and control; instruction set based classification of processors (RISC, CISC, and their comparison).

UNIT III

BASIC NON PIPELINED CPU ARCHITECTURE: CPU Architecture types (accumulator, register, stack, memory/ register) detailed data path of a typical register based CPU, fetch-decode-execute cycle (typically 3 to 5 stage); micro-instruction formats, implementation of control unit: hardwired and micro-programmed, control memory, microinstruction sequencing.

UNIT IV

MEMORY HIERARCHY & I/O TECHNIQUES: Need for a memory hierarchy (Locality of Reference Principle, memory hierarchy in practice: cache, main memory and secondary memory, memory parameters: access cycle time, cost per bit); main memory (semiconductor RAM & ROM organization, memory expansion, static & dynamic memory types); cache memory: associative & direct mapped cache organizations.

UNIT V

INTRODUCTION TO PARALLELISM: Goals of parallelism (exploitation of concurrency, throughput enhancement); Amdahl's law; instruction level parallelism (pipelining, super scaling-basic features); processor level parallelism (multiprocessor systems overview).

TEXT BOOK

1. John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third
2. edition, 1998.
3. 2. V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation", V edition, McGraw-Hill Inc, 1996.
4. Carpinelli, ―Computer Organization & Architecture‖ Tata McGraw Hill, 2001

REFERENCE BOOKS

1. Stallings. W, ―Computer Organization & Architecture: Designing For Performance‖, 6th Edition, Prentice Hall of India, 2002/ Pearson Education Asia, 2003
2. Mano M Morris, ―Computer System Architecture‖, 3rd Edition, Prentice Hall of India Publication, 2001 / Pearson Education Asia, 2003

3. Jotwani, ―Computer System Org anisation‖, T ata McGraw Hill, 2000.
4. Rajaraman V. and Radhakrishnan T, ―Introduction to Digital Computer Design‖, 4th Edition, Prentice Hall of India 2004.
5. Stalling William, ―Computer Organization and Architecture‖, 7th Edition, Prentice Hall of India, 2005.
6. Brey Barry, ―Intel Micro Processors‖, Pearson US Imports & PHIPEs,1998
7. Paraami, "Computer Architecture", BEH R002, Oxford Press.

CS-206C	DATABASE MANAGEMENT SYSTEM	L T P	Cr
		3 0 0	3

COURSE OBJECTIVE

To provide knowledge about various organizations and management information systems, keeping in view the aspects of share ability, availability, evolvability and integrity

PRE-REQUISITES

Knowledge of data structures, discrete mathematical structures

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Define the basic concepts of DBMS and Demonstrate the basic elements of a relational database management system

CO2: Identify the data models for relevant problems and Design entity relationship models.

CO3: Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data.

CO4: Demonstrate their understanding of key notions of query evaluation and optimization techniques and Extend normalization for the development of application software's.

CO5: Synthesize the concepts of transaction management, concurrency control and recovery.

UNIT I

INTRODUCTION: What is database, Purpose of database system; advantages of using DBMS; database concept and architecture; data abstraction; data models; instances and schema; data independence; schema architecture; database languages; database administrator; database users

UNIT II

DATA MODELING: Entity sets attributes and keys, relationships (ER); database modeling using entity; type role and structural constraints, weak and strong entity types; enhanced entity-relationship (EER), ER diagram design of an E-R database schema; specialization and generalization

UNIT III

RELATIONAL MODEL: Relational model: relational model -basic concepts, enforcing data integrity constraints, Relational algebra: introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators; extended relational algebra operations, Calculus: Tuple relational calculus, Domain relational Calculus; Codd's rules.

UNIT IV

DATABASE DESIGN AND SQL: Database design process; relational database design, anomalies in a database; functional dependencies membership and minimal covers normal forms, multi-valued dependencies, join dependencies, inclusion dependencies; reduction of an E-R schema to tables; effect of de-normalization on database performance, Query-by-example (QBE), Introduction to SQL, basic queries in SQL, advanced queries in SQL, functions in SQL; basic data retrieval, aggregation, categorization, updates in SQLs; views in SQL.

UNIT V

TRANSACTION PROCESSING: Desirable properties of transactions, implementation of atomicity and durability; reconsistent model, read only and write only model; concurrent executions, schedules and recoverability; serializability of schedules concurrency control; serializability algorithms; testing for serializability; precedence graph; concurrency control, deadlock handling - detection and resolution.

TEXT BOOK

1. Silberschatz A., Korth H. F. and Sudarshan S., "Database System Concepts",6th edition, McGraw-Hill, International Edition,2010
2. Steven Feuerstein, Bill Pribyl , "Oracle PL/SQL", O'Reilly Media , 4th Edition, 2005

REFERENCE BOOKS:

1. Desai Bipin, "Introduction to Database Management System", Galgotia Publications, 1991
2. Elmasri R. and Navathe S. B., "Fundamentals of Database Systems", 6th edition, Addison-Wesley, Low Priced Edition, 2010
3. Date C. J., "An Introduction to Database Systems", 8th edition, Addison-Wesley, Low Priced Edition, 2003
4. Date C. J. and Darwen H., "A Guide to the SQL Standard", 4th edition, Addison-Wesley, 2003
5. Hansen G. W. and Hansen J. V., "Database Management and Design", 2nd edition, Prentice- Hall of India, Eastern Economy Edition, 1999
6. Majumdar A. K. and Bhattacharyya P., "Database Management Systems", 5th edition, Tata McGraw- Hill Publishing, 1999
7. Looms, "Data Management & File Structure", Prentice Hall of India, 1989.

CS-208C	JAVA PROGRAMMING	L T P	Cr
		3-1-0	4

OBJECTIVE

To relay the theoretical and practical knowledge of Core Java programming language

PRE-REQUISITES

Basic Knowledge of programming language and object oriented programming

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To understand the various features of object-oriented programming and features of OOP specific to Java programming.

CO2: To understand the components involved in designing web pages through Java programming.

CO3: To understand the various components of event mechanism.

CO4: To understand the major components of network programming through java swings.

CO5: To understand the major key contributing components to enable web-based applications through Java programming.

UNIT I

INTRODUCTION TO JAVA, DATA TYPE, VARIABLES, ARRAY : Basic Concepts of OOP and its Benefits; Application of OOP; Features of Java; Different types of data types, Literals, Variables, Type conversion and casting :Java's automatic type conversion, Casting incompatible types; Automatic type promotion in expression; Arrays: One-Dimensional Arrays, Multidimensional Arrays, Alternative Array Declaration Syntax

UNIT II

STRINGS, OPERATORS, EXPRESSION, CONTROL STATEMENTS: String handling: String class, Different string operations, String comparison ,Searching and modifying a string, Using string buffer class, Vector & Wrapper classes Different types of operators: arithmetic, bitwise, logical, relational, Boolean, assignment, conditional, special; Operator precedence and associatively; Using parentheses; Expression; Solving an expression; Control statements: if-else, nested if-else switch; Iteration statements: while, do-while, for, nested loops Jump Statements: using break, using continue, return

UNIT III

INHERITANCE, INTERFACES, PACKAGE : Inheritance: Different types of Inheritance, super keyword, Method overriding, Different types of access specifiers Defining Interface, Extending & Implementing interfaces, implementing multiple inheritance, Package: Java API Packages, Using System Package, Naming Conventions, Creating package, Accessing a package, using your own package

UNIT IV

MULTITHREADING, EXCEPTION HANDLING & APPLET PROGRAMMING: Multithreading: The Java Thread Model, Creating a Thread: extending Thread class and implementing Runnable interface, life cycle of a thread, using Thread methods, Thread exception Thread priority, Synchronization Exception: Exception Handling mechanism , Multiple catch statements , Using finally statements , throwing our own exception; Applet: Local & Remote Applets ,Steps to write & running Applets, Applet life cycle, Passing parameters, Displaying numerical values, getting input from the user

UNIT V

GRAPHICS PROGRAMMING & FILE HANDLING: Graphics class: Lines & Rectangle, Circles & Ellipses, Arcs, Polygons, Line Graphs, Bar Charts; File Handling: Stream Classes: Character & Byte Stream Class, I/O Exceptions, Reading /Writing character, Reading /Writing bytes, Concatenating & buffering files, Random Access Files

TEXT BOOK

Herbert Schildt , "The Complete Reference Java 2 fifth edition, McGraw Hill.

REFERENCE BOOKS

5. Balaguruswamy , E., ""Programming with Java", Tata Mcgraw Hill.
6. Horetmann Cay and Cornell Gary, "Core Java Volume – I", Pearson Education.
7. Horetmann Cay and Cornell Gary, "Core JavaTM 2, Volume II – Advanced Features", 7th Edition, Pearson Publisher.
8. Kathy Sierra and Bert Bates, "Head First Java" by O'REILLY publications.

CS-210C	WEB & INTERNET TECHNOLOGIES	L T P	Cr
		3 0 0	3

OBJECTIVE

- To understand the concepts and architecture of the World Wide Web.
- To understand and practice Markup Language.
- To understand and practice Embedded Dynamic Scripting on Client-side Internet Programming.
- To understand and practice Web Development Techniques on client-side.

PRE-REQUISITES

Basics of programming, Structure and HTML Tags, Images, List, Tables, Anchors and Form Elements

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Explain the history of the internet and related internet concepts that are vital in understanding web development.

CO2: Discuss the insights of internet programming and implement complete application over the web.

CO3: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.

CO4: Utilize the concepts of JavaScript and Java

CO5: Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.

UNIT I

INTRODUCTION TO WWW: Introduction to Computer networks - Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response — Generation of dynamic web pages.

UNIT II

UI DESIGN: HTML5: What is HTML5 - Features of HTML5 – Semantic Tags – New Input Elements and tags - Media tags (audio and video tags) – Designing Graphics using Canvas API - Drag and Drop features – Geolocation API - Web storage (Session and local storage).

CSS3: What is CSS3 – Features of CSS3 – Implementation of border radius, box shadow, image border, custom web font, backgrounds - Advanced text effects(shadow) - 2D and 3D Transformations - Transitions to elements - Animations to text and elements

UNIT III

RESPONSIVE WEB DESIGN (RWD): Responsive Design: What is RWD – Introduction to RWD Techniques – Fluid Layout, Fluid Images and Media queries - Introduction to RWD Framework .

TWITTER BOOTSTRAP – Bootstrap Background and Features - Getting Started with Bootstrap - Demystifying Grids – Off Canvas - Bootstrap Components - JS Plugins - Customization

UNIT IV

INTRODUCTION TO JAVASCRIPT: Introduction - Core features - Data types and Variables - Operators, Expressions and Statements - Functions & Scope - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling – Browser Object Model - Windows and Documents - Form handling and validations.

Object-Oriented Techniques in JavaScript - Classes – Constructors and Prototyping (Sub classes and Super classes) – JSON – Introduction to AJAX.

UNIT V

INTRODUCTION TO JQUERY: Introduction – jQuery Selectors – jQuery HTML - Animations – Effects – Event Handling – DOM – jQuery DOM Traversing, DOM Manipulation – jQuery AJAX

TEXT BOOKS

1. Harvey & Paul Deitel & Associates, Harvey Deitel and Abbey Deitel, “Internet and World Wide Web - How To Program”, Fifth Edition, Pearson Education, 2011.
2. Achyut S Godbole and Atul Kahate, “Web Technologies”, Second Edition, Tata McGraw Hill, 2012.

REFERENCE BOOK

1. Thomas A Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Third Edition, Tata McGraw Hill, 2013.
2. David Flanagan, “JavaScript: The Definitive Guide, Sixth Edition”, O'Reilly Media, 2011
3. Bear Bibeault and Yehuda Katz, “jQuery in Action”, January 2008
4. Web link for Responsive Web Design - https://bradfrost.github.io/this-is-responsive/
5. Ebook link for JavaScript - https://github.com/jasonzhuang/tech_books/tree/master/js

CS-212C	DESIGN & ANALYSIS OF ALGORITHMS	L T P	Cr
		3-1-0	4

OBJECTIVE

To relay the theoretical and practical aspects of design of algorithms

PRE-REQUISITES

Knowledge of fundamentals of basic computer programming for implementing algorithms

COURSE OUTCOMES

The students undergoing this course will be able to:
CO1: Define the basic concepts of algorithms and analyze the performance of algorithms.
CO2: Discuss various algorithm design techniques for developing algorithms.
CO3: Discuss various searching, sorting and graph traversal algorithms.
CO4: Understand NP completeness and identify different NP complete problems.
CO5: Discuss various advanced topics on algorithms.

UNIT I

BRIEF REVIEW: Growth of functions, Asymptotic Notations, Representation of Graphs, Breadth First Search, Depth First Search and Data Structures for Disjoint Sets.

UNIT II

DIVIDE AND CONQUER: General method; binary search; merge sort; quick sort; selection sort; Strassen‘s matrix multiplication algorithms and analysis of algorithms for these problems.

UNIT III

GREEDY METHOD: General method; knapsack problem, job sequencing with deadlines; minimum spanning trees Algorithm of Kruskal’s and Prim’s; single source paths and analysis of these problems.

UNIT IV

DYNAMIC PROGRAMMING AND BACK TRACKING: General method; optimal binary search trees; O/I knapsack; the traveling salesperson problem, 8 queens ‘problem; graph coloring; Hamiltonian cycles

UNIT V

NP HARD AND NP COMPLETE PROBLEMS: Basic concepts; Cook's theorem; NP hard graph and NP scheduling problems; some simplified NP hard problems.

TEXT BOOK

Horowitz Ellis and Sahni Sartaj, ―Fundamental of Computer Algorithms‖, Galgotia Publications, 1978

REFERENCE BOOKS

1. Cormen Thomas H., Leiserson Charles E. and Rivest Ronald L., ―Introduction to Algorithms‖, Tata McGraw Hill, 1990
2. Aho A. V. and Hopcroft J. E., ―The Design and Analysis of Computer Algorithm‖, Addison Wesley, 1974
3. Berlion P., and Bizard P., Algorithms – The Construction, Proof and Analysis of Programs, John Wiley & Sons, 1986.
4. Bentley J. L., ―Writing Efficient Programs‖, Prentice Hall of India, June 1982.
5. Goodman S. E. and Hedetnieni, ―Introduction to Design and Analysis of Algorithm‖, McGraw Hill, 1997
6. Trembley Jean Paul and Bunt Richard B., ―Introduction to Computers Science - An Algorithms Approach‖, Tata McGraw Hill, 2002
7. Knuth Donald E., ―Fundamentals of Algorithms: The Art of Computer Programming‖, Vol. l, Naresh Publications, 1985
8. Goodrich Michael T. and Roberto Tamassia, ―Algorithm Design: Foundations, Analysis & Internet Examples‖, Wiley Student Ed., 2002

CS-252C	OPERATING SYSTEMS LAB	L T P	Cr
		0 0 2	1

LIST OF EXPERIMENTS

1. Study of Windows 2003 Operating System, Various services available in Windows 2003 Server and Internal/system commands for network and system monitoring in Windows 2003 Server,
2. Difference between the Windows 2003 Server and Windows 2003 Client software.
3. Study of Linux Operating System (Linux kernel, shell, basic commands like make, pipe and filter and Simple programs to display process group Ids: PID, PPID, GID), Internal/system commands for network and system monitoring in Linux.
4. Display "Linux Programming Lab" N times using library function calls and system calls.
5. Programs using system calls that provides error checking
6. Programs using Processes.
7. Administration of Linux Operating System (connecting users, connectivity across LAN and WAN; Mounting and un-mounting of devices, taking backups, restoring data from backups.
8. a. Writing of Shell Scripts
   b. AWK programming
   c. Study of MacOS features, Internal/system commands for network and system monitoring in MacOS.
9. a. Study of differences between Windows 2003 Server, Linux and MacOS.
   b. Programs using Command Line Arguments.
   c. Programs for Simple Shell and Complex Shell with cd command, editor command, etc.
10. a. Programs for Primitive Communications.
    b. Programs using Pipes: Unnamed Pipes, Names Pipes.
    c. Programs using Message Queues.

REFERENCE BOOKS

1. Bach Maurich, “Design of the Unix Operating System”, Prentice Hall of India, 1986
2. Prato Stephen, “Advanced Unix Programmer’s Guide”, BPB Publications, 2006
3. Das Sumitabha, “Unix- Concept and Applications”, Tata McGraw Hill, 2002.

CS-256C	DATA BASE MANAGEMENT SYSTEM LAB	L T P	Cr
		0-0-2	1

LIST OF EXPRIMENTS

14. Introduction to PL/SQL
15. Write a program to carry out
    u. Creation of table
    v. Insertion of data into table
    w. Viewing of data into table: All rows and all columns, Selected columns and all rows, Selected rows and all columns, Selected rows and selected columns, Elimination of duplicates from selected statements, Sorting of data into a table.
    x. Deletion of data from given table: Removal of all rows, Removal of selected rows
    y. Updating of table contents: Updating all rows, Updating of record conditionally
    z. Modifying the structure of table: Adding new column, Modifying existing column
    aa. Renaming tables
    bb. Destroying tables
    cc. Examining objects created by user: Finding tables created by user, Finding column details of table created
    dd. Computation on table data: Arithmetic operators, Logical operators (AND, OR, NOT), Range searching (BETWEEN, NOT BETWEEN), Pattern matching (LIKE, IN, NOT IN)
16. Oracle set functions (Scalar, Group & Pattern Matching Operator): AVG, SUM, MIN, MAX, COUNT, COUNT(*), ABS, ROUND, LENGTH, SUBSTR, POWER, SQRT, LOWER, UPPER, LPAD, RPAD, LTRIM, RTRIM
17. Data constraints at column level and at table level: NULL value concept, UNIQUE constraints, Primary key constraint, Foreign key constraint, Check constraint.
18. VIEWS: Creation of views, Renaming of columns in view, Selection, Updation, Destroy
19. Grouping Data from tables in SQL
20. INDEXES
21. SEQUENCES
22. Granting and Revoking Permissions in SQL
23. CURSORS & its Applications
24. Create Function and use Cursor in Function
25. TRIGGERS
26. Hands on Exercises

REFERENCE BOOKS

5. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross
6. Date C. J. and Darwen H., "A Guide to the SQL Standard", 4th edition, Addison-Wesley, 2003
7. Desai Bipin, "Introduction to Database Management System", Galgotia Publications, 1991
8. Date C. J., "An Introduction to Database Systems", 8th edition, Addison-Wesley, Low Priced Edition

CS-260C	WEB & INTERNET TECHNOLOGIES LAB	L T P	Cr
		0 0 2	1

LIST OF EXPERIMENTS

1 Design a web page using Physical and Logical tags of HTML.

2 Design a web page using

2.1 Ordered List

2.2 Unordered Lists

2.3 Nested Lists

3 Design a web page to show the use of image as a hyperlink

4 Design a web-page using frames and linking

5 Design a class Time Table using tables in HTML.

6 Code to create a bookmark.

7 Design a web-page showing the use of forms using HTML 4.01 and HTML 5 Tags.

8 Design a page using basic tags of HTML 5.0.

9 Design a web-page using style sheets (External, Internal and Inline)

10 Write a Program to print if the no is even or odd using JavaScript

11 Input a number and find the difference of the sum of factors and non-factors.

12 WAP in JavaScript to print the pattern

12345

1234

123

12

1

13 WAP to Accept an Array of 10 numbers and display the sum of elements.

14 WAP to find greatest of all elements of an array

15 Design a web-page to show different validation checking using Java Script

16 WAP in PHP code for calculating S.I

17 WAP to Calculate factorial of a number

18 WAP to print the table of 10.

19 WAP to print the sum of diagonal elements

20 WAP to enter 5 elements each from Array1 and Array2 and print these elements using third array.

21 WAP to show database connectivity using PHP and Mysql.

CS-258C	JAVA PORGRAMMING LAB	L T P	Cr
		0 0 2	1

The following programs on different topic are to be done in this lab.

11. Sample Program

(b) Write a Java program to print "Hello Java"

12. Operators and Expressions

(d) Write a java program to find the area of a rectangle.

(e) To write a java program to find the result of the following expressions

(v) (a<<2) +(b>>2)

(vi) (b>0)

(vii) (a+b*100)/10

(viii) a & b

Assume a=10, b=5

(f) To write a java program to print the individual digits of a 3 digit number using Command line arguments.

13. Decision making statements

(d) Write a java program to read two integers and print the larger number. followed by the words "is larger". If the numbers are equal print the message "These numbers are equal"

(e) Write a java program to read an integer and find whether the number is odd or even.

(f) Write a java program to find the number of and sum of all integers greater than 100 and less than 200 that are divisible by 7.

14. Looping Statements

(e) Write a Java program to find the sum of digits of a given number.

(f) Write a java program to find the first 15 terms of Fibonacci sequence.

(g) Write a java program to print the Armstrong numbers.

(h) Given a number, write a program using while loop to reverse the digits of the number.

For example, the number

12345

should be written as 54321.

15. Array & Strings

(g) Write a java program to find the largest and smallest number in an array.

(h) Write a java program to multiply two matrices.

(i) Write a java program to sort the following numbers in descending order.

{55, 40, 80, 65, 71}

(j) Write a java program that creates a string object and initializes it with your name and performs the following operations

(iii) To find the length of the string object using appropriate String method.

(iv) To find whether the character 'a' is present in the string. If yes find the number of times 'a' appear in the name and the location where it appears.

(k) Write a java program to arrange the following word in alphabetical order

{Madras, Delhi, Ahmadabad, Calcutta, Bombay}

(l) Write a java program to create a StringBuffer object and illustrate how to append characters and to display the capacity and length of the StringBuffer.

16. Classes & Objects

(f) Write a java program to display total marks of 5 students using student class. Given the following attributes: Regno(int), Name(string), Marks in subjects(Integer Array), Total (int).
(g) Write a java program to find the area of a room using constructor.
(h) Write a java program to implement method overloading.
(i) Write a java program to show the use of "static" members.
(j) Write a java program to implement the nesting of methods.

17. Inheritance

(d) Write a java program to implement single inheritance using "super" keyword.
(e) Write a java program to implement method overriding.
(f) Write a java program to implement multiple inheritances.

18. Package & Multithreading

(c) Write a program to create your own package and use that package in another program to print " Hello package".
(d) Write a program to implement multithreading using the system function like yield(), stop(), sleep().

19. Exception Handling and Applet programming

(b) Write a java program to implement multiple try/catch statements.
(c) Write a java program to print " Hello applets" using applets.

20. File handling

(c) Write a program to copy the content of one file into another using character stream classes.
(d) Write a program to copy the content of one file into another using byte stream classes.

TEXT BOOK

Herbert Schildt , "The Complete Reference Java 2 fifth edition, McGraw Hill.

REFERENCE BOOKS

1. Balaguruswamy , E., ""Programming with Java", Tata Mcgraw Hill.
2. Horetmann Cay and Cornell Gary, "Core Java Volume – I", Pearson Education.

CS-282C	MINOR PROJECT – 1/TRAINING	L T P	Cr
		0 0 2	1

OBJECTIVE

The student shall be capable of identifying a problem related to the program of study and carry out wholesome research on it leading to findings which will facilitate development of a new/improved product, process for the benefit of the society.

B.Tech projects should be socially relevant and research oriented ones. Student is expected to do an individual project or in group of 3 members. The project work is carried out in two phases – Minor Project in VI semester and Major Project in VII semester. Major project of the project work shall be in continuation of Minor Project only. At the completion of a project the student will submit a project report, which will be evaluated (end semester assessment) by duly appointed examiner(s). This evaluation will be based on the project report and a viva voce examination on the project. Student will be allowed to appear in the final viva voce examination only if he / she has submitted his / her project work in the form of paper for presentation / publication in a conference / journal and produced the proof of acknowledgement of receipt of paper from the organizers / publishers.

PDP-202	LIFE SKILLS	L T P	Cr
		0 0 2	1

COURSE OUTCOMES

The students undergoing this course will be able to**:**

CO1: Develop and exhibit and accurate sense of self.

CO2: Assess and analyze the symptoms, causes and effects of personal and academic stressors in order to implement appropriate stress management techniques.

CO3: Analyze time management techniques

CO4: Assess Self and become better decision makers

CO5: Build stronger relationships and achieve career and personal goals.

UNIT I

PERSONALITY DEVELOPMENT & TA– Concept of PD- Significance of PD. The 4 OK States & PAC Concept

SWOT Analysis, Success & Failure, Dimensions of Personality – Theories of Freud & Erickson, Transactional Analysis – Dr. Eric Berne

UNIT II

STRESS MANAGEMENT – Meaning of Stress, Effects of Stress on Body & Mind. How to overcome stress

UNIT III

TIME MANAGEMENT – Concept of TM, Time Matrix, 24 hr Time tracker. How to manage time effectively?

UNIT IV

SELF -AWARENESS & SELF - ESTEEM – What is SA & SE? Importance of Self Awareness, Emotional Intelligence – Definition and significance

UNIT V

ART OF CONVERSATION – Conversational Skills - How to start, sustain and conclude conversation?

UNIT VI

MOTIVATION – Meaning, Internal & External Motivation, How to stay motivated? Self Motivation

Syllabus

of

B.Tech(CSE-AIML/DS)

3rd Year

5th Semester

EC-301C	MICROPROCESSORS & MICROCONTROLLER	L T P	Cr
		3 0 0	3

OBJECTIVES

This subject introduces the concept of Microprocessors to the students. It covers 8 bit (8085) and 16-bit (8086) Microprocessors: their architecture, assembly language programming and interfacing with peripheral devices

PRE-REQUISITES

Knowledge of Boolean algebra, number systems and basic digital circuitry.

COURSE OUTCOMES

CO1: Understand the taxonomy of microprocessors and knowledge of contemporary microprocessors.
CO2: Describe the architecture, bus structure and memory organization of 8085 as well as higher order microprocessors.
CO3: Explore techniques for interfacing I/O devices to the microprocessor 8085 including several specific standard I/O devices such as 8251 and 8255.
CO4: Demonstrate programming using the various addressing modes and instruction set of 8085 microprocessor
CO5: Design structured, well commented , understandable assembly language programs to provide solutions to real world control problems

UNIT I

THE 8085 PROCESSOR: Introduction to microprocessor; 8085 microprocessor: Architecture; Pin Diagram; instruction set; interrupt structure; Addressing modes and assembly language programming.

UNIT II

THE 8086 MICROPROCESSOR ARCHITECTURE: Architecture; block diagram of 8086 with details of sub-blocks; memory segmentation and physical address computations; program relocation; addressing modes; pin diagram and description of various signals; Interrupt Structure.

INSTRUCTION SET OF 8086: Data transfer instructions; arithmetic instructions; branch instructions; looping instructions; NOP and HLT instructions; flag manipulation instructions;
logical instructions; shift and rotate instructions; directives; programming examples.

UNIT III

INTERFACING DEVICE: The 8255 PPI chip: Architecture; control words and modes; interfacing and programming with 8085.
DMA: Introduction to DMA process; 8257 pin diagram; architecture; operation; command words; interfacing and programming with 8085.

UNIT IV

PROGRAMMABLE INTERRUPT CONTROLLER: 8259 diagram; architecture; initialization command words; operational command wards.

UNIT V

PROGRAMMABLE INTERVAL TIMER: 8253 pin diagram; architecture; modes.

TEXT BOOK

Gaonkar, Ramesh S., ―Microprocessor Architecture: Programming and Applications with 8085‖, 5th Edition, Prentice Hall of India, 1995

REFERENCE BOOKS

1. Brey,‖The Intel Microprocessors 8086- Pentium Processor‖, 4th Edition, 2005
2. Hall, ―Microprocessors and interfacing‖, Tata McGraw Hill, 3nd Edition, 2003
3. Liu Yu-Chang and Gibson Glenn A., ―Microcomputer Systems: The 8086/8088 Family: Architecture, Programming and Design‖, Prentice Hall of India, 2003
4. Ray A. K. and Burchandi, ―Advanced Microprocessors and Peripherals Architectures, Programming and Interfacing‖, Tata McGraw Hill, 2002
5. Rafiquzzman, ―Microprocessor based System Design UBS‖ Wiley-Interscience, 5th Edition, 2005

CS-301C	COMPUTER NETWORK	L T P	Cr
		3 0 0	3

OBJECTIVES

To have a fundamental understanding of the design, performance and state of the art of wireless communication systems, Topics covered include state of the art wireless standards and research and thus changes substantially form one offering of this course to the next

PRE-REQUISITES

Knowledge of computers hardware and software

COURSE OUTCOMES

CO1: Understand computer network basics, network architecture, TCP/IP and OSI reference models.

CO2: Identify and understand various techniques and modes of transmission

CO3: Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN

CO4: Describe routing and congestion in network layer with routing algorithms and classify IPV4 addressing scheme

CO5: Discuss the elements and protocols of transport layer. Understand network security and define various protocols such as FTP, HTTP, Telnet, DNS

UNIT I

OVERVIEW OF DATA COMMUNICATION AND NETWORKING: Introduction; Data communications: components, data, direction of data flow, Protocols, Networks: type of connection, topology: Star, Bus, Ring, Mesh, Tree, categories of network: LAN, MAN, WAN: Internet: brief history, Layered architecture of networks, OSI reference model, Functions of each layer, services and protocols of each layer, TCP / IP reference model.

UNIT II

PHYSICAL AND DATA LINK LAYER: Transmission media: Guided media, Unguided media Switching: Circuit switching, packet switching, datagram switching. Error Detection and Correction: Types of errors, detection vs correction, cyclic codes, checksum. Framing: Flow and Error Control, Protocols: Stop &wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ.

UNIT III

MEDIUM ACCESS SUBLAYER RANDOM ACCESS: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, Controlled Access: Reservation, Polling, Channelization: FDMA, TDMA, CDMA, IEEE Standards, Standard Ethernet, Changes in the standard, Fast Ethernet, Gigabit Ethernet

UNIT IV

NETWORK LAYER: Network Devices**:** Active and Passive Hubs, Repeaters, Bridges, Two and Three layer switch, Gateway. Internet Protocol, Transmission Control Protocol, User Datagram Protocol; IP Addressing, IP address classes, subnet addressing, DNS, Internet control protocols: ARP, RARP, ICMP.

UNIT V

TRANSPORT LAYER: Process to process delivery, user datagram protocol, TCP services, features, TCP Connection, flow control, error control and congestion control; Congestion control, Quality of Service, WAN Technologies: Synchronous Digital Hierarchy (SDH) / Synchronous Optical Network (SONET); Asynchronous Transfer Mode (ATM) Frame Relay.

TEXT BOOK

Tanenbaum Andrew S, ―Computer Networks‖, 4th Edition, Pearson Education/Prentice Hall of India, 2003.

REFERENCE BOOKS

1. Forouzan Behrouz A., ―Data Communications and Networking‖, Tata McGraw Hill 2006.
2. Stallings William, ―Data and Computer Com munication‖ , 5th Edition, Prentice Hall of India, 1997.
3. Fred H alsall, ―Data Communications, Computer Networks and Open Systems‖, 4th edition, Addison Wesley, Low Price Edition, 2000
4. Fitzgerald Jerry, ―Business Data Communications‖, Wiley, 2009.
5. Peterson Larry L. and Davie Bruce S., ―Computer Networks – A System Approach‖, 3rd Edition, Morgan Kaufmann, 2003.
6. Tittel E. D., ―Computer Networking‖, Tata McGraw Hill, 2002
7. Kurose James F. and Ross Keith W., ―Computer Networking: A Top-Down Approach Featuring the Internet‖, 2nd Edition, Pearson Education, 2003.
8. Keshav S., ―An Engineering Approach to Computer Networking‖, Addison-Wesley, 1997.
9. Comer D. E., ―Internetworking with TCP/IP‖, Volume 1, 3rd Edition, Prentice Hall of India, 1995.

CS-303C	ARTIFICIAL INTELLIGENCE	L T P	Cr
		3 0 0	3

OBJECTIVES

To introduce about artificial intelligence approaches to problem solving, various issues involved and application areas

PRE-REQUISITES: Knowledge of neural networks, data structures

COURSE OUTCOMES

CO1: Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems. Solve basic AI based problems

CO2: Define the concept of Artificial Intelligence and Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

CO3: Apply AI techniques to real-world problems to develop intelligent systems.

CO4: Select appropriately from a range of techniques when implementing intelligent systems.

CO5: Discuss the basics of ANN and different optimizations techniques

UNIT I

INTRODUCTION TO AI AND SEARCH TECHNIQUES: Foundation and history of AI; data, information and knowledge; AI problems and techniques – AI programming languages, problem space representation with examples; blind search strategies, breadth first search, depth first search, heuristic search techniques: hill climbing: best first search, A * algorithm AO* algorithm, Minimax search procedure for Game Playing.

UNIT II

KNOWLEDGE REPRESENTATION ISSUES AND TECHNIQUES: Predicate logic; representing knowledge using rules. Semantic nets, partitioned nets, parallel implementation of semantic nets; frames, forward and backward chaining; frame based systems.

UNIT III

REASONING UNDER UNCERTAINITY: Reasoning under uncertainty, non monotonic reasoning; Review of probability; Baye's probabilistic interferences and Dumpster Shafer theory; statistical reasoning, fuzzy reasoning.

UNIT IV

PLANNING & LEARNING: Goal stack planning; non linear planning, hierarchical planning representation for planning; partial order planning algorithm. Basic concepts of Learning ; rote learning, learning by taking advices, learning by problem solving, learning from examples, discovery as learning, learning by analogy; explanation based learning; neural nets; genetic algorithms.

UNIT V

EXPERT SYSTEM AND APPLICATIONS OF ARTIFICIAL INTELLIGENCE: Expert systems: rule based systems architecture: Principles of natural language processing: knowledge acquisition concepts; AI application to robotics, and current trends in intelligent systems; parallel and distributed AI.

TEXT BOOK

Rich Elaine and Knight Kevin, —Artificial Intelligence 3rd Edition, Tata McGraw Hill, 1991

REFERENCE BOOKS

1. Nilson Nils J., —Artificial Intelligence‖, McGraw-Hill, New York 1971
2. Russell Stuart and Norvig Peter, —Artificial Intelligence: A Modern Approach‖, Prentice Hall of India, 1998
3. Negnevitsky, —Artificial Intelligence: A Guide to Intelligent System ‖, Pearson Education, 2004.
4. Patterson O. W., —Introduction to Artificial Intelligence & Expert Systems‖, Prentice Hall of India, 1996.
5. Winston Patrick Henry, —Artificial Intelligence, 3rd Edition, Addition Wesley, 1992
6. Clockson & Mellish, —Programming PROLOG‖, 3rd Edition, Narosa Publications, 2002.

CS-305C	PYTHON PROGRAMMING	L-T-P	Cr
		3-0-0	3

OBJECTIVES

To build programming logic and thereby developing skills in problem solving using Python programming language; To be able to do testing and debugging of code written in Python Emphasize the concepts and constructs rather than on language features.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand the building blocks of Internet of Things and characteristics
CO2: Describe the various application areas of IoT.
CO3: Design a basic IoT product using Raspberry Pi and sensors.
CO4: Deploy an IoT application and connect to the cloud.
CO5: Simulate/implement given problem scenario and analyze its performance.

UNIT I

PLANNING THE COMPUTER PROGRAM AND PROBLEM SOLVING TECHNIQUES: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation. Flow charting, decision table, algorithms, structured programming concepts, Programming methodologies viz. Top-down and bottom-up programming.

UNIT II

OVERVIEW OF PROGRAMMING & INTRODUCTION TO PYTHON: Structure of a Python Program, Elements of Python. Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic Operator, Relation a l operator, Logical or Boolean operator, Assignment, Operator, Ternary operator ,Bit wise operator, Increment or Decrement operator).

UNIT III

CREATING PYTHON PROGRAMS: Input and Output Statements, Control Statements (Looping- while Loop, for Loop, Loop Control, Conditional Statement-if...else, Difference between break, continue and pass).

UNIT IV

STRUCTURES & FUNCTIONS: Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.

UNIT V

CLASSES, OBJECT-ORIENTED PROGRAMMING AND EXCEPTION: Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding, Handling exceptions

TEXT BOOKS

John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India

REFERENCE BOOKS

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.or 2010
3. Allen Downey, Jeffrey Elkner, Chris Meyers ,How to think like a computer scientist :Learning with Python,Freelyavailableonline.2012
4. http://docs.python.org/3/tutorial/index.html
5. http://interactivepython.org/courselib/static/pythonds
6. http://www.ibiblio.org/g2swap/byteofpython/read/

CS-320C	MACHINE LEARNING	L T P	CR
		3 0 0	3

COURSE OUTCOMES

CO1: Appreciate the importance of visualization in the data analytics solution
CO2: Apply structured thinking to unstructured problems
CO3: Understand a very broad collection of machine learning algorithms and problems
CO4: Learn algorithmic topics of machine learning and mathematically deep enough to introduce the required theory
CO5: Develop an appreciation for what is involved in learning from data.

UNIT I

INTRODUCTION TO MACHINE LEARNING: The Origins of Machine Learning, Uses and Abuses of Machine Learning, How do Machines Learn? - Abstraction and Knowledge Representation, Generalization, Assessing the Success of Learning, Steps to Apply Machine Learning to Data, Choosing a Machine Learning Algorithm - Thinking about the Input Data, Thinking about Types of Machine Learning Algorithms, Matching Data to an Appropriate Algorithm.

UNIT II

SIMPLE LINEAR REGRESSION: Introduction to Simple Linear Regression, Simple Linear Regression Model Building, Estimation of Parameters Using Ordinary Least Squares, Interpretation of Simple Linear Regression Coefficients, Validation of Simple Linear Regression Model, Coefficient of Determination (R-squared) and Adjusted R-Squared, Spurious Regression, Hypothesis Test for Regression Coefficients (t-Test), Test for Overall Model: Analysis of Variance (F-Test), Residual Analysis.

UNIT III

MULTIPLE REGRESSION AND MODEL BUILDING: Introduction, Ordinary Least Squares Estimation for Multiple Linear Regression, Multiple Linear Regression Model Building, Partial Correlation and Regression Model Building, Interpretation of Multiple Linear Regression Coefficients - Partial Regression Coefficients, Standardized Regression Coefficient, Regression Models with Categorical (i.e., Qualitative) Variables - Interpretation of Regression Coefficients of Categorical Variables, Interaction Variables in Regression Models, Validation of Multiple Regression Model, Coefficient of Multiple Determination (R - Squared), Adjusted R-Squared, Statistical Significance of Individual Variables in Multiple Linear Regression: t-Test, Validation of Overall Regression Model: F-Test, Validation of Portions of a Multiple Linear Regression Model - Partial F-Test, Residual Analysis in Multiple Linear Regression.

UNIT IV

INTRODUCTION TO CLASSIFICATION & CLASSIFICATION ALGORITHMS: What is Classification? General Approach to Classification, k-Nearest Neighbor Algorithm, Logistic Regression, Decision Trees, Naive Bayesian Classifier, Ensemble Methods: Bagging, Boosting and AdaBoost and XBoost, Random Forests, Advanced Classification Methods: Backpropagation in Multilayer Feed-Forward Neural Networks, Support Vector Machines, Rough Set and Fuzzy Set Approaches, Classification Model Evaluation and Selection: Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Lift Curves and Gain Curves, ROC Curves, Misclassification Cost Adjustment to Reflect Real-World Concerns, Decision Cost/Benefit Analysis.

UNIT V

INTRODUCTION TO CLUSTER ANALYSIS & CLUSTERING METHODS: The Clustering Task and the Requirements for Cluster Analysis , Overview of Some Basic Clustering Methods, Hierarchical Methods: Agglomerate versus Divisive Hierarchical Clustering, Distance Measures, Probabilistic Hierarchical Clustering, Multiphase Hierarchical Clustering Using Clustering Feature Trees, Partitioning Methods: k-Means Clustering, k-Medoids Clustering, Density-Based Clustering: DBSCAN - Density-Based Clustering Based on Connected Regions with High Density, Measuring Clustering Goodness

TEXT-BOOKS

1. Machine Learning: An Algorithmic Perspective by Stephen Marsland, Chapman and Hall/CRC.
2. T. Mitchell, Machine Learning, McGraw Hill.
3. M. Gopal, Applied Machine Learning, McGraw Hill.
4. Sutton R. S. and Barto, A. G., Reinforcement Learning: An Introduction, The MIT Press (2017).

REFERENCE-BOOKS

1. Introduction to Machine Learning by Ethem Alpaydin, PHI Learning.
2. M. Evangelia, Supervised and Unsupervised Pattern Recognition, CRC Press.
3. G. James, D. Witten, T. Hastie, R. Tibshirani, Introduction to Statistical Learning, Springer

CS-309C	FORMAL LANGUAGE & AUTOMATA THEORY	L T P	Cr
		3-1-0	4

OBJECTIVES

To understand the theory and practice of compiler implementation. To learn finite state machines and lexical scanning. To learn context free grammars, compiler parsing techniques, construction of abstract syntax trees, push down Automata and Turing Machine.

PRE-REQUISITES

Knowledge of mathematics and Programming Languages

COURSE OUTCOMES

CO1: Understand the basic concepts of formal languages, automata and grammar types, as well as the use of formal languages and reduction in normal forms
CO2: Demonstrate the relation between regular expressions, automata, languages and grammar with formal mathematical methods
CO3: Design push down automata, cellular automata and turing machines performing tasks of moderate complexity
CO4: Analyze the syntax and formal properties, parsing of various grammars such as LL(k) and LR(k)
CO5: Describe the rewriting systems and derivation languages

UNIT I

FINITE AUTOMATA AND REGULAR EXPRESSIONS: Finite state systems; basic definitions non-deterministic finite automata (NDFA), deterministic finite automata (DFA), equivalence of DFA and NDFA finite automata with e-moves;, limitations of FSM, Moore and Mealy Machines; Equivalence of Moore and Mealy Machines., Minimization of Finite Automata. Concept of basic machine; properties

UNIT II

PROPERTIES OF REGULAR SETS: regular expressions; equivalence of finite automata and regular expressions, regular expression conversion and vice versa, Arden's theorem; The Pumping Lemma for regular sets; applications of the pumping lemma; closure properties of regular sets.

UNIT III

CONTEXT FREES GRAMMARS & PDA: Definition, Context free and context sensitive grammar; ambiguity regular grammar; reduced forms; removal of useless symbols and unit production; Chomsky Normal Form (CNF), Greibach Normal Form (GNF). Introduction to pushdown machines; design of PDA; conversion of PDA to CFG and vice versa, application of pushdown machines.

UNIT IV

TURING MACHINES: Basic concepts, Deterministic and non-deterministic Turing machines; design of Turing machines; halting problem of Turing machines.

UNIT V

INTRODUCTION TO COMPILER DESIGN AND PARSING: Introduction to translators and its need, structure of Compilers and its different phases. **:** Introduction to Parser and role of Parser (Syntax analyzer), Types of parsers: Bottom up and Top down Parser.

TEXT BOOK

Hopcroft, Ullman O. D. and Mothwani R., "Introduction to Automata Theory, Language & Computations", Addison Wesley, 2001

REFERENCE BOOKS

1. Mishra K. L. P. and Chandrasekaran N., "Theory of Computer Science - Automata, Languages and Computations", Prentice Hall of India, 2000
2. Linz Peter, "Introduction to Formal Languages & Automata", Narosa Publications, 2001
3. Greenlaw Ramond and Hoover H. James, "Fundamentals of the Theory of Computation - Principles and Practice", Harcourt India Pvt. Ltd., 1998
4. Lewis H. R. and Papaditriou C. H., "Elements of Theory of Computation", Prentice Hall of India, 1998
5. Martin John C., "Introduction to Languages and Theory of Computations", Tata McGraw Hill, 2003

EC-351C	MICROPROCESSORS & MICROCONTROLLER LAB	L T P	CR
		0 0 2	1

LIST OF EXPERIMENTS

1. Familiarization with the operation of 8085 Microprocessor kit.
2. Write a program using 8085 for: a) Addition of two 8-bit numbers. b) Addition of two 16-bit numbers
3. Write a program using 8085 for : a) 8-bit subtraction b) 16-bit subtraction
4. Write a program using 8085 for a) Multiplication of two 8- bit numbers
   b)Division of two 8- bit numbers
5. Write a program using 8085 to arrange an array of 10 Nos in-
   a) Ascending order b) Descending order
6. Familiarization with the operation of 8086 microprocessor kit
7. Write a program using 8086 for copying 12 bytes of data from source to destination.
8. Write a program using 8086 for:
   a) Finding the largest number from an array.
   b) Finding the smallest number from an array.
9. Write a program using 8086 for arranging an array of numbers in descending order and ascending order
10. Write a program for finding square of a number using look-up table and verify.
11. Write a program to interface a two digit number using seven-segment LEDs. Use 8085 microprocessor and 8255 PPI.

CS-355	ARTIFICIAL INTELLIGENCE LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

1. Study of Python programming language.
2. Write a program to find out route distance between two cities using Python.
3. Write a program to implement Tower of Hanoi using Python.
4. Write a program to calculate factorial of a number using Python.
5. Write a program to print the list of customer having different colored cars with price and model available using Python.
6. Write a program to implement water jug problem using Python.
7. Write a program to implement Breadth First Search using Python
8. Write a program to implement Depth First Search using Python
9. Write a program to solve 8-Queens problem using Python.
10. Write a program to solve Monkey Banana problem using Python.

CS-357	MACHINE LEARNING LAB	L T P	CR
		0 0 2	1

COURSE OUTCOMES (COS):

After completion of course, students would be able to:

CO1: Understand the implementation procedures for the machine learning algorithms.
CO2: Design Python programs for various Learning algorithms.
CO3: Apply appropriate data sets to the Machine Learning algorithms.
CO4: Identify and apply Machine Learning algorithms to solve real world problems

HARDWARE REQUIREMENT: i5 Processor, 8GB RAM, Internet Connection
SOFTWARE ENVIRONMENT: IDE recommended PYCHARM (Recommended), JUPYTER, VISUAL STUDIO

LIST OF EXPERIMENTS

1. i. Introduction to pandas

   ii. Introduction to NumPy

   iii. Wine Quality Prediction

   iv. Housing Price Prediction
2. Program to demonstrate Simple Linear Regression
3. Program to demonstrate Logistic Regression using SCIKIT learn
4. Program to demonstrate Multiple Linear Regression
5. Program to demonstrate k-Nearest Neighbor flowers classification
6. Program to demonstrate Decision Tree – ID3 Algorithm
7. Program to demonstrate Naïve- Bayes Classifier
8. Program to demonstrate Back-Propagation Algorithm
9. Program to demonstrate k-means clustering algorithm
10. Program to demonstrate DBSCAN clustering algorithm
11. Program to demonstrate SVM based classification

CS-355C	PYTHON PROGRAMMING LAB	L T P	Cr
		0-0-2	1

Program 1: Programs using if else structure

e) Find the Largest Among Three Numbers
f) Python Program to Check Leap Year
g) Python Program to Take in the Marks of 5 Subjects and Display the Grade
h) Python Program to Check if a Date is Valid and Print next date

Program 2: programs using for and while loop

f) Python Program to check whether given number is Prime Number or not
g) Python Program to Find LCM of two numbers
h) Write a Python program to compute the GCD of two numbers
i) Python Program to Find the Sum of Digits in a Number
j) Python Program to convert binary number to decimal number
k) Python Program to Display Fibonacci sequence Using Recursion

Program 3: Program using List and String data structure

e) Write Python Program to input a list of integers, (1) display the no of elements in the list (2) display minimum and maximum element in the list (3) display sum of square of all the element in the list (4) (5) add a new element at end and display the list (6) add a new element at given index and display list (7) display the occurrence of given element in the list (8) remove the given element in the list (9) add element from a new list from given list (10) sort the given list & reverse the given list (11) also perform slicing, concatenation and multiplication operation

f) A fruit seller sells different type of fruits. Type of fruits and corresponding rates are stored in two different lists. Customer can order any type of fruit (one or more type) in any quantity. If total bill of customer is greater than 500, customer is given 10% discount. If any of the fruits required by the customer is not available in the store, then consider the bill amount to be -1. Write a Python program to calculate and display the bill amount

g) Write a Python program to display all the permutations of given string (don't use python permutation function)

h) Accept two strings 'string1' and 'string2' as input from the user. Generate a resultant string-1, such that it is a concatenated string of all upper case alphabets from both the strings in the order they appear. Generate a resultant string-2 that contain character which are in both string1 and 2 Print the actual resultant string-1 and resultant string-2

Program 4: Programs using concept of sets, tuple & dictionary

e) Write a Python program that take a string as input and store the character and occurrence of each character in a dictionary. Create two lists from dictionary first having each character in sorted order of their frequency and second having corresponding frequency.

f) A furniture seller sells different type of furniture, Type of Furniture and rates are stored in a dictionary. Customer can order any type of furniture (one or more type) in any quantity. If total bill of customer is greater than 10,000, customer is given 5% discount. 8% GST is charged on total bill. If any of the furniture required by the customer is not available in the store, then consider the bill amount to be -1. Write a Python program to calculate and display the bill amount

g) Consider a scenario from Lingayas Vidyapeeth. Given below are two Sets representing the names of students enrolled for a particular course: java_course = {"Anmol", "Rahul", "Priyanka", "Pratik"} python_course = {"Rahul", "Ram", "Nazim", "Vishal"}Write a Python program to list the number of students enrolled for:1)Python course2)Java course only3)Python course only4)Both Java and Python courses5)Either Java or Python courses but not both6)Either Java or Python

h) Students name and their corresponding marks are stored in a dictionary. Write a Python program to perform following (1) Display name and marks of each student (2) Display the names of top two scorer (3) display the class average for this course (4) check if the marks for given student is stored in dictionary or not, if not add the name and marks in the dictionary else display his/her marks (5) delete the name and marks of a given student in the dictionary (6) add name and marks from another dictionary and display combined dictionary

Program 5: Using Function in Python:

a) Write Python functions using the concept of Keyword & default arguments and write a program to use them

b) Write python functions to use the concept of variable length argument & global variable. Write a program to use these functions

c) Write a recursive function to solve the Tower of Hanoi Problem

Program 6: Program using concept of Class, object, class variable, class method, static method

a) Create a class Account with name, account no and balance as attribute and no_of_accounts as class variable. Account no should be generated automatically (starting from 1) using the class variable no_of_account. Add the methods for displaying the account information, depositing given amount, withdrawing given amount and initializer method to initialize the object. Create objects of Account class and call different method to test the class

b) Create a class Employee with name , empid ,salary as attribute and no_of_ employee and annual_incr (% annual increment) as class variable. empid should be generated automatically (starting from 1) using the class variable, no_of_employee. Add the instance methods for displaying the employee information, annually increasing the salary with help of class variable annual_incr , class method to change the value of annual_incr and initializer method to initialize the object. Create objects of employee class and call different method to test the class (program using class method)

c) Write a Program to showing the use of built in class attributes (__doc__, __dict__, __name__, __module__,__bases__) and special methods(__del__( ), __str__( )) and built in function isinstance()

Program 7: Program using the concept of Inheritance

a) Create a class Polygon to represent a polygon having no of sides and a list having magnitude of each side as attribute. Add the inputSides() to input sides and displaySides() to display sides as methods. Derive a class Triangle from Polygon and add an additional method displayArea() to display area. Create object of Triangle and call different methods to test the class

b) Create a class Person having name, age, as attributes, __init__() method to initialize the object and display() to display person information. Derive a class Student from Person having roll no, University name, branch as additional attributes and __init__(), display() to display student information and change_Branch() method. Create object of Student type and call different methods to test the class.

c) Write a program to show the concept of multiple inheritance in python

Program 8: Program using the concept of Polymorphism, operator overloading

a) In a retail outlet there are two modes of bill Payment (1) Cash : Calculation includes VAT(10%) Total Amount = Purchase amount + VAT (2) Credit card: Calculation includes processing charge and VAT Total Amount = Purchase amount + VAT (10%) + Processing charge (2%) The act of bill payment is same but the formula used for calculation of total amount differs as per the mode of payment. Can the Payment maker simply call a method and that method dynamically selects the formula for the total amount? Demonstrate this Polymorphic behaviour with code.

b) Write a program to create a class to represent length in feet and inch. Overload the "+" operator to add the two object of length type.

c) Write a program to overload comparison operator in python

Program 9: Program on file handling in Python

a) Write a python program to write few lines on a file, read it back and create a dictionary having each word in file as keys in dictionary and occurrence of these word as values and print the dictionary.

b) A file student.txt store student information. Information about each student is written on separate line in the form: roll-no student-name (student-name may consist of any number of words).Write a Python program that takes student roll no as input and print the student name. If roll no is not present in the file it display : "roll no not present in the file"

c) Write a python program to read a file that contains email ids on the separate lines in the form: "personname@companyname.com. Create a new file that contain only company names, read the new file to print the company name

d) Program 10: Program on Exception handling

e) Write a function divide (arg1, arg2) to divide arg1 by arg2. Use the exception handling mechanism to handle all type of possible exceptions that may occur. Take the value of arg1 and arg2(of any type) from user as input and call the function divide to print the result of division or suitable message if any type of exception occurs(use also else and finally block)

f) Write a program to open a file in read only mode read data from file and then try to write data on file. Use the exception handling mechanism to handle all type of possible exception

g) Write a Python program that takes email id, mobile number and age as inputs from user. Validate each and raise user defined exceptions accordingly

Note:-

Email id: there must be only one @ and At least one "."

Mobile number must be 10 digits

Age must be a positive number less than 101

Program 11: Program on Multithreading

a) Write two functions : print_even(n) and print_odd(n) to print even numbers and print odd numbers respectively up to integer n. Create two thread objects by passing these function in thread class constructor to execute these functions in two different thread. Use sleep() method to see how these functions are executed concurrently(* use start() method to start and join() method to wait for thread to terminate)

b) Write a python program to use the concept of multithreading by Overriding run() method in a subclass of threading.Thread.

c) Write a python program using the concept of thread synchronization.

REFERENCE BOOKS

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Allen Downey, Jeffrey Elkner, Chris Meyers ,How to think like a computer scientist :Learning with Python,Freelyavailableonline.2012
3. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India

CS-381C	MINOR PROJECT- II/TRAINING	L-T-P	CR
		0-0-4	2

OBJECTIVE

The student shall be capable of identifying a problem related to the program of study and carry out wholesome research on it leading to findings which will facilitate development of a new/improved product, process for the benefit of the society.

B.Tech projects should be socially relevant and research oriented ones. Student is expected to do an individual project or in group of 3 members. The project work is carried out in two phases – Minor Project in VI semester and Major Project in VII semester. Major project of the project work shall be in continuation of Minor Project only. At the completion of a project the student will submit a project report, which will be evaluated (end semester assessment) by duly appointed examiner(s). This evaluation will be based on the project report and a viva voce examination on the project. Student will be allowed to appear in the final viva voce examination only if he / she has submitted his / her project work in the form of paper for presentation / publication in a conference / journal and produced the proof of acknowledgement of receipt of paper from the organizers / publishers.

CS-319C	DATA ENGINEERING	L T P	Cr
		3-0-0	3

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Describe the basic concepts and technologies of distributed systems.
CO2: Evaluate the data analysis techniques for applications handling large data and demonstrate the data science process
CO3: Visualize and present the inference using various tools
CO4: Understand the importance of multicollinearity in regression modelling
CO5: Evaluate the concept of network analysis through PERT and CPM techniques

UNIT I

INTRODUCTION: Introduction to data, information and knowledge, Data preprocessing, Data preparation, Descriptive statistics: mean, median, mode, skewness, kurtosis, data distribution, normalization, standard deviation, range, quartile, z-score

UNIT II

STATISTICAL TESTS:
Inference frequency approach, variability of estimates, hypothesis testing using confidence intervals, F-test, T-test, Z-test, Chi-square test, Anova, p-values.

UNIT III

SUPERVISED LEARNING: First step, learning curves, training-validation and test. Learning models generalities, support vector machines, random forest. Examples

UNIT IV

REGRESSION ANALYSIS: Regression: linear regression simple linear regression, multiple & Polynomial regression, Sparse model. Unsupervised learning, clustering, similarity and distances, quality measures of clustering, case study.

UNIT V

GRAPHICAL ANALYSIS: Network Analysis, Graphs, Social Networks, centrality, drawing centrality of Graphs, PageRank, Ego-Networks, community Detection.
TOOLBOXES: Python, fundamental libraries for data Scientists. Integrated development environment (IDE). Data operations: Reading, selecting, filtering, manipulating, sorting, grouping, rearranging, ranking, and plotting.

TEXT BOOKS

1. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers.
2. Python for Everybody: Exploring Data in Python 3 by Dr. Charles Russell Severance

REFERENCE BOOKS

1. Data Engineering with Python- Paul Crickard
2. Designing Data-Intensive Applications- Martin Kleppman
3. The Data Engineering Cookbook – Andreas Kretz

CS-369C	DATA ENGINEERING LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

1. Basics of Python Programming
2. Study of Data Engineering using Python
3. Training the SVM model
4. Implementation of random forest from Scratch in Python
5. Clustering using Python
   a. kNN
   b. Agglomerative
6. Social Network analysis with Network X in Python
   a. Symmetric Network
   b. Asymmetric Network
   c. Weighted Network

REFERENCE BOOKS

1. Y Daniel Liang, “Introduction to Programming using Python”, Pearson.
2. Benjamin Baka, David Julian, “Python Data Structures and Algorithms”, PACKT Publishers,2017.
3. Rance D. Necaise, “Data Structures and Algorithms using Python”, Wiley Student Edition.
4. Martin Jones, “Python for Complete Beginners”, 2015.

		L	T	P	Credit
CS-307C	DATA ANALYSIS & MODELING	**3**	**0**	**0**	**3**

OBJECTIVES

1. To make the students learn about the basic concepts of data analysis
2. To understand the student the modelling concepts of data analysis
3. To learn about the methodologies using probability theory.
4. To make the students aware about the fundamental data analysis and hypothesis techniques
5. To learn the different data modelling methodologies such as Hidden Markov Models and Bayesian networks

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Gain a solid understanding of probabilistic data modelling, interpretation, and analysis

CO2: Solve important basis practical statistics

CO3: Handle data analysis related problems arising in broad computer science and engineering and daily life.

CO4: Calculate and interpret the meaning of correlation coefficient to measure the strength of relationship between two numerical variables,

CO5: Calculate and interpret the meaning coefficient of determination to measure the predictive power of the simple as well as multiple regression,

CO6: To forecast the future values using various models

UNIT I

DATA ANALYSIS: Regression modelling, multivariate analysis, Bayesian modelling, inference and Bayesian networks, support vector and kernel methods, analysis of time series: linear systems analysis & nonlinear dynamics, rule induction, neural networks: learning and generalisation, competitive learning, principal component analysis and neural networks, fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, stochastic search methods

UNIT II

BASIC PROBABILITY: Discrete and continuous random variables, independence, covariance, central limit theorem, Chebyshev inequality, diverse continuous and discrete distributions.

UNIT III

STATISTICS, PARAMETER ESTIMATION, AND FITTING A DISTRIBUTION: Descriptive statistics, graphical statistics, method of moments, maximum likelihood estimation

Unit IV

RANDOM NUMBERS AND SIMULATION: Sampling of continuous distributions, Monte Carlo methods, developing Business Scenario, Sensitivity analysis, Sensitivity analysis using excel, ANOVA

UNIT V

STOCHASTIC PROCESSES AND DATA MODELLING: Markov process, Hidden Markov Models, Poisson Process, Bayesian Network, Regression, Queuing systems

TEXT BOOK

Probability and Statistics for Computer Scientists, by Michael Baron, Chapman and Chapman and Hall/CRC; 2 edition (August 5, 2013), ISBN-10: 1439875901.

REFERENCES

1. Art of Computer Systems Performance Analysis: Techniques For Experimental Design Measurements Simulation and Modelling, Raj Jain (Wiley; 2 edition, 2015), ISBN: 978-1118858424.
2. A Concise Course in Advanced Level Statistics with worked examples (Oxford University Press; 4th Revised edition, 2014), ISBN: 1408522292.
3. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer

CS-371C	DATA ANALYSIS & MODELLING LAB	L	T/SDA	P	Credit
		0	0	2	1

OBJECTIVES

1. To make the students learn about the basic concepts of data analysis
2. To understand the student the modelling concepts of data analysis
3. To learn about the methodologies using probability theory.
4. To make the students aware about the fundamental data analysis and hypothesis techniques
5. To learn the different data modelling methodologies such as Hidden Markov Models and Bayesian networks

COURSE OUTCOMES

Students undergoing this course will be able to:

CO1: Gain a solid understanding of probabilistic data modelling, interpretation, and analysis

CO2: Solve important basis practical statistics

CO3: Handle data analysis related problems arising in broad computer science and engineering and daily life.

CO4: Calculate and interpret the meaning of correlation coefficient to measure the strength of relationship between two numerical variables,

CO5: Calculate and interpret the meaning coefficient of determination to measure the predictive power of the simple as well as multiple regression,

CO6: To forecast the future values using various models

LIST OF EXPERIMENTS

1. Implementation of Linear Regression.
2. Study the analysis of Time Series and its implementation.
3. Study of Fuzzy Logic.
4. Study and implementation of Bayesian Model.
5. Study and Implementation of central limit theorem and Chebyshev inequality.
6. Implementation of Fitting a Distribution.
7. Study of Maximum Likelihood estimation.
8. Study of Monte Carlo Methods.
9. Study and Implementation of Markov Process.
10. Study and Implementation of Hidden Markov Model.

TEXT BOOK

Probability and Statistics for Computer Scientists, by Michael Baron, Chapman and Chapman and Hall/CRC; 2 edition (August 5, 2013), ISBN-10: 1439875901.

REFERENCES

1. Art of Computer Systems Performance Analysis: Techniques For Experimental Design Measurements Simulation and Modelling, Raj Jain (Wiley; 2 edition, 2015), ISBN: 978-1118858424.
2. A Concise Course in Advanced Level Statistics with worked examples (Oxford University Press; 4th Revised edition, 2014), ISBN: 1408522292.
3. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer

SYLLABUS
Of
B.Tech(CSE-AIML/DS)
3rd Year
6th Semester

CS-302C	STATISTICAL LEARNING THEORY	L T P	Cr
		3-0-0	3

COURSE OUTCOMES

CO1: To learn existing statistical algorithms of Machine Learning (ML) and Pattern Recognition (PR).
CO2: To understand the difference between Classification and Regression
CO3: To have hands-on experience in implementing various ML and PR techniques on different datasets.
CO4: To learn to compare the performance of two learning systems.
CO5: To study few optimization methods used to estimate the parameters of a model during training.

UNIT I

Probabilistic formulations of prediction problems, Plug-in estimators, empirical risk minimization linear threshold functions, perceptron algorithm

UNIT II

Risk bounds, Concentration inequalities, Uniform convergence, Rademacher averages; combinatorial dimensions, Convex surrogate losses for classification

UNIT III

Game-theoretic formulations of prediction problems, Minimax strategies for log loss, linear loss, and quadratic loss, Universal portfolios, Online convex optimization

UNIT IV

Neural network, Stochastic gradient methods, Combinatorial dimensions and Rademacher averages,Hardness results for learning,Efficient learning algorithms

UNIT V

Kernel methods, Reproducing kernel Hilbert spaces, Mercer's theorem, Convex optimization for kernel methods, Representer theorem, Ensemble methods, AdaBoost, AdaBoost as I-projection, Convergence and consistency of AdaBoost

REFERENCES

1. A Probabilistic Theory of Pattern Recognition, Devroye, Gyorfi, Lugosi, Springer
2. The Elements of Statistical Learning, Hastie, et al, Springer
3. Combinatorial methods in density estimation, Devroye and Lugosi, Springer
4. Statistical Learning Theory, Vapnik, Wiley
5. An Introduction to Computational Learning Theory, Kearns and Vazirani, MIT Press

CS-322C	SOFTWARE ENGINEERING	L T P	Cr
		3 0 0	3

COURSE OBJECTIVE

To provide basic knowledge of properties of software and its development processes, software quality, CASE tools, etc.

PRE-REQUISITES

Knowledge of computer programming, principles of management

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Plan a software engineering process life cycle, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements

CO2: Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project

CO3: Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.

CO4: Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice

CO5: Able to use modern engineering tools necessary for software project management, time management and software reuse.

UNIT I

INTRODUCTION: Definition and Emergence of Software Engineering, Evolving Role of Software, Software Life Cycle Models, Software Characteristics, Applications, Software Product, Software Process, Software Crisis, Software Myths.

UNIT II

SOFTWARE PROJECT MANAGEMENT: Project management concepts, software process and project metrics project planning, project size estimation metrics, project estimation techniques, empirical estimation techniques, COCOMO- a heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management, project scheduling and tracking.

UNIT III

REQUIREMENTS ANALYSIS AND SPECIFICATION: Requirements engineering, system modeling and simulation, analysis principles: modeling, partitioning, software, prototyping: methods and tools; specification principles, representation, the software requirements specification and reviews analysis modeling: data modeling, functional modeling and information flow: data flow diagrams, behavioral modeling; the mechanics of structured analysis: creating entity/ relationship diagram, data flow model, control flow model, the control and process specification.

UNIT IV

SYSTEM DESIGN AND COMPUTERAIDEDSOFTWARE ENGINEERING: Design Process: design and software quality, design principles; design concepts: abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, software procedure, information hiding; functional independence, cohesion, coupling; design heuristics for effective modularity; design model; design documentation, architectural design: software architecture, CASE, building blocks; integrated case environments and architecture, repository.

UNIT V

TESTING AND MAINTENANCE: Software testing techniques, software testing fundamentals: objectives, principles, testability; test case design, white box testing, basis path testing: control structure testing: black box testing, testing for specialized environments, architectures and applications. software testing strategies: verification and validation, unit testing, integration testing, validation testing, alpha and beta testing; system testing, acceptance testing debugging approaches; software re-engineering, reverse engineering, restructuring, forward engineering, Software maintenance, Adaptive , corrective and perfective, software reliability: measures of reliability and availability, software safety.

TEXT BOOK

Pressman Roger S., ―Software Engineering – A Practitioner‘s Approach‖ , McGraw Hill, 2004

REFERENCE BOOKS

1. Jalote P ankaj, ―An Integrated Approach to Software Engineering‖, 3rd edition, Narosa Book Distributors Private Ltd, 2005
2. Mall Ra jib, ―Fundamentals ofSoftware Eng ineering ‖, Prentice Hall of India,2003
3. Sommerville Ian, ―Software Engineering‖, 8th edition, Addison Wesley, 2007
4. Gustafson David, ―Software Eng ineering ‖, Tata McGraw Hill, 2002
5. Behforooz Ali and Hudson Frederick J., ―Software Engineering Fundamentals‖, Oxford University press, John Wiley & Sons, 2005.

CS-306C	ARTIFICIAL NEURAL NETWORK	L T P	Cr
		3-0-0	3

OBJECTIVE

To introduce about incorporating more mathematical approach (beyond conventional logic system) into the artificial intelligence approaches for problem solving such as fuzzy logic, genetic algorithms, etc.

PRE-REQUISITES

Knowledge of mathematics, statistics and probability

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Model Neuron and Neural Network, and to analyze ANN learning, and its applications

CO2: Perform Pattern Recognition, Linear classification.

CO3: Develop different single layer/multiple layer Perception learning algorithms

CO4: Design of another class of layered networks using deep learning principles.

UNIT I

OVERVIEW OF BIOLOGICAL NEURONS: Structure of biological neurons relevant to ANNs.

FUNDAMENTAL CONCEPTS OF ARTIFICIAL NEURAL NETWORKS: Models of ANNs; Feedforward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner –lake all e larning rule, etc.

UNIT II

SINGLE LAYER PERCEPTION CLASSIFIER: Classification model, Features & Decision regions; training & classification using discrete perceptron, algorithm, single layer continuous perceptron networks for linearly separable classifications.

UNIT III

MULTI-LAYER FEED FORWARD NETWORKS: Linearly non-seperable pattern classification, Delta learning rule for multi-perceptron layer, Generalized delta learning rule, Error back-propagation training, learning factors, Examples.

UNIT IV

SINGLE LAYER FEED BACK NETWORKS: Basic Concepts, Hopfield networks, Training & Examples.

ASSOCIATIVE MEMORIES: Linear Association, Basic Concepts of recurrent Auto associative memory: rentrieval algorithm, storage algorithm; By directional associative memory, Architecture, Association encoding & decoding, Stability.

UNIT V

SELF ORGANIZING NETWORKS: UN supervised learning of clusters, winner-take-all learning, recall mode, Initialisation of weights, seperability limitations

TEXT BOOK

Introduction to artificial Neural systems by Jacek M. Zurada, 1994, Jaico Publ. House.

REFERENCE BOOKS

1. "Neural Networks :A Comprehensive formulation", Simon Haykin, 1998, AW
2. "Neural Networks", Kosko, 1992, PHI.
3. "Neural Network Fundamentals" – N.K. Bose , P. Liang, 2002, T.M.H
4. Neural Network , T.N.Shankar, University Science Press
5. Neuro Fuzzy Systems, Lamba, V.K., University Science Press

CS-308C	CRYPTOGRAPHY AND NETWORK SECURITY	L T P	Cr
		3-0-0	3

OBJECTIVES

The main objective behind this course is to learn about the various network attacks and preventing attacks. This course is designed to cover Application security, Network security, Web security etc.

PREREQUISITE

Data Communications and Computer Networks, Computer Programming, Data Structures, Prime Number Theory

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand and analyze public-key cryptography, RSA and other public-key cryptosystems

CO2: Analyze and design hash and MAC algorithms, and digital signatures.

CO3: Design network application security schemes, such as PGP, S/ MIME, IPSec, SSL, TLS, HTTPS, SSH, etc.

CO4: Understand key management and distribution schemes and design User Authentication Protocol

CO5: Know about Intruders and Intruder Detection mechanisms, Types of Malicious software, Firewall Characteristics, Types of Firewalls, Firewall Location and Configurations.

UNIT I

ATTACKS ON COMPUTERS & COMPUTER SECURITY: Introduction; The need of Security ; Security Approaches; Principal of Security; Types of Attacks,

CRYPTOGRAPHY : Introduction; Plain Text & Cipher Text; Substitution Techniques; Transposition Techniques; Types of Cryptography; Steganography; Symmetric Key Algorithm: Algorithm Types and Modes, DES; Asymmetric Key Algorithm: RSA, Digital Signatures

UNIT II

DIGITAL CERTIFICATES AND PUBLIC KEY INFRASTRUCTURE: Digital Certificates ; Private Key Management; The PKIX Model ; Public Key Cryptography Standards; Creating Digital certificates using Java

UNIT III

INTERNET SECURITY PROTOCOLS: Introduction; Secure Socket Layer(SSL); Secure Electronic Transaction (SET); Electronic Money; Email security; Wireless application protocol (WAP); Security in GSM: Security in 3G

UNIT IV

USER AUTHENTICATION AND KERBEROS: Introduction, Authentication Basics; Passwords; Authentication Tokens; Certificate Based Authenticaton; Biometric Authentication; Kerberos

UNIT V

NETWORK SECURITY, FIREWALL AND VPN: Introduction, Firewalls: Types of Firewalls ; IP Security; Virtual Private Network; Intrusion,

CASE STUDIES ON NETWORK SECURITY : Introduction ; secure Inter branch payment transactions; Denial of Service attacks; IP Spoofing attacks; Contract Signing; Secret Splitting ; Virtual elections

TEXT BOOKS

1. Stallings William, "Cryptography and Network Security", 4th Edition, Prentice-Hall, Englewood Cliffs, 2006
2. Behrouz A. Forouzan "Cryptography and Network Security", TMH

REFERENCE BOOKS

1. Atul Kahate , "Cryptography and Network Security", 3rd Edition, Tata Mcgraw Hill.
2. Mani Subramanian, "Network Management Principles & Practices", Addison Wesley, 1999
3. Kauffman C., Perlman R. and Spenser M., "Network Security", 2nd Edition, Prentice Hall, 2002.
4. Menezes Alfred, van Oorschot Paul, and Vanstone Scott, "Handbook of Applied Cryptography", CRC Press, NY, 2004.
5. Bellovin S. and Chesvick W., "Internet Security and Firewalls", 2nd Edition, Addison Wesley, 1998.
6. Schneier Bruce, "Applied Cryptography", Wiley Student Edition, 2nd Edition

CS-324C	COMPUTER VISION	L T P	Cr
		3-0-0	3

COURSE OUTCOMES

CO1: identify basic concepts, terminology, theories, models and methods in the field of computer vision.

CO2: describe known principles of human visual system.

CO3: describe basic methods of computer vision related to multi-scale representation, edge detection and detection of other primitives, stereo, motion and object recognition.

CO4: suggest a design of a computer vision system for a specific problem**.**

UNIT I

COMPUTER VISION: AN INTRODUCTION: Introduction to computer vision and images, Basic image operation, Mathematical operations on images, Sunglass filter: A simple application, Bitwise operations, Image Annotation

UNIT II

IMAGE FORMATION MODELS: Monocular imaging system , Radiosity: The 'Physics' of Image Formation, Radiance, Irradiance, BRDF, color etc, Orthographic & Perspective Projection,• Camera model and Camera calibration, Binocular imaging systems, Multiple views geometry, Structure determination, shape from shading , Photometric Stereo, Depth from Defocus , Construction of 3D model from images

UNIT III

OBJECT RECOGNITION: TRADITIONAL AND DEEP LEARNING METHODS: HoG/ SIFT features, Bayes classifiers, SVM classifiers, Image classification, object detection and semantic segmentation, adversarial attacks. Various neural network architectures, visualization techniques

UNIT IV

INTRODUCTION TO NEURAL NETWORKS: Artificial neural networks, loss functions, back propagation and SGD, Batch Normalization.

UNIT V

MOTION ANALYSIS AND ACTIVITY RECOGNITION: Motion detection and tracking, Inference of human activity from image sequences

TEXT BOOKS

1. Computer Vision - A modern approach, by D. Forsyth and J. Ponce, Prentice Hall Robot Vision, by B. K. P. Horn, McGraw-Hill.
2. Introductory Techniques for 3D Computer Vision, by E. Trucco and A. Verri, Publisher: Prentice Hall.

REFERENCE BOOKS

1. E. R. Davies, Computer & Machine Vision, Fourth Edition, Academic Press, 2012
2. Simon J. D. Prince, Computer Vision: Models, Learning, and Inference, Cambridge University Press, 2012

CS-326C	COMPILER DESIGN	L T P	Cr
		3-0-0	3

COURSE OBJECTIVE

To make the student to understand the process involved in a compiler, create an overall view of various types of translators, linkers, loaders, and phases of a compiler, understand what is syntax analysis, various types of parsers especially the top down approach, awareness among students the various types of bottom up parsers, understand the syntax analysis and, intermediate code generation, type checking, the role of symbol table and its organization, Code generation, machine independent code optimization and instruction scheduling.

PRE-REQUISITES

Knowledge of automata theory, context free languages, computer architecture, data structures and simple graph algorithms, logic or algebra.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Student will be familiar with the front-end as well as back-end stages of compiler design and Design Lexical analyzer for given language using LEX tools

CO2: understand the differences between constructing lexers/parsers by hand versus using automated generators

CO3: Hands-on experience with generating intermediate representations, which in turn will let them appreciate the importance of designing simpler languages

CO4: To appreciate the nuances of analyzing and transforming programs for performance

CO5: Experience of working with relatively large programming environments, which will also inculcate a sense of good software design

UNIT I

INTRODUCTION TO COMPILING & LEXICAL ANALYSIS: Introduction of Compiler, Major data Structure in compiler, BOOT Strapping & Porting, Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, Lexical analysis: Input buffering, Specification & Recognition of Tokens, LEX

UNIT II

SYNTAX ANALYSIS: Basic Parsing Techniques: Parsers, Shift reduce parsing, Operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables.

UNIT III

SYNTAX DIRECTED TRANSLATION: Syntax directed definitions: Construction of Syntax trees, Bottom up evaluation of S-attributed definition, L-attribute definition, Top down translation, Bottom Up evaluation of inherited attributes Recursive Evaluation, Analysis of Syntax directed definition.

UNIT IV

CODE GENERATION: Intermediate code generation: Declarations, Assignment statements, Boolean expressions, Case statements, Procedure calls Code Generation: Issues in the design of code generator, Basic block and flow graphs, Register allocation and assignment, DAG representation of basic blocks, peephole optimization, generating code from DAG.

UNIT V

CODE OPTIMIZATION: Introduction to Code optimization: sources of optimization of basic blocks, loops in flow graphs, dead code elimination, loop optimization, Introduction to global data flow analysis, Code Improving transformations ,Data flow analysis of structure flow graph Symbolic debugging of optimized code.

REFERENCES:

1. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques andTools , Pearson Education
2. Raghavan, Compiler Design, TMH Pub.
3. Louden. Compiler Construction: Principles and Practice, Cengage Learning
4. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
5. Mak, writing compiler & Interpreters, Willey Pub.

CS-352C	STATISTICAL LEARNING THEORY LAB	L T P	Cr
		0-0-2	1

LIST OF PROGRAMS

1. Excel for data management
2. Basic data analysis and visualization in Excel
3. Intro to SPSS platform & data mgmt.
4. Basic descriptive & inferential statistics in SPSS
5. Visualizing data in SPSS
6. Intro to SAS platform & data mgmt
7. Basic descriptive & inferential statistics in SAS
8. Visualizing data in SAS
9. Qualitative data analysis (QDA) programs

REFERENCES

1. The Little SAS Book
2. Basic Introduction to R (Harden, 2010)
3. Saunders & Brown, 2008, Ch. 3; Lewis-Beck, 1995, Ch. 1-3; Agresti & Finlay, 2009
4. Patton, Carl V. and David S. Sawicki, Basic Methods of Policy Analysis and Planning. 2nd Edition, Prentice-Hall, 1993.

CS-374C	COMPUTER VISION LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

2. Introduction to MATLAB Programming
3. Write a Program to display the Negative of a digital Image
4. Write a Program to perform thresholding on an input Image
5. Write a Program to perform gray level slicing without background.
6. Write a Program to perform gray level slicing with background
7. Write a Program to perform bit-plane slicing
8. Write a Program to display Histogram of an image
9. Write a Program to perform Log Transformation of an image
10. Write a Program to implement Ideal low pass filter
11. Write a Program to implement Butterworth low pass filter

REFERENCE BOOKS

1. Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 2nd edition, Pearson Education.
2. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach", Prentice Hall
3. A.K. Jain, "Fundamental of Digital Image Processing", PHI
4. W.K. Pratt, "Digital Image Processing"

CS-356C	ARTIFICIAL NEURAL NETWORK LAB	L T P	Cr
		0-0-2	1

LIST OF PROGRAMS

1. Write a program to perform the basics matrix operations.
2. WAP to plot the Straight line.
3. WAP to plot the Sine curve.
4. How the weight & bias value effects the output of neurons.
5. How the choice of activation function effect the output of neuron experiment with the following function purelin(n), bimary threshold(hardlim(n) haradlims(n)) ,Tansig(n) logsig(n)
6. How the weight and biased value are able to represent a decision boundary in the feature space.
7. How the Perceptron Learning rule works for Linearly Separable Problem.
8. How the Perceptron Learning rule works for Non-Linearly Separable Problem.
9. Write a program to draw a graph with multiple curve.

CS-358C	CRYPTOGRAPHY & NETWORK SECURITY LAB	L T P	Cr
		0-0-2	1

LIST OF PROGRAMS

1. To implement Ceaser Cipher Encryption-Decryption.
2. To implement Monoalphabetic Substitution.
3. To implement Polyalphabetic Substitution.
4. To implement Play fair Cipher.
5. To implement Hill Cipher Encyption-Decryption
6. To implement Diffie Hellman Key Exchange.
7. To implement RSA Encryption-Decryption.
8. To implement DES Encryption-Decryption
9. Implementation of SSL
10. Authentication through passwords
11. Configuration of firewall and VPN

PDP-302	PROBLEM SOLVING SKILLS	L T P	Cr
		0-0-2	1

UNIT I

LOGICAL REASONING – Logical Deductions (Syllogism & Venn Diagrams) logical connectives

UNIT II

ANALYTICAL REASONING – Seating Arrangements, combinations, selections, comparisons, blood relations, directions etc.

UNIT III

NON – VERBAL REASONING (ALPHA NUMERIC & VISUAL PUZZLES) – To solve problems on numbers, alphabet, symbols, visuals, problem types and series, analogies, odd man out, coding, decoding and symbols & notations.

UNIT IV

HIGHER MATHS – Algebra & Mensuration

UNIT V

BUSINESS MATHS – Number system, ratios & averages, time & work, time & distance, percentages, profit & loss, simple & compound interest

UNIT VI

DATE INTERPRETATION & SUFFICIENCY – Tables, Bar Chart, Line Graph & Pie Chart

CS-314C	DATA WRANGLING	L T P	Cr
		3-0-0	3

PREREQUISITES

Knowledge of Python Programming

COURSE OUTCOMES

After completing this course, the students will be able:

CO1: To know the basics of data and how the data is read

CO2: To work with different data and file formats

CO3: To clean the data and convert it in consistent form

CO4: To analyse the data with different techniques

CO5: To know about web scraping

UNIT I

INTRODUCTION TO DATA WRANGLING: What Is Data Wrangling?- Importance of Data Wrangling -How is Data Wrangling performed?- Tasks of Data Wrangling-Data Wrangling Tools-Introduction to Python-Python Basics-Data Meant to Be Read by Machines-CSV Data-JSON Data-XML Data.

UNIT II

WORKING WITH EXCEL FILES AND PDFS: Installing Python Packages-Parsing Excel Files-Parsing Excel Files -Getting Started with Parsing-PDFs and Problem Solving in Python-Programmatic Approaches to PDF Parsing-Converting PDF to Text-Parsing PDFs Using pdf miner-Acquiring and Storing Data-Databases: A Brief Introduction-Relational Databases: MySQL and PostgreSQL-Non-Relational Databases: NoSQL-When to Use a Simple File-Alternative Data Storage.

UNIT III

DATA CLEANUP: Why Clean Data?- Data Cleanup Basics-Identifying Values for Data Cleanup-Formatting Data-Finding Outliers and Bad Data-Finding Duplicates-Fuzzy Matching-RegEx Matching-Normalizing and Standardizing the Data-Saving the Data-Determining suitable Data Cleanup-Scripting the CleanupTesting with New Data

UNIT IV

DATA EXPLORATION AND ANALYSIS: Exploring Data-Importing Data-Exploring Table Functions-Joining Numerous Datasets-Identifying Correlations-Identifying Outliers-Creating Groupings-Analyzing Data-Separating and Focusing the Data Presenting Data-Visualizing the Data-Charts-Time-Related Data-Maps- Interactives -Words-Images, Video, and Illustrations-Presentation Tools-Publishing the Data-Open Source Platforms.

UNIT V

WEB SCRAPING: What to Scrape and How-Analyzing a Web Page-Network/Timeline-Interacting with JavaScript-In-Depth Analysis of a Page-Getting Pages-Reading a Web Page-Reading a Web Page with LXML-XPath-Advanced Web Scraping-Browser-Based Parsing-Screen Reading with Selenium-Screen Reading with Ghost.PySpidering the Web-Building a Spider with Scrapy-Crawling Whole Websites with Scrapy.

TEXT BOOK

Principles of Data Wrangling: Practical Techniques for Data Preparation

REFERENCE BOOKS

1. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython
2. Data Wrangling with Python: Creating actionable data from raw sources
3. Data Wrangling with Python: Tips and Tools to Make Your Life Easier

CS-314C	DATA WRANGLING LAB	L T P	Cr
		3-0-0	3

LIST OF PROGRAMS

1. Data pre-processing methods on student and labour datasets Implement data cube for data
2. warehouse on 3-dimensional data
3. Implement various missing handling mechanisms, Implement various noisy handling
4. mechanisms
4. Develop k-means and MST based clustering techniques, Develop the methodology for
5. assessment of clusters for given dataset
5. Design algorithms for association rule mining algorithms
6. Derive the hypothesis for association rules to discovery of strong association rules; Use
6. confidence and support thresholds
7. Construct Haar wavelet transformation for numerical data, Construct principal component
8. analysis (PCA) for 5-dimensional data.
7. Implement binning visualizations for any real time dataset, Implement linear regression
9. techniques
8. Visualize the clusters for any synthetic dataset, Implement the program for converting the
10. clusters into histograms
9. Write a program to implement agglomerative clustering technique ,Write a program to
11. implement divisive hierarchical clustering technique
10. Develop scalable clustering algorithms ,Develop scalable a priori algorithm.

CS-316C	BUSINESS INTELLIGENCE & ANALYTICS	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Know the basics of business intelligence as well as its applications

CO2: Learn the counterparts of the business intelligence like data warehouse, ERP etc.

CO3: know about the processing and analysis online

CO4: State the different emerging technologies in the field of data science

CO5: visualizing the data and dashboards

UNIT I

INTRODUCTION TO BUSINESS INTELLIGENCE: BI concept, BI architecture, BI in today's perspective, BI Process, Applications of BI like Financial analysis, statistical analysis, sales analysis, CRM, result pattern and ranking analysis, Balanced Scorecard, BI in Decision Modelling: Optimization, Decision making under uncertainty. Ethics and business intelligence.

UNIT II

BUSINESS INTELLIGENCE COUNTERPARTS: Data Warehousing, Data Marts and Analytical Data, Organization of the Data Warehouse, Enterprise Resource Planning, Distributing the Enterprise, First ERP, then Business Intelligence, The Current State of Affairs, Customer Relationship Management, CRM, ERP, and Business Intelligence, Customer Decisions, Decisions About Customers, Business Intelligence and Financial Information.

UNIT III

ON-LINE ANALYTICAL PROCESSING (OLAP): What Is OLAP?, OLAP and OLTP, Operational Data Stores, Variations in Data and Approach, OLAP Applications and Functionality, Multi-Dimensions, Thinking in More Than Two Dimensions, What Are the Possibilities? Drilling and Pivoting, OLAP Architecture, Cubism, Tools, ROLAP, MOLAP, HOLAP, Data Mining, What Is in the Mine?

UNIT IV

DATA SCIENCES FUTURE OF BUSINESS INTELLIGENCE: Emerging Technologies, Machine Learning, Predicting the Future with the help of Data Analysis, BI Search & Text Analytics, Data Mining and Knowledge Discovery in Databases. Methodological and practical aspects of knowledge discovery algorithms including, Data Preprocessing, Supervised and Unsupervised Machine Learning algorithms such as K Means, k-Nearest Neighborhood algorithm, Decision Trees, Support Vector Machine, Artificial Neural Networks, and Deep Learning.

UNIT V

DATA VISUALIZATION AND DASHBOARD DESIGN: Responsibilities of BI analysts by focusing on creating data visualizations and dashboards. Importance of data visualization, basic and composite charts such as scatter plots, line graphs, pie charts, bar charts, heat maps, area charts, bubble chart, density curve and histograms.

TEXT BOOK

Data Strategy: How To Profit From A World Of Big Data, Analytics And The Internet Of Things" by Bernard Marr

REFERENCE BOOKS

1. "Data Analytics For Beginners: Your Ultimate Guide To Learn And Master Data Analysis. Get Your Business Intelligence Right – Accelerate Growth And Close More Sales" by Victor Finch
2. "Performance Dashboards – Measuring, Monitoring, And Managing Your Business" by Wayne Eckerson
3. "Data Science For Business: What You Need To Know About Data Mining And Data-Analytic Thinking" by Foster Provost & Tom Fawcett

CS-366C	BUSINESS INTELLIGENCE LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

1. Introduction to BI tools, their pros and cons and limitations.
2. Demonstration of BI techniques ETL on Application Financial Analysis.
3. Demonstration of BI techniques ETL on Application Student result pattern and ranking analysis.
4. Demonstration of Classification process using J48 algorithm on arff data set.
5. Demonstration of Clustering techniques process using k-means algorithm on Mobile phone Static Data set.
6. Demonstration of decision tree
7. Demonstration of Exploring Excel Modelling capabilities to solve business problems.
8. Business Intelligence Mini Project: Each group of 4 Students (max) assigned one case study for this; A BI report must be prepared outlining the following steps:
    a) Problem definition, identifying which data mining task is needed.
    b) Identify and use a standard data mining dataset available for the problem.
    c) Implement the Knowledge discovery algorithm of choice.
    d) Interpret and visualize the results.
    e) Provide clearly the BI decision that is to be taken as a result of mining.
    d) Interpret and visualize the results.
    e) Provide clearly the BI decision that is to be taken as a result of mining.
9. Demonstration of Performance Dashboard: Measuring, Monitoring and management of Business
10. Demonstration of KPIs and Enterprise dashboard, design of enterprise dashboards using Pentaho tool.

LINGAYA'S VIDYAPEETH
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SCHOOL OF COMPUTER SCIENCES

Syllabus

Of

B.Tech(CSE-AIML/DS/CS)

4th Year

7th Semester

CS-401C	R PROGRAMMING	L-T-P	Cr
		3 0 0	3

COURSE OUTCOMES

CO1: Access online resources for R and import new function packages into the R workspace
CO2: Import, review, manipulate and summarize data-sets in R
CO3: Explore data-sets to create testable hypotheses and identify appropriate statistical tests
CO4: Perform appropriate statistical tests using R
CO5: Create and edit visualizations with R

UNIT – I

INTRODUCTION: Overview of R, R data types and objects, reading and writing data, sub setting R Objects, Essentials of the R Language, Installing R, Running R, Packages in R, Calculations, Complex numbers in R, Rounding, Arithmetic, Modulo and integer quotients, Variable names and assignment, Operators, Integers, Factors, Logical operations

UNIT – II

Control structures, functions, scoping rules, dates and times, Introduction to Functions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, Data Frames, Classes
VECTORS: Generating sequences, Vectors and subscripts, Extracting elements of a vector using subscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors Vector Arithmetic and Logical Operations, Vector Indexing, Common Vector Operation

UNIT – III

LISTS: Creating Lists, General List Operations, List Indexing Adding and Deleting List Elements, Getting the Size of a List, Extended Example: Text Concordance Accessing List Components and Values Applying Functions to Lists, DATA FRAMES, Creating Data Frames, Accessing Data Frames, Other Matrix-Like Operations

UNIT - IV

FACTORS AND TABLES, Factors and Levels, Common Functions Used with Factors, Working with Tables, Matrix/Array-Like Operations on Tables , Extracting a Subtable, Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and Maxima, Calculus, Functions for Statistical Distributions

UNIT - V

OBJECT-ORIENTED PROGRAMMING: S Classes, S Generic Functions, Writing S Classes, Using Inheritance, S Classes, Writing S Classes, Implementing a Generic Function on an S Class, visualization, Simulation, code profiling, Statistical Analysis with R, data manipulation

TEXT BOOKS

1. R Programming for Data Science by Roger D.Peng
2. The Art of R Programming by Prashanthsingh, VivekMourya, CengageLearning India.

CS-403C	DEEP LEARNING	L T P	Cr
		3 0 0	3

OBJECTIVES

The objective of this course is to cover the fundamental of neural networks as well as some advanced topics such as recurrent neural networks, long short term memory cells and convolutional neural networks. The course also requires students to implement programming assignments related to these topics.

COURSE OUTCOMES

CO1: Understand the fundamentals and current usage of the TensorFlow library for deep learning research and the graphical computational model of TensorFlow
CO2: Understand the context of neural networks and deep learning
CO3: Design recurrent neural networks with attention mechanisms for natural language classification, generation, and translation.
CO4: Perform regularization, training optimization, and hyperparameter selection on deep models.
CO5: Explore the parameters for neural networks

UNIT 1

BASICS: Biological Neuron, Idea of computational units, McCulloch–Pitts unit and Thresholding logic, Linear Perceptron, Perceptron Learning Algorithm, Linear separability. Convergence theorem for Perceptron Learning Algorithm.

FEEDFORWARD NETWORKS: Multilayer Perceptron, Gradient Descent, Backpropagation, Empirical Risk Minimization, regularization, autoencoders.

UNIT II

DEEP NEURAL NETWORKS: Difficulty of training deep neural networks, Greedy layerwise training.

BETTER TRAINING OF NEURAL NETWORKS: Newer optimization methods for neural networks (Adagrad, adadelta, rmsprop, adam, NAG), second order methods for training, Saddle point problem in neural networks, Regularization methods (dropout, drop connect, batch normalization).

UNIT III

RECURRENT NEURAL NETWORKS: Back propagation through time, Long Short Term Memory, Gated Recurrent Units, Bidirectional LSTMs, Bidirectional RNNs

CONVOLUTIONAL NEURAL NETWORKS: LeNet, AlexNet.

UNIT IV

GENERATIVE MODELS: Restrictive Boltzmann Machines (RBMs), Introduction to MCMC and Gibbs Sampling, gradient computations in RBMs, Deep Boltzmann Machines.

UNIT V

RECENT TRENDS: Variational Autoencoders, Generative Adversarial Networks, Multi-task Deep Learning, Multi-view Deep Learning

APPLICATIONS: Vision, NLP, Speech (just an overview of different applications in 2-3 lectures)

TEXT BOOKS

Deep Learning, Ian Goodfellow and Yoshua Bengio and Aaron Courville, MIT Press, 2016.

REFERENCES

1. Neural Networks: A Systematic Introduction, Raúl Rojas, 1996
2. Pattern Recognition and Machine Learning, Christopher Bishop, 2007

CS-405C	PATTERN RECOGNITION	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

CO1: Explain and compare a variety of pattern classification, structural pattern recognition, and pattern classifier combination techniques.

CO2: Summarize, analyze, and relate research in the pattern recognition area verbally and in writing.

CO3: Apply performance evaluation methods for pattern recognition, and critique comparisons of techniques made in the research literature

CO4: Apply pattern recognition techniques to real-world problems such as document analysis and recognition.

CO5: Implement simple pattern classifiers, classifier combinations, and structural pattern recognizers.

UNIT I

INTRODUCTION: Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

UNIT II

STATISTICAL PATTEN RECOGNITION: Bayesian Decision Theory, Classifiers, Normal density and discriminant functions,

UNIT III

PARAMETER ESTIMATION METHODS: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods -Principal Component Analysis (PCA), Fisher Linear discriminant analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.

UNIT IV

NONPARAMETRIC TECHNIQUES: Density Estimation, Parzen Windows, K-Nearest NeighborEstimation, Nearest Neighbor Rule, Fuzzy classification.

UNIT V

UNSUPERVISED LEARNING & CLUSTERING: Criterion functions for clustering, Clustering Techniques:Iterative square - error partitional clustering – K means, agglomerative hierarchical clustering, Cluster validation.

REFERENCES

1. Richard O. Duda, Peter E. Hart and David G. Stork, "Pattern Classification", 2nd Edition, John Wiley, 2006.
2. C. M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2009.
3. S. Theodoridis and K. Koutroumbas, "Pattern Recognition", 4th Edition, Academic Press, 2009.

CS-407C	SPEECH AND NATURAL LANGUAGE PROCESSING	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

CO1: Understand Natural Language Processing and Probabilistic model of defining language and techniques

CO2: Applying Hidden Markov model and Speech Recognition

CO3: Application of context free grammar and language parsing

CO4: Implement probabilistic and language parsing.

CO5: Differentiation of semantic and discourse in terms of NLP

UNIT I

INTRODUCTION TO NATURAL LANGUAGE PROCESSING: Why is NLP hard, Empirical Laws, Text Processing: Basics, Spelling Correction: Edit Distance, Weighted Edit Distance, Other Variations, Noisy Channel Model for Spelling Correction, N-Gram Language Models, Evaluation of Language Models, Basic Smoothing

UNIT II

LANGUAGE MODELING: Advanced Smoothing Models, Computational Morphology, Finite - State Methods for Morphology, Introduction to POS Tagging, Introduction to POS Tagging, Viterbi Decoding for HMM, Parameter Learning, Baum Welch Algorithm, Maximum Entropy Models – I,II, Conditional Random Fields

UNIT III

SYNTAX: Introduction, Parsing I, CKY, PCFGs- Inside-Outside Probabilities, Dependency Grammars and Parsing – Introduction, Transition Based Parsing : Formulation, Learning , MST-Based Dependency Parsing-Learning

UNIT IV

DISTRIBUTIONAL SEMANTICS: Introduction, Structured Models, Word Embeddings, Lexical Semantics – Wordnet, Word Sense Disambiguation, Novel Word Sense detection, Topic Models : Introduction, Latent Dirichlet Allocation : Formulation, Gibbs Sampling for LDA, Applications, LDA Variants and Applications , Entity Linking

UNIT V

INFORMATION EXTRACTION: Introduction, Relation Extraction, Text Summarization – LEXRANK, Optimization based Approaches for Summarization, Text Classification, Sentiment Analysis- Affective Lexicons, Learning Affective Lexicons , Aspect - Based Sentiment Analysis

TEXT BOOKS:

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and ImedZitouni, PearsonPublication.

2. Natural Language Processing and Information Retrieval: TanvierSiddiqui, U.S. Tiwary.
3. "Natural Language Understanding" James Allen, -1995Benjamin/cummings Pub. Comp. Ltd
4. "Language as a cognitive process", Terry Winograd 1983, AW
5. "Natural Language processing in prolog", G. Gazder, 1989, Addison Wesley.
6. " Introduction of Formal Language Theory", MdljArbib&Kfaury, 1988, Springer

REFERENCES

1. Speech and Natural Language Processing - Daniel Jurafsky& James H Martin, Pearson Publications.
2. https://nptel.ac.in/course.html/Natural Language Processing

CS-451C	R PROGRAMMING LAB	L T P	Cr
		0-0-2	1

1. Write an R-Program to print HelloWorld
2. Write an R-Program to take input fromuser.
3. Write an R-Program to demonstrate working with operators (Arithmetic, Relational, Logical, Assignmentoperators).
4. Write an R Program to Check if a Number is Odd orEven
5. Write an R Program to check if the given Number is a PrimeNumber
6. Write an R Program to Find the Factorial of aNumber
7. Write an R Program to Find the Factors of aNumber
8. Write an R Program to Find the Fibonacci sequence Using RecursiveFunction
9. Write an R Program to Make a SimpleCalculator
10. Write an R Program to Find L.C.M of twonumbers
11. Write an R Program to create a Vector and to access elements in a Vector
12. Write an R Program to create a Matrix and access rows and columns usingfunctions
13. *colnames()* and *rownames()* .
14. Write an R Program to create a Matrix using *cbind()* and *rbind()*functions.
15. Write an R Program to create a Matrix from a Vector using ***dim()***function.
16. Write an R Program to create a List and modify itscomponents.
17. Write an R Program to create a DataFrame.
18. Write an R Program to access a Data Frame like aList.
19. Write an R Program to access a Data Frame like aMatrix.
20. Write an R Program to create aFactor.
21. Write an R Program to Access and Modify Components of aFactor.
22. Write an R Program to create an S3 Class and S3Objects.
23. Write an R Program to write a own generic function in S3Class.
24. Write an R Program to create an S4 Class and S4Objects.
25. Write an R Program to write a own generic function in S4 Class.
26. Write an R Program to create Reference Class and modify its Methods.

CS-453C	DEEP LEARNING LAB	L T P	Cr
		0-0-2	1

PRACTICAL EXERCISES:

1. Implement Simple Programs like vector addition in TensorFlow.
2. Implement a simple problem like regression model in Keras.
3. Implement a perceptron in TensorFlow/Keras Environment.
4. Implement a Feed-Forward Network in TensorFlow/Keras.
5. Implement an Image Classifier using CNN in TensorFlow/Keras.
6. Implement a Transfer Learning concept in Image Classification.
7. Implement an Autoencoder in TensorFlow/Keras.
8. Implement a SimpleLSTM using TensorFlow/Keras.
9. Implement an Opinion Mining in Recurrent Neural network.
10. Implement an Object Detection using CNN.
11. Mini Project

CS-455C	PATTERN RECOGNITION LAB	L T P	Cr
		0-0-2	1

PRACTICAL EXERCISES

1. Automatic classification
2. Analysis of sensor input data
3. speech recognition and understanding
4. computer vision
5. multiple criteria optimization,
6. image analysis,
7. image segmentation,
8. image fusion.

CS-481C	MAJOR RESEARCH PROJECT	L-T-P	CR
		0-0-8	4

OBJECTIVES

1. Identify and discuss the role and importance of research in the emerging Technology and Engineering
2. Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem
3. Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.
4. Ability to present the findings of their technical solution in a written report.
5. Presenting the work in International/ National conference or reputed journals

COURSE OUTCOMES

After undergoing this course, the students will be able to:

CO1: Develop aptitude for research and independent learning.

CO2: Demonstrate the ability to carry out literature survey and select unresolved problems in the domain of the selected project topic

CO3: Gain the expertise to use new tools and techniques for the design and development.

CO4: Acquire the knowledge and awareness to carry out cost-effective and environment friendly designs.

CO5: Develop the ability to write good technical report, to make oral presentation of the work, and to publish the work in reputed conferences/journals.

The Major project topic should be selected / chosen to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study.

The Major research Project should have the following

- Relevance to social needs of society
- Relevance to value addition to existing facilities in the institute
- Relevance to industry need
- Problems of national importance
- Research and development in various domain
- Literature survey Problem Definition
- Motivation for study and Objectives
- Preliminary design / feasibility / modular approaches
- Implementation and Verification
- Report and presentation
- Experimental verification / Proof of concept
- Design, fabrication, testing of Communication System.

CS-411C	INFORMATION SECURITY AUDIT & MONITORING	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

CO1: Understand the difference between Security Metrics and Audits.
CO2: Knowledge on Vulnerability Management
CO3: Know the Information Security Audit Tasks, Reports and Post Auditing Actions
CO4: Understand Information Security Assessments-I
CO5: Understand Information Security Assessments-II

UNIT I

AUDITING: Accountability; Compliance

UNIT II

AUDIT TRAILS: Audit Trails; Reporting timeline; Record Retention; External Auditors; Laws

UNIT III

MONITORING: Monitoring tools; Warning banner ;Traffic analysis; Trend analysis

UNIT IV

PENETRATION TESTING & VULNERABILITY ASSESSMENT-I: Customers and Legal Agreements; Rules of Engagement; Penetration Testing Planning and Scheduling; Pre Penetration Testing Checklist; Information Gathering; Vulnerability Analysis; External Penetration Testing

UNIT V

PENETRATION TESTING & VULNERABILITY ASSESSMENT-II: Internal Network Penetration Testing; Penetration testing for Denial of Service; Password Cracking; Social Engineering, Stolen Laptop, PDAs and Cell phones, Application; Physical Security, Database; VoIP, VPN; War Dialing, Virus and Trojan Detection; Log Management, File, Integrity Checking, Blue Tooth and Hand held Device ;Telecommunication and Broadband Communication; Email Security, Security Patches, Data Leakage; Penetration Testing Deliverables and Conclusion; Penetration Testing Report and Documentation Writing, Penetration Testing Report Analysis; Post Testing Actions; Ethics of a Penetration Tester, Standards and Compliance

TEXT BOOK

Cyber security for Beginners by Raef Meeuwisse

REFERENCE BOOKS

1. *Extrusion Detection: Security Monitoring for Internal Intrusions By Matt Pascucci*
2. Offensive Countermeasures: The Art of Active Defense by John Strand and Paul Asadoorian
3. Visible Ops Security: Achieving Common Security And IT Operations Objectives In 4 Practical Steps by Gene Kim, Paul Love, and George Spafford

CS-413C	DIGITAL FORENSICS	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

CO1: Describe Forensic science and Digital Forensic concepts
CO2: Determine various digital forensic Operandi and motive behind cyber attacks
CO3: Interpret the cyber pieces of evidence, Digital forensic process model and their legal perspective.
CO4: Demonstrate various forensic tools to investigate the cybercrime and to identify the digital pieces of evidence
CO5: Analyze the digital evidence used to commit cyber offences.

UNIT I

COMPUTER FORENSICS: Standard Procedure; Incident Verification; System identification; Recovery of Erased and damaged data; Disk imaging and preservation; Data encryption and compression; Automated search techniques; Forensic software

UNIT II

NETWORK FORENSICS AND INTERNET FORENSICS: Tracking network traffic; Reviewing Network Logs; Tools, Performing Live Acquisitions, Order of volatility; Standard Procedure; Internet & World Wide Web threats (Email, Chat-rooms, Search Engines; Hacking & illegal access, Obscene and indecent transmission, Extortion & threats) ; Domain Name Ownership Investigation; Reconstructing Past Internet Activities and Events; Email Forensics: E-mail Analysis; Email Forensics: Email Headers and Spoofing; Email Forensics: Laws against Email Crime; Messenger Forensics: AOL, Yahoo, MSN, and Chats; Browser Forensics: Analyzing Cache and Temporary Internet Files; Browser Forensics: Cookie Storage and Analysis; Browser Forensics: Web Browsing Activity Reconstruction

UNIT III

FORENSIC INVESTIGATION AND EVIDENCE PRESENTATION, LEGAL ASPECTS OF DIGITAL FORENSICS: Authorization to collect the evidence; Acquisition of evidence; Authentication of the evidence; Analysis of the evidence; Reporting on the findings; Testimony; Laws & regulations - Information Technology Act ; Giving evidence in court

UNIT IV

MOBILE FORENSICS & STEGANOGRAPHY:N Collecting and Analyzing Cell Phone, PDA, Blackberry, iPhone, iPod, iPad,and MP3 Evidence; Analyzing CD, DVD, Tape Drives, USB, Flash Memory, and other Storage Devices; Digital Camera Forensics ; Reconstructing Users Activities; Recovering and Reconstructing Deleted Data; Steganography Tools and Tricks; Data Hiding; Data Recovery.

UNIT V

MALWARE ANALYSIS: Analyzing Live Windows System for Malware**;** Analyzing Live Linux System for Malware**;** Analyzing Physical and Process Memory Dumps for Malware**;** Discovering and Extracting Malware from Windows Systems**;** Discovering and Extracting Malware from Linux Systems**;** Rootkits and Rootkit Detection and Recovery**;** Reverse Engineering Tools and Techniques

TEXT BOOK

Digital Forensic- The Fascinating World of Digital Evidence by Nilakshi Jain, Wiley Publications

REFERENCE BOOKS

1. Internet Security: Cryptographic Principles, Algorithms and Protocols by Man Young Rhee
2. Computer Forensics and Investigations by Nelson, Phillips, Enfinger, and Steuart
3. The Third Edition of Internet Cryptography" by Richard E.Smith
4. Computer Forensics by John R.Vacca
5. The Third Edition of Computer Forensics and Cyber Crime: An Introduction by Marjie T.Britz
6. Digital Forensics and Cyber Crime by Joshua I James and Frank Breitinger
7. Fundamentals of Digital Forensics: Theory, Methods, and Real-Life Applications by Joakim Kävrestad
8. The Second Edition of Digital Forensics with Kali Linux by Shiva V. N. Parasram
9. Digital Forensics and Cyber Crime by R K Jha
10. Digital Forensics Basics: A Practical Guide Using Windows OS by Nihad A. Hassan
11. Cyber Security, Cyber Crime and Cyber Forensics: Applications and Perspectives by Raghu Santanam
12. Guide to Computer Forensics and Investigations by Christopher Steuart, Bill Nelson, and Amelia Phillips
13. Cyber Forensics: From Data to Digital Evidence by Albert J. Marcella JR.
14. Digital Forensics by Anders Flaglien, Inger Marie Sunde, Ausra Dilijonaite, Jeff Hamm, Jens
15. Petter Sandvik, Petter Bjelland, Katrin Franke, and Stefan Axelsson
16. Cyber Forensics by Dejey and S. Murugan

CS-415C	IT APPLICATION SECURITY	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

CO1: Understand the need of Information Security, polices, standards and security blue print of an organization

CO2: Apply cryptographic algorithms in real time applications

CO3: Analyze different types of physical security techniques

CO4: Assess the behavior of different threats and attacks

CO5: Propose solutions for cybersecurity issues using various models

UNIT I

APPLICATION SECURITY: Input Validation - Buffer Overflow, Cross-Site Scripting; SQL Injection, Canonicalization, Sensitive Information , Access Sensitive Data In Storage, Network Eavesdropping, Data Tampering.

UNIT II

AUTHENTICATION & AUTHORIZATION: Network eavesdropping, Brute force attack, Dictionary attacks, Cookie replay, Credential theft, Elevation of privilege, Disclosure of confidential data, Data tampering; luring attacks, Phishing.

UNIT III

CONFIGURATION MANAGEMENT & SESSION MANAGEMENT: Unauthorized access to administration interfaces, Unauthorized access to configuration stores, Retrieval of clear text configuration data, Lack of individual accountability, Over-privileged process and service accounts, Hijacking; session replay, man in the middle.

UNIT IV

CRYPTOGRAPHY, PARAMETER MANIPULATION & EXCEPTION MANAGEMENT: Cryptography, Poor key generation or key management, Weak or custom encryption, Parameter manipulation ,Query string manipulation, Form field manipulation, Cookie manipulation, HTTP header manipulation Exception management Information disclosure, Denial of service.

UNIT V

AUDITING AND LOGGING, COUNTERMEASURES: Auditing and logging, User denies performing an operation, Attacker exploits an application without trace, Attacker covers his or her tracks, Countermeasures.

TEXT BOOK

1. Information Security: An Integrated Collection of Essays. Los Alamitos, CA: IEEE Computer Society Press.

2. Fundamentals of Computer Security Technology. Englewood Cliffs, NJ: PTR Prentice-Hall.ISBN 0- 13-108929-3.
3. Invidation to Cryptology. Upper Saddle River, NJ: Prentice Hall.

CS-417C	PHYSICAL SECURITY	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

CO1: To Provide physical security to devices.
CO2: Have a basic knowledge on vulnerabilities and how to overcome them.
CO3: To Know the best time to conduct security surveys and the Audit
CO4: Helps to understand the evolving threats affecting the critical infrastructure
CO5: Evaluate the ability of an organization against critical conditions.

UNIT I

PHYSICAL SECURITY OVERVIEW: Importance of Physical Security; Relationship between Physical and Cyber Security; Guard against Disgruntled Employees and Angry Former Employees; How Activists and Corporate Foes Can Hurt You : Vandals Who Damage For Fun, Saboteurs Who Work For Profit, Thieves and Spies Are Everywhere; Domestic Terrorists Are Still a Threat ;International Terrorist Are a Growing Threat; Physical Security for Natural Disasters ; Security for Random Incidents; Steps to Improve Physical It Security; Influence of Physical Design: Defensible Space, Crime Prevention through Environmental Design.

UNIT II

VULNERABILITY ASSESSMENT: Risk Management and the Vulnerability Assessment; Risk Assessment and the Vulnerability Assessment Process; Statistics and Quantitative Analysis; Vulnerability Process Overview; Reporting and Using Of Vulnerability Assessment; System Engineering and Vulnerability Assessment.

UNIT III

SECURITY SURVEYS AND THE AUDIT: Overview : The Best Time to Conduct the Survey, Why Conduct a Security Review; Classification of Survey Recommendations : Developing Security Points, Nine Points of Security Concern, Personality of the Complex, Positive and Negative Aspects of Making Recommendations ; Crime Analysis, Key Control: Digital Closed-Circuit Television, Intrusion Alarms, Lighting and Security; Other Security Aspects; Security Survey Follow-Up: Residential Security, Home Security Checklist, Top Ten Security Threats, The Audit, Site Survey and Risk Assessment,

UNIT IV

VIDEO TECHNOLOGY OVERVIEW, BIOMETRICS CHARACTERISTICS, ACCESS CONTROL AND BADGES, FENCE STANDARDS: Video System, Camera Function; Scene Illumination, Scene Characteristics: Lenses, Cameras, Transmission, Switchers, quads and Multiplexers, Monitors, Recorders, Hard-Copy Video Printers; Ancillary Equipment: CCTV Biometrics Characteristics Access Control, Designated Restricted Areas; Degree of Security, Considerations; Employee Screening, Identification System, Id Methods; Mechanized/Automated Systems: Card/Badge Specifications, Visitor

Identification and Control, Visitors, Enforcement Measures, Sign/Countersign and Code Word,

UNIT V

FIRE AND FIRE SAFETY INSPECTION, STANDARDS, REGULATIONS, AND GUIDELINES—COMPLIANCE AND YOUR SECURITY PROGRAM, INCLUDING GLOBAL RESOURCES & SECURITY PERSONNEL: How Fire Spreads? , Four Ways to Put Out a Fire; Classifying Fire, Ul Standard 217, Water Supply for Sprinklers and Tanks; Fire Safety Inspection – Administrative and Planning Phase, General Physical Inspection Phase, Extinguisher Inspection Phase, Stand Pipe, Fire Hose, And Control Valve Inspection Phase, Sprinkler System Inspection Phase, Hazardous Materials Inspection Phase, Alarm System Inspection Phase; Introduction, Standards, Regulations, Guidelines, Managing Compliance, Resources; Number and Function of Guards, Uniform, Firearms, Vehicles, Guardhouses, Communication, Rounds, Logbooks; Hazard Assessment, Command Structure; Emergency Drills & Crisis Management.

TEXT BOOK

Physical Security Principles (Kindle Edition) by Michael E. Knoke CPP

REFERENCE BOOKS

1. Implementing Physical Protection Systems: A Practical Guide (Paperback) by David G. Patterson
2. Effective Physical Security by Lawrence Fennelly

CS-461C	INFORMATION SECURITY AUDIT & MONITORING LAB	L T P	Cr
		0 0 2	1

LIST OF PRACTICALS

1. To capture log events in an audit logging program and it should include:
   Operating System(OS) Events
   - start up and shut down of the system
   - start up and down down of a service
   - network connection changes or failures
   - changes to, or attempts to change, system security settings and controls
2. To capture OS Audit Records
   - log on attempts (successful or unsuccessful)
   - the function(s) performed after logged on (e.g., reading or updating critical file, software installation)
   - account changes (e.g., account creation and deletion, account privilege assignment)
   - successful/failed use of privileged accounts
3. To capture Application Account Information
   - successful and failed application authentication attempts
   - application account changes (e.g., account creation and deletion, account privilege assignment)
   - use of application privileges
4. To capture Application operations
   - application startup and shutdown
   - application failures
   - major application configuration changes
   - application transactions, for example,
   - e-mail servers recording the sender, recipients, subject name, and attachment names for each e-mail

5. To perform **penetration tests** to evaluate computer and network security evaluating computer and network from internal and extrernal security threats.

6. Use of tools like Wireshark Analyzer and Metaspoilt to monitor internal and external security threats.

CS-463C	DIGITAL FORENSICS LAB	L T P	Cr
		0 0 2	1

LIST OF PRACTICALS

1. Lab to implement Port Redirection
2. Lab to analyse hidden data files
3. Lab to implement Stegnography
4. Lab to implement viewing Microsoft Internet Explorer cache

CS-465C	IT APPLICATION SECURITY LAB	L T P	Cr
		0 0 2	1

LIST OF PRACTICALS

1. **Eavesdropping Attacks and its prevention using SSH**
   Exercise 1 – Design and implementation of a simple client/server model and running application using sockets and TCP/IP
   Exercise 2 – view insecurity of default passwords, printed passwords and password transmitted in plain text
   Exercise 3 – use SSH for secure file transfer or for accessing local computer using port forwarding technique.
2. **Virtual Private Network Over WAN**
   Exercise 4 – To Create a Virtual Private Network (VPN) over WAN
   Exercise 5 – To evaluate application response time in the presence and absence of a firewall.
3. **Scanning and Probing**
   Exercise 6 – Find an SSL VPN server running on TCP port.
   Exercise 7 – Find all opened UDP ports.
4. **SQL injections**
   Exercise 8 – Injecting into string variables
   Exercise 9 – Injecting into numerical variables
5. **Security Group Policies Management**
   Exercise 10- Implement group policy
   Exercise 11-allow users for network settings
6. **IMB Rational AppScan**
   Exercise 12- Code Scanning
   Exercise 13- Introduction to Code Analysis using IBM Rational AppScan
   Exercise 14 - installation of AppScan
   Exercise 15– Understand AppScan functions and running Procedure for downloading the application source code
   Exercise 16- AppScan run procedure (Web Services Explorer)

CS-421C DATA HANDLING AND VISUALIZATION

L	T	P	Cr
3	**0**	**0**	**3**

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Design effective data visualizations in order to provide new insights
CO2: Find and select appropriate data that can be used in order to create visualization
CO3: Find and save data to IU-supported research storage for both short- and long-term preservation in order to comply with data management mandates
CO4: Handle data and data visualizations in a manner that demonstrates an understanding of ethical considerations surrounding data
CO5: Properly document and organize data and visualizations in order to prepare them for reuse.

UNIT I

INTRODUCTION TO VISUALIZATION: Visualizing Data-Mapping Data onto Aesthetics, Aesthetics and Types of Data, Scales Map Data Values onto Aesthetics, Coordinate Systems and Axes- Cartesian Coordinates, Nonlinear Axes, Coordinate Systems with Curved Axes, Color Scales-Color as a Tool to Distinguish, Color to Represent Data Values ,Color as a Tool to Highlight, Directory of Visualizations-Amounts, Distributions, Proportions, x–y relationships, Geospatial Data

UNIT II

VISUALIZING DISTRIBUTIONS: Visualizing Amounts-Bar Plots, Grouped and Stacked Bars, Dot Plots and Heatmaps, Visualizing Distributions: Histograms and Density Plots- Visualizing a Single Distribution, Visualizing Multiple Distributions at the Same Time, Visualizing Distributions: Empirical Cumulative Distribution Functions and Q-Q Plots-Empirical Cumulative Distribution Functions, Highly Skewed Distributions, Quantile-Quantile Plots, Visualizing Many Distributions at Once-Visualizing Distributions Along the Vertical Axis, Visualizing Distributions Along the Horizontal Axis

UNIT III

VISUALIZING ASSOCIATIONS & TIME SERIES: Visualizing Proportions-A Case for Pie Charts, A Case for Side-by-Side Bars, A Case for Stacked Bars and Stacked Densities, Visualizing Proportions Separately as Parts of the Total ,Visualizing Nested Proportions-Nested Proportions Gone Wrong, Mosaic Plots and Treemaps, Nested Pies ,Parallel Sets. Visualizing Associations Among Two or More Quantitative Variables-Scatterplots, Correlograms, Dimension Reduction, Paired Data. Visualizing Time Series and Other Functions of an Independent Variable-Individual Time Series, Multiple Time Series and Dose–Response Curves, Time Series of Twoor More Response Variables

UNIT IV

VISUALIZING UNCERTIANITY: Visualizing Trends Smoothing, Showing Trends with a Defined Functional Form, Detrending and Time-Series Decomposition, Visualizing Geospatial Data-Projections, Layers, Choropleth Mapping, Cartograms, Visualizing Uncertainty-Framing Probabilities as Frequencies, Visualizing the Uncertainty of Point Estimates, Visualizing the Uncertainty of Curve Fits, Hypothetical Outcome Plots

UNIT V

PRINCIPLE OF FIGURE DESIGN: The Principle of Proportional Ink-Visualizations Along Linear Axes, Visualizations Along Logarithmic Axes, Direct Area Visualizations, Handling Overlapping Points-Partial Transparency and Jittering, 2D Histograms, Contour Lines, Common Pitfalls of Color Use-Encoding Too Much or Irrelevant Information ,Using Nonmonotonic Color Scales to Encode Data Values, Not Designing for Color-Vision Deficiency

TEXT-BOOKS

Claus Wilke, "Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures", 1st edition, O'Reilly Media Inc, 2019.

REFERENCE-BOOKS

1. Ossama Embarak, Data Analysis and Visualization Using Python: Analyze Data to Create Visualizations for BI Systems,Apress, 2018
2. Scott Murray, "Interactive data visualization for the web", O"Reilly Media, Inc., 2013

CS-423C COMPUTING & OPTIMIZATION OF DATA SCIENCE

L	T	P	Credit
3	**0**	**0**	**3**

COURSE OUTCOMES

CO1: Apply computing theory, languages, and algorithms, as well as mathematical and statistical models, and the principles of optimization to appropriately formulate and use data analyses

CO2: Formulate and use appropriate models of data analysis to solve hidden solutions to business-related challenges

CO3: Ability to use the mathematical concepts in the field of data science.

CO4: Employ the techniques and methods related to the area of data science in variety of applications.

CO5: Apply logical thinking to understand and solve the problem in context

UNIT I

INTRODUCTION: History, basic structure of a computer, network of computers, Program=Algorithms + Data, programs as a sequence of instructions levels of programming: High level language, medium level language, machine language, interpreted and compiled languages

Memory variables, types, scalar, composite types, arrays/lists, expressions

Functions: scope of variables, code reuse, call frame and call stack, arguments, return values

Control flow: decisions, Iterations

UNIT II

DATA STRUCTURES AND OBJECTS: lists, dictionaries, NumPy arrays, Strings

File I/O, command line arguments, Data visualization, plotting functions, making use of colour, geographical data

PROGRAM DEVELOPMENT: Testing, test cases, debugging, program efficiency

UNIT III

LINEAR ALGEBRA - Review of Matrix Algebra - Matrices, Eigen Values and Eigen Vectors - Vector Spaces - Vector spaces - Sub spaces - Linear independence - Basis Dimension. Inner Product Spaces: Inner products - Orthogonality - Orthogonal basis - Gram Schmidt Process - Change of basis - Orthogonal complements - Projection on subspace - Least Square Principle-QR decomposition.

UNIT IV

CONVEX SETS, functions, and programs and their properties, Basics of convex analysis, cones.

Linear, quadratic, and semi definite programming.

Optimality conditions, introduction to duality theory, theorems of alternatives.

Algorithms: Unconstrained minimization, Descent methods, Newton's method, Interior-point methods.

UNIT V

LINEAR PROGRAMMING PROBLEM, Transportation Problem, Pert, CPM (critical path method)

TEXT BOOK

1. Howard Anton, Chris Rorres, Elementary Linear Algebra, Tenth edition, John Wiley & Sons, 2010
2. Edwin K.P. Chong, Stanislaw H. Zak, An introduction to Optimization, Second edition, Wiley, 2013
3. Nabil Nassif, Jocelyne Erhel, Bernard Philippe, Introduction to Computational Linear Algebra, CRC press, 2015

REFERENCE BOOKS

1. Gilbert Strang, Linear Algebra and Its Applications, Fourth edition, Cengage, 2006
2. Mohan C. Joshi andKannan M. Moudgalya, Optimization: Theory and Practice, Narosa Publishing House, New Delhi, 2004
3. Hal Daum III, A Course in Machine Learning, 2015

CS-429C	STATISTICAL ANALYSIS USING R	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

CO1: Understand the fundamental syntax of R through readings, practice exercises, demonstrations, and writing R code
CO2: Import a variety of data formats into R using RStudio
CO3: Prepare or tidy data's for in preparation for analysis
CO4: Query data using SQL and R. Analyze a data set in R and present findings using the appropriate R packages
CO5: Visualize data attributes using ggplot2 and other R packages.

UNIT I

INTRODUCTION TO R:What is R? – Why R? – Advantages of R over Other Programming Languages - R Studio: R command Prompt, R script file, comments – Handling Packages in R: Installing a R Package, Few commands to get started: installed.packages(), packageDescription(), help(), find.package(), library() - Input and Output – Entering Data from keyboard – Printing fewer digits or more digits – Special Values functions : NA, Inf and –inf.

UNIT II

R DATA TYPES: Vectors, Lists, Matrices, Arrays, Factors, Data Frame – R - Variables: Variable assignment, Data types of Variable, Finding Variable ls(), Deleting Variables - R Operators: Arithmetic Operators, Relational Operators, Logical Operator, Assignment Operators, Miscellaneous Operators - R Decision Making: if statement, if – else statement, if– else if statement, switch statement – R Loops: repeat loop, while loop, for loop - Loop control statement: break statement, next statement.

UNIT III

R-FUNCTION : function definition, Built in functions: mean(), paste(), sum(), min(), max(), seq(), user-defined function, calling a function, calling a function without an argument,calling a function with argument values - R-Strings – Manipulating Text in Data: substr(), strsplit(), paste(), grep(), toupper(), tolower() - R Vectors – Sequence vector, rep function, vector access, vector names, vector math, vector recycling, vector element sorting - R List -Creating a List, List Tags and Values, Add/Delete Element to or from a List, Size of List, Merging Lists, Converting List to Vector - R Matrices – Accessing Elements of a Matrix, Matrix Computations: Addition, subtraction, Multiplication and Division- R Arrays: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements - R Factors –creating factors, generating factor levels gl().

UNIT IV

Data Frames –Create Data Frame, Data Frame Access, Understanding Data in Data Frames: dim(), nrow(), ncol(), str(), Summary(), names(), head(), tail(), edit() functions - Extract Data from Data Frame, Expand Data Frame: Add Column, Add Row - Joining columns and rowsin a Data frame rbind() and cbind() – Merging Data frames merge() – Melting and Casting data melt(), cast().

LOADING AND HANDLING DATA IN R: Getting and Setting the Working Directory – getwd(), setwd(), dir() - **R-CSV Files -** Input as a CSV file, Reading a CSV File, Analyzing the CSV File: summary(), min(), max(), range(), mean(), median(), apply() - Writing into a CSV File –**R -Excel File** – Reading the Excel file.

UNIT V

Descriptive Statistics: Data Range, Frequencies, Mode, Mean and Median: Mean Applying Trim Option, Applying NA Option, Median - Mode **- Standard Deviation – Correlation - Spotting Problems in Data with Visualization:** visually Checking Distributions for a single Variable **- R –Pie Charts**: Pie Chart title and Colors – Slice Percentages and Chart Legend, 3D Pie Chart – **R Histograms** – Density Plot **- R – Bar Charts**: Bar Chart Labels, Title and Colors.

REFERENCES

1. Sandip Rakshit, R Programming for Beginners, McGraw Hill Education (India), 2017, ISBN : 978-93-5260-455-5.
2. Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN: 978-93-5260-524-8.
3. Tutorials Point (I) simply easy learning, Online Tutorial Library (2018), *R Programming*, Retrieved from https://www.tutorialspoint.com/r/r_tutorial.pdf.
4. Andrie de Vries, Joris Meys, R for Dummies A Wiley Brand, 2nd Edition, John Wiley and Sons, Inc, 2015, ISBN: 978-1-119-05580-8

CS-425C	DATA SCIENCE USING PYTHON	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Create algorithms of moderate complexity, and can implement them in at least two languages appropriate for data science work.

CO2: Exploratory and inferential analysis, students can construct complex statistical models, assess the fit of such models to the data, and apply the models in real-world contexts.

CO3: Recognize that different models fit and perform better than others, and can measure fit and performance appropriately.

CO4: Performing exploratory and inferential procedures, students can fit complex models using dedicated statistical software

CO5: choose appropriate data management strategies, can carry out relevant analyses, can interpret and apply the results to inform understanding and solve specific problems in context, and can communicate the work to a technical audience.

UNIT I

Python data structures, Control statements, Functions, Object Oriented programming concepts using classes, objects and methods, Exception handling, Implementation of user-defined Modules and Package, File handling in python.

UNIT II

Knowledge domains of Data Analysis, Understanding structured and unstructured data, Data Analysis process, Dataset generation, Importing Dataset: Importing and Exporting Data, Basic Insights from Datasets, Cleaning and Preparing the Data: Identify and Handle Missing Values.

UNIT III

Data Formatting, Exploratory Data Analysis, Filtering and hierarchical indexing using Pandas. Data Visualization: Basic Visualization Tools, Specialized Visualization Tools, Seaborn Creating and Plotting Maps

UNIT IV

Numpy and Scipy Package, Understanding and creating N-dimensional arrays, basic indexing and slicing, Boolean indexing, fancy indexing, Universal functions, Data processing using arrays, File input and output with arrays.

UNIT V

Data wrangling, Web scrapping, Combing and merging data sets, Reshaping and pivoting, Data transformation, String Manipulation, case study for web scrapping.

TEXT-BOOKS

1. David Ascher and Mark Lutz, Learning Python, Publisher O'Reilly Media.
2. Reema Thareja, "Python Programming using Problem Solving approach", Oxford University press
1. Wes Mckinney "Python for Data Analysis", First edition, Publisher O'Reilly Media.

REFERENCE-BOOKS

1. Allen Downey , Jeffrey Elkner ,Chris Meyers,: Learning with Python, Dreamtech Press
2. David Taieb ,"Data Analysis with Python: A Modern Approach " 1st Edition, Packt Publishing

CS-471C	DATA HANDLING AND VISUALIZATION LAB	L T P	Cr
		0 0 2	1

COURSE OBJECTIVE

To up skills the knowledge about the data visualization using python.

COURSE OUTCOMES

CO1: Implement numerical and statistical analysis on various data sources.
CO2: Apply data pre-processing and dimensionality reduction methods on raw data.
CO3: Implement linear regression technique on numeric data for prediction.
CO4: Execute clustering and association rule mining algorithms on different datasets.

LIST OF EXPERIMENTS

1. Fundamentals: Introduction to Matplotlib, importing libraries in python, Basic Scatter plot, Creating Axes, Line plot
2. Customization: Title & Axis labels, Equations in text, Formatting Axis ticks, Customizing Tick Labels, Adding Legend, Annotations, Plot Styles
3. Types of Visualizations: Histograms, Bar Graphs, Box and Whisker Plots, Pit charts, 2D histograms, Images, Colour maps, 3D Line and Scatter plots, Adding animation.
4. To get the input from user and perform numerical operations (MAX, MIN, AVG, SUM, SQRT, ROUND) using Python
5. To perform data import/export (.CSV, .XLS, .TXT) operations using data frames in Python
6. To perform statistical operations (Mean, Median, Mode and Standard deviation) using Python.
7. Download the House Pricing dataset from Kaggle and map the values to Aesthetics
8. Use different Color scales on the Rainfall Prediction dataset
9. Create different Bar plots for variables in any dataset
10. Show an example of Skewed data and removal of skewedness
11. For a sales dataset do a Time Series visualization
12. Build a Scatterplot and suggest dimension reduction
13. Use Geospatial Data-Projections on datasets in http://www.gisinindia.com/directory/gis-data-for-india
14. Create the a trend line with a confidence band in any suitable dataset

CS-475C	DATA SCIENCE USING PYTHON LAB	L T P	Cr
		0 0 2	1

LIST OF PRATICALS

1. Python data structures, Control statements,
2. Functions, Object Oriented programming concepts using classes, objects and methods,
3. Exception handling, Implementation of user-defined Modules and Package, File handling in python.
4. Knowledge domains of Data Analysis, Understanding structured and unstructured data
5. Data Analysis process, Dataset generation, Importing Dataset
6. Importing and Exporting Data, Basic Insights from Datasets, Cleaning and Preparing the Data: Identify and Handle Missing Values.
7. Data Formatting, Exploratory Data Analysis
8. Filtering and hierarchical indexing using Pandas. Data Visualization
9. Basic Visualization Tools, Specialized Visualization Tools, Seaborn Creating and Plotting Maps.
10. Numpy and Scipy Package, Understanding and creating N-dimensional arrays
11. Basic indexing and slicing, Boolean indexing, Fancy indexing, Universal functions
12. Data processing using arrays, File input and output with arrays.
13. Data wrangling, Web scrapping, Combing and merging data sets, Reshaping and pivoting
14. Data transformation, String Manipulation, case study for web scrapping.

CS-479C	STATISTICAL ANALYSIS USING R LAB	L T P	Cr
		0 0 2	1

EXPERIMENTS

1. Write a program to check whether a year (integer) entered by the user is a leap year ornot?
2. Write an R program to find the sum of natural numbers without formula using the if–elsestatement and the while loop.
3. Write a program that prints the grades of the students according to the marks obtained.The grading of the marks should be as follows.

Marks	Grades
800-1000	A+
700 – 800	A
500 – 700	B+
400-500	B
150 – 400	C
Less than 150	D

4. Write an R program to make a simple calculator that can add, subtract, multiply and divideusing switch cases and functions.
5. Write a set of instructions to create the following matrix using vectors and rbind() function. Rename the rows to Lang1,Lang2 & Lang3 respectively and use the function to access any one elements using row names.

MatrixOfTechnology

Rows	Columns			
	1	2	3	4
1	C#	Java	Cobol	.Net
2	JavaScript	NodeJs	**R**	Azure
3	Power BI	ASP.Net	Unity	Block Chain

6. Write a program to perform searching within a list (1 to 50). If the number is found in the list, print that the search is successful otherwise print that the number is not in the list.
7. Create a list and data frame that stores the marks of any three subjects for 10 students. Find out the total marks, average, maximum marks and minimum marks of every subject.
8. Write the steps to import data from Excel to CSV files and apply data viewer functions like rm(),dim(), head(), tail(), sorting, filtering, searching to view few set of rows.

Syllabus

Of

B.Tech(CSE-AIML/DS/CS)

4th Year

8th Semester

CS-402C	AIML TOOLS AND APPLICATIONS	L T P	Cr
		3-0-0	3

OBJECTIVES

Machine learning tools are algorithmic applications of artificial intelligence that give systems the ability to learn and improve without ample human input, similar concepts are data mining and predictive modeling. They allow software to become more accurate in predicting outcomes without being explicitly programmed.

COURSE OUTCOMES

At the end of the course, a student will be able to:

CO1: Top tools to be used in AI Scikit Learn, Tensorflow, Theano, Caffe, MxNet, Keras, PyTorch, CNTK , etc.

CO2: Demonstrate various AI Tools, applications, languages and Machine Learning Techniques.

CO3: Solve problems using search strategies and understand the basic process of Machine Learning.

CO4: Apply classification and regression algorithms on real world data.

CO5: Develop an expert system.

CO6: Comprehend the structure of an artificial neural network and identify the building blocks of a convolutional neural network.

UNIT I

INTRODUCTION TO AI- Agents and Environments – Uninformed Search Strategies- Informed Search Strategies- Local Search Algorithm- Problem Formulation-Constraint Satisfaction Problem.

INFERENCE- Forward and Backward Chaining-Unification-Uncertainty-Inference in Bayesian Network – Learning from Observations-Forms of Learning-Inductive Learning-Neural Network-Learning Decision trees-Reinforcement Learning-Case Study-

TOOLS : Introduction to python, control statements, list, dictionary, object, class etc.

UNIT II

MACHINE LEARNING FUNDAMENTALS –Types of Machine Learning - Supervised, Unsupervised, Reinforcement- The Machine Learning process. Terminologies in ML- Testing ML algorithms Installation of Python Libraries/ MATLAB tools for Machine Learning (ii) Data pre-processing using Python Machine Learning libraries

INTRODUCTION TO TOOLS : Intro to scikit-learn, classification, regression, clustering, PCA, Dimension reduction.

PANDAS->>data cleaning, data wrangling, etc.

UNIT :- III

PERCEPTRON- Multilayer perceptron- Back Propagation – Initialization, Training and Validation Support Vector Machines(SVM) as a linear and non-linear classifier - Limitations of SVM Practical Component:

TOOLS : Introduction to TensorFlow Programming (Using TensorFlow Libraries / MATLAB) (i) Recognition of MNIST handwritten digits using Artificial Neural Network. (ii) Build an email spam classifier using SVM.

UNIT IV

PROBABILISTIC GRAPHICAL MODELS: Bayesian Networks - Learning Naive Bayes classifiers-Markov Models – Hidden Markov Models Sampling – Basic sampling methods – Monte Carlo -Reinforcement Learning Practical Component: (Using Python Libraries / MATLAB)

UNIT V

MINING COMPLEX DATA TYPES - Other Methodologies - Data Mining Applications **DATA MINING AND SOCIETY** – Data Mining Trends – Real world applications – Data Mining Tool study.

TOOLS : Pytorch Programming

SUGGESTED ACTIVITY: Prediction and Analysis of Student Performance by Data Mining in WEKA.

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TEXT BOOKS

1. Dr.Nilakshi Jain, Artificial Intelligence, As per AICTE: Making a System Intelligent, Wiley Publications, 1st Edition,2019.
2. Vijayvargia, Abhishek, Machine Learning with Python: An Approach to Applied Machine Learning, BPB Publications; 1st edition,2018.
3. Dr. S.Lovelyn Rose, Dr. L.Ashok Kumar, Dr.D.Karthika Renuka, Deep Learning using Python, Wiley India Pvt. Ltd 2019.

REFERENCES

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson
2. Publications, 4th Edition, 2020.
3. Saroj Kaushik, Artificial Intelligence, Cengage Learning India, 2011.

WEB REFERENCES

1. https://keras.io/

2. https://ai.google/

3. https://www.coursera.org/learn/neural-networks-d

CS-404C	DATA SCIENCE TOOLS AND APPLICATIONS	L T P	Cr
		3-0-0	3

COURSE OUTCOMES

CO1: The student obtains necessary knowledge in Data Science and tools, which is sufficient to develop new methods on other sciences**.**

CO2: Select appropriate methods of SAS for Statistical data analysis of given data.

CO3: Understanding of Apache Spark's architecture, execution model and programming model.

CO4: Design and program efficient algorithms related to recent machine learning techniques, train models, conduct experiments, and develop real-world ML-based applications and products

CO5: Analyze data and calculate with tables using Tableau commands.

UNIT I

INTRODUCTION TO DATA SCIENCE, Exploratory data analysis, Model selection and evaluation, Classification: KNN, decision trees, SVM, Introduction to probability: Naïve Bayes and logistic regression, Clustering: k-means, hierarchical clustering.

INTRODUCTION TO TOOLS: SAS, Apache Spark, BigML, MATLAB, Tableau, ggplot2, Jupyter, Matplotlib, NLTK, Tensor Flow, Weka.

UNIT II

SAS: SAS Environment, SAS Library, Input & Output, Valid names and comments, Data Type and format, create datasets from external files, Input & Output raw data, control flow in SAS, SAS data step functions.

UNIT III

SPARK: Introduction to Spark, Distributed Datasets and data frames, Spark Application Programming, Spark Libraries, Spark configuration and monitoring.

UNIT IV

BigML: BigML sources and datasets**,** Supervised learning models: Models, Ensembles, Linear Regressions, Logistic Regressions, Deepnets, Time Series, OptiML, and Fusions.

UNIT V

TABLEAU: Introduction Tableau, connecting to Excel, CSV Text Files, Connecting to Databases, Working with Data, Analyzing, Formatting, Data Calculations, Aggregate Calculations, User Calculations, Table Calculations, Logical Calculations, String Calculations, Number Calculations, Type Conversion, Parameters, Filtering Conditions, Filtering Measures

REFRENCES

1. Han, J., Kamber, M., Pei, J. Data mining concepts and techniques. Morgan Kaufmann, 2011.
2. SAS® 9.4 Language Reference: Concepts, Sixth Edition
3. Spark: The Definitive Guide: Big Data Processing Made Simple by Matei Zaharia

CS-406C	CYBER SECURITY TOOLS AND APPLICATIONS	L T P	Cr
		3-0-0	3

OBJECTIVE

The objective of this course is to create architectural, algorithmic and technological foundations for ensuring cyber security, maintenance of the privacy of individuals, the confidentiality of organizations, and the protection of sensitive information, despite the requirement that information be released publicly or semi-publicly.

COURSE OUTCOMES

The students after undergoing this course will be able to:

CO1: Know about the crimes occurred in cyber space

CO2: Learn about the devices as well as analysis part of digital devices

CO3: Investigate the various cyber as well as web attacks and techniques used

CO4: Manage the different evidences fetched for a crime

CO5: Learn about different laws as well as authorities involved in the cyber crimes

UNIT I

CYBER CRIME: Cyber Space – Cyber Crime – Criminal Behaviour – Jurisdictional Concerns - Jurisprudential Inconsistency – eCash Security – Prepaid Cards – Stored Values Cards – Mobile Payments – Internet Payment Services - Cyber stalking - Cyber extortion – Cyber terrorism - Cyber warfare –Cyber weapons -ATM frauds – Phreaking – Internet Gambling.

PRACTICAL COMPONENT: 1. Key logger 2. Email Fraud (Suggested Reading: Telecommunication Fraud - Software piracy)

UNIT II

CYBER FORENSICS: Digital device – Hard disk –Disk characteristics - Disk imaging - Data Carving – Techniques - commercial piracy - soft lifting – Steganography – Network components - Port scans - Wireshark - pcap analysis - Trojans and Backdoors – Botnets - DoS – DDoS Attacks - Honey Pots – Malware – Virus and Worms.

PRACTICAL COMPONENT: 1. Pcab file Analysis – Case Study 2. Network Port Scan – Forensics (Suggested Readings: Active and Passive Sniffing)

UNIT III

CYBER INVESTIGATION: Concepts of Investigation - cyber investigation, Network Investigation - Investigating audit logs - Investigating Web attacks - Investigating Computer Intrusions - Profiling – Cyber Criminal profiling – Stylometric Techniques – Warranted searches – Warrantless searches – Undercover Techniques .

PRACTICAL COMPONENT: 1. Investigating Audit Logs 2. Investigating Web attacks (Suggested Readings: Surveying and preserving digital crime scene)

UNIT IV

EVIDENCE MANAGEMENT: Evidence – Digital Evidence - Types – physical evidence – Real evidence – Circumstantial evidence – network evidence - Evidence collection – Evidence Analysis - Contextual Information –Evidence Management – pre search activities – On Scene activities – Report Preparations

PRACTICAL COMPONENT: 1. Digital Evidence Analysis 2. Network Analysis (Suggested Readings: Investigative Reconstruction with Digital Evidence)

UNIT V

CYBER LAWS AND AUTHORITIES: Information Technology Act 2000 – Digital signature - Electronic Governance - Secure electronic records - Regulation of certifying authorities – CERNTin - Electronic signature certificates - Penalties compensation - Future Trends and Emerging Concerns

PRACTICAL COMPONENT: 1. Digital Signature

REFERENCES

1. "Cyber Security: Threats and Responses for Government and Business"by Caravelli
2. "Cyber Security: Law and Guidance" by Helen Wong
3. "Ghost in the Wires: My Adventures as the World's Most Wanted Hacker" by Kevin Mitnick.

****

M.Tech			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CS-501B	Mathematical Foundation of Computer Science	3	0	0	3
2	CS-503B	Big Data Analytics	3	0	0	3
3	CS-505B	Object Oriented Design & Algorithm	3	0	0	3
4	CS-507B	Advanced Data Structure & Algorithm	3	0	0	3
5	CS-509B	Advanced Database Management System	3	0	0	3
6	CS-555B	Object Oriented Design Lab	0	0	4	2
7	CS-557B	Advanced Data Structure Lab	0	0	4	2
		Total---->	**15**	**0**	**8**	**19**

M.Tech			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CS-502B	Trends in AI & Soft Computing	3	0	0	3
2	CS-504B	Research Methodology and IPR	3	0	0	3
3	CS-506B	Data Mining & Data Warehousing	3	0	0	3
4	CS-508B	Cloud Computing	3	0	0	3
5	CS-552B	Soft Computing & Artificial Intelligence Lab	0	0	4	2
6	CS-554B	Data Mining Lab	0	0	4	2
7	CS-556B	Project with Seminar	0	0	8	4
		Total---->	**12**	**0**	**16**	**20**

M.Tech			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CS-601B	Digital Image Processing	3	0	0	3
2	CS-603B	Data Science using python	3	0	0	3
3	CS-605B	Machine Learning	3	0	0	3
4	CS-607B	Natural Language Processing & Text Managing	3	0	0	3
5	CS-609B	Data Compression	3	0	0	3
6	CS-653B	Data Science using python lab	0	0	4	2
7	CS-655B	Dissertation Preliminary	0	0	4	2
8	CS-657B	Seminar II	0	0	38	19
		Total---->	**15**	**0**	**42**	**38**

M.Tech			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CS-614B	Cryptography & Cyber Security	3	0	0	3
2	CS-658B	Seminar - III	0	0	2	1
3	CS-659B	Dissertation	0	0	30	15
		Total---->	**3**	**0**	**32**	**19**

CS-501B	MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE	L T P	Cr
		3 0 0	3

COURSE OBECTIVES

Study the fundamental concepts of logic, abstract algebra, linear algebra, probability and statistics, graph theory etc.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: know the mathematical concepts of computer science
CO2: Learn about the permutations and combinations
CO3: Get knowledge about the different algebraic structures and substructures
CO4: Learn how the functions work recursively
CO5: Know about the lattices as well as Boolean algebra

UNIT I

LOGIC STATEMENTS: Connectives, Truth Tables, Normal forms, Predicate calculus, Inference, Theory for Statement Calculus and Predicate Calculus, automata theorem proving.

UNIT II

COMBINATTORICS: Review of Permutation and Combination, Mathematical Induction, Pigeon hole principle, Principle of Inclusion and Exclusion, generating function, Recurrence relations.

UNIT III

ALGEBRAIC STRUCTURES: Semi goup - Monoid - Groups(Definition and Examples only) Cyclic group - Permutation group(Sn and Dn) - Substructures - Homomorphism of semi group, monoid and groups - Cosets and Lagrange Theorem – Normal Subgroups - Rings and Fields (Definition and examples only)

UNIT IV

RECURSIVE FUNCTIONS: Recursive functions - Primitive recursive functions - computable and non - computable functions.

UNIT V

LATTICES: Partial order relation, poset - Lattices, Hasse diagram - Boolean algebra

TEXT BOOKS

1. Gersting J.L., Mathematical Structure for Computer Science, 3rd Edition W.H. Freeman and Co., 1993.
2. Donald F. Stanat and David F. McAllister, Discrete mathematics in Computer Science.
3. Thomas Koshy, Elementary number theory with Applications, Elsevier
4. I.N.Herstein, Topics in Algebra.JOHN Wiley & SONS. 1990.

5. Sheldon M. Ross, Introduction to Probability Models, Elsevier.
6. H. Cormen, C. E. Leiserson, R. L. Rivest, C Stein, Introduction to Algorithms, Prentice Hall India.
7. Sara Baase and Alan Van Van Gelder. Computer Algorithms: Introduction to Design and Analysis. Addison – Wiley, 2000.

REFERENCES

1. Lidl and pitz., Applied Abstract Algebra, Springer - Verlag, New York, 1984.
2. K.H. Rosen, Discrete Mathematics and its Applications, Mc-Graw Hill Book Company, 1999.
3. http://www.mhhe.com//rosen

CS-503B	BIG DATA ANALYTICS	L-T-P	Cr
		3-0-0	3

OBJECTIVES

This course brings together several key big data technologies used for storage, analysis and manipulation of data and recognize the key concepts of Hadoop framework, MapReduce, Pig, Hive, and No-SQL and a sample project in Hadoop API.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Learn the basic concepts of big data
CO2: Handle the big data as well as get familiar with the Hadoop
CO3: Get deeper knowledge of Hadoop as well as map reduce
CO4: Know about the architecture for real time applications
CO5: Learn about the Pig

UNIT I

Big Data and its Importance – Four V's of Big Data – Drivers for Big Data – Introduction to Big Data Analytics – Big Data Analytics applications, Hadoop's Parallel World – Data discovery – Open source technology for Big Data Analytics – cloud and Big Data – Predictive Analytics – Mobile Business Intelligence and Big Data – Crowd Sourcing Analytics – Inter- and Trans-Firewall Analytics - Information Management.

UNIT-II

Integrating disparate data stores - Mapping data to the programming framework - Connecting and extracting data from storage - Transforming data for processing - Subdividing data in preparation for Hadoop Map Reduce, Hadoop Map Reduce - Creating the components of Hadoop

UNIT-III

Map Reduce jobs - Distributing data processing across server farms -Executing Hadoop Map Reduce jobs - Monitoring the progress of job flows - The Building Blocks of Hadoop Map Reduce - Distinguishing Hadoop daemons - Investigating the Hadoop Distributed File System Selecting appropriate execution modes: local, pseudo-distributed, fully distributed.

UNIT-IV

Real-Time Architecture – Orchestration and Synthesis Using Analytics Engines – Discovery using Data at Rest – Implementation of Big Data Analytics – Big Data Convergence – Analytics Business Maturity Model,

UNIT V

Installing and Running Pig – Comparison with Databases – Pig Latin – UserDefine Functions – Data Processing Operators – Installing and Running Hive – Hive QL – Tables – Querying Data – User-Defined Functions – Oracle Big Data.

TEXT BOOK

Michael Minelli, Michehe Chambers, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business", 1st Edition, Ambiga Dhiraj, Wiely CIO Series, 2013.

REFERENCE BOOKS

1. Arvind Sathi, "Big Data Analytics: Disruptive Technologies for Changing the Game", 1st Edition, IBM Corporation, 2012.
2. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", 1st Edition, Wiley and SAS Business Series, 2012.
3. Tom White, "Hadoop: The Definitive Guide", 3rd Edition, O'reilly, 2012

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CS-505B	OBJECT ORIENTED DESIGN AND ANALYSIS	L-T-P	Cr
		3-0-0	3

OBJECTIVES

This course brings together several key features of object oriented related to design and analysis.

COURSE OBJECTIVES

After undergoing this course, the students will be able to:

CO1: Know about the fundamentals of object oriented design
CO2: Analyze the object oriented key features like behavior, design etc
CO3: Learn the basic concepts of UML
CO4: Learn about the USE-CASES, their designs as well as their implementation
CO5: Know about the testing and coding for design of object-oriented

UNIT I

OBJECT ORIENTED DESIGN FUNDAMENTALS: The object model - Classes and Objects, Complexity ,Classification, Notation, Process - Pragmatics - Binary and entity relationship, Object types - Object state, OOSD life cycle, Frameworks and design patterns, design for reusability, advanced object-oriented programming techniques, design using object-oriented databases and distributed object architectures, design of software agents.

UNIT II

OVERVIEW OF OBJECT ORIENTED ANALYSIS: Shaler/Mellor, Coad/Yourdon, Rumbagh, Booch's Approach towards the analysis, UML ,Usecase, Conceptual model, Behaviour ,Class, Analysis patterns, Overview, Diagrams, Aggregation.

UNIT III

UNIFIED MODELING LANGUAGE: UML –static view, Dynamic view, Model Management View, UML Diagrams, Collaboration - Sequence - Class - Design patterns and frameworks - Comparison with other Design methods

UNIT IV

USE CASE DRIVEN, ARCHITECTURE CENTRIC, ITERATIVE, AND INCREMENTAL THE FOUR PS: people, project, product, and process Use case driven process: why use case, capturing use cases, analysis, design, and implementation to realize the use cases, testing the use cases Architecture-centric process: architecture in brief, why we need architecture, use cases and architecture, the steps to architecture, an architecture description.

UNIT V

MANAGING OBJECT ORIENTED DEVELOPMENT MANAGING ANALYSIS AND DESIGN - Evaluation testing - Coding - Maintenance Metrics, case Studies In Object Oriented Development Design of foundation class libraries - Object Oriented databases - Client/Server computing - Middleware.

TEXT BOOKS

1. Craig Larmen, Applying UML and Patterns: An Introduction to Object Oriented Analysis and Design and Iterative Development, Prentice Hall (2004)
2. Booch G., Rambaugh J., Jacobson Ivar, The Unified Modeling Language User Guide, Pearson Education (2003)
3. The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson 2nd Edition, Pearson Education.
4. UML 2 Toolkit by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado WILEYDreamtech India Pvt. Ltd.
5. The Unified Software Development Process by Ivar Jacobson, Grady Booch, James Rumbaugh, Pearson Education

REFERENCE BOOKS

Yogesh Singh, RuchikaMalhotra , Object oriented software engineering, PHI 2012

CS-507B	ADVANCED DATA STRUCTURES AND ALGORITHMS	L T P	Cr
		3 0 0	3

OBJECTIVES

To learn about the time complexity of algorithms and understand the representations used in heap data structures, different types of search structures and various algorithm design techniques. Understand the advanced data structures.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Know about the data types as well as measures of complexity of algorithms
CO2: Get knowledge about heaps and its different types
CO3: Get familiar with the BST and its types
CO4: learn about the dynamic programming

CO5: learn about the approaches used for parallel algorithms

UNIT I

ABSTRACT DATA TYPES - Time and Space Analysis of Algorithms - Big Oh and Theta Notations - Average, best and worst case analysis - Simple recurrence relations – Mappings.

UNIT II

MIN-MAX HEAPS - Heaps - Leftist heaps -Binomial heaps - Fibonacci heaps - Skew heaps - Lazybinomial heaps.

UNIT III

BINARY SEARCH TREES - AVL trees - 2-3 trees - 2-3-4 trees - Red-black trees - B-trees - splay trees - Tries.

UNIT IV

DIVIDE AND CONQUER AND GREEDY: Quicksort - Strassen's matrix multiplication - Convex hull - Treevertex splitting - Job sequencing with deadlines - Optimal storage on tapes Dynamic Programming and Backtracking: Multistage graphs - 0/1 knapsack - 8- queens problem - graph coloring.

UNIT V

PARALLEL ALGORITHMS: Basic Techniques- Work & Efficiency - Distributed Computation - Heuristic & Approximation Approaches.

TEXT BOOKS

Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Third Edition, Pearson Education, Asia.2007.

REFERENCE BOOKS

1. E. Horowitz, S.Sahni and Dinesh Mehta, Fundamentals of Data structures in C++, University Press, 2009.
2. E. Horowitz, S. Sahni and S. Rajasekaran, Computer Algorithms/C++, Second Edition, University Press, 2007.
3. Jean-Paul Tremblay, Paul .G. Sorenson, "An Introduction to Data Structures with Applications", Tata McGraw Hill second edition , 1991.
4. Thomas H.Coremen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein , "Introduction to algorithms", Third edition, MIT press.

CS-509B	ADVANCED DATABASE MANAGEMENT SYSTEM)	L T P	Cr
		3 0 0	3

OBJECTIVES

To provide a comprehensive study of Relational, Distributed and Advanced Database technologies.

COURSE OUTCOMES

The students undergoing this course will be able to:
CO1: Learn about the query processing and normalization
CO2: Know about different storage structures like indexes, sorting etc
CO3: Learn about the distributed databases and their architecture
CO4: Get knowledge about the different object oriented databases
CO5: Learn about the different data models used for big data

UNIT I

ER MODEL - Normalization - Query Processing - Query Optimization - Transaction Processing - Concurrency Control - Recovery - Database Tuning.

UNIT II

STORAGE STRUCTURES, Indexing and multi-dimensional indexes, Query Processing Algorithms, External Sorting, Query Optimization- Heuristic based optimization- cost based optimization, Buffer Management, Concurrency Control, Recovery.

UNIT III

INTER AND INTRA QUERY PARALLELISM - Distributed Database Features - Distributed Database Architecture - Fragmentation - Distributed Query Processing - Distributed Transactions Processing - Concurrency Control - Recovery - Commit Protocols.

UNIT IV

INTRODUCTION TO OBJECT ORIENTED DATA BASES - Approaches - Modelling and Design - Persistence - Query Languages - Transaction - Concurrency - Multi Version Locks - Recovery - POSTGRES - JASMINE -GEMSTONE - ODMG Model.

UNIT V

ENHANCED DATA MODELS - Client/Server Model - Web Databases - Mobile Databases- XML and Web Databases - current issues - Rules - Knowledge Bases - Active and Deductive Databases - Multimedia Databases- - Multimedia Query languages - Spatial Databases.

TEXT BOOKS

Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2006.

REFERENCE BOOKS

1. Thomas Connolly and CarlolynBegg, "Database Systems, A Practical Approach to Design, Implementation and Management", Fourth Edition, Pearson Education 2000.
2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education, 2006.
3. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education,

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CS-555B	OBJECT ORIENTED DESIGN LAB	L T P	Cr
		0-0-4	2

COURSE OBJECTIVES:

- To capture the requirements specification for an intended software system
- To draw the UML diagrams for the given specification
- To map the design properly to code
- To test the software system thoroughly for all scenarios
- To improve the design by applying appropriate design patterns.

COURSE OUTCOMES

After completing the course, the students will be able:

CO1: Perform OO analysis and design for a given problem specification.

CO2: Identify and map basic software requirements in UML mapping.

CO3: Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns

CO4: Test the compliance of the software with the SRS.

Draw standard UML diagrams using an UML modeling tool for a given case study and map design to code and implement a 3 layered architecture. Test the developed code and validate whether the SRS is satisfied.

1. Identify a software system that needs to be developed.
2. Document the Software Requirements Specification (SRS) for the identified system.
3. Identify use cases and develop the Use Case model.
4. Identify the conceptual classes and develop a Domain Model and also derive a Class Diagram from that.
5. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence and Collaboration Diagrams
6. Draw relevant State Chart and Activity Diagrams for the same system.
7. Implement the system as per the detailed design
8. Test the software system for all the scenarios identified as per the usecase diagram
9. Improve the reusability and maintainability of the software system by applying appropriate design patterns.
10. Implement the modified system and test it for various scenarios

SUGGESTED DOMAINS FOR MINI-PROJECT:

1. Passport automation system.
2. Book bank
3. Exam registration
4. Stock maintenance system.
5. Online course reservation system
6. Airline/Railway reservation system
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference management system
13. BPO management system
14. Library management system
15. Student information

CS-557B	ADVANCED DATA STRUCTURE LAB	L T P	Cr
		0 0 4	2

OBJECTIVES

Implement advanced data structures and advanced algorithm concepts. Calculate the time complexity of algorithms and express it using appropriate notations and implement different algorithm design techniques.

COURSE OUTCOMES

CO1 Be able to design and analyze the time and space efficiency of the data structure
CO2 Be capable to identity the appropriate data structure for given problem
CO3 Have practical knowledge on the applications of data structures

LIST OF EXPERIMENTS

1. Implement min - max heap and calculate the efficiency of the algorithms.
2. Implement Heap data structure.
3. Implement splay trees.
4. Implement the insertion of AVL trees with rotations.
5. Implement B-Tree.
6. Implement vertex cover problem using approximate algorithms.
7. Implement and calculate the time complexity of quick sort
8. Implement Convex hull
9. Implement 0/1 Knapsack using Dynamic Programming
10. Implement Graph coloring using backtracking

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Syllabus

Of M.Tech(CS)

1st Year 2nd Semester

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SCHOOL OF COMPUTER SCIENCE

CS-502B	TRENDS IN ARTIFICIAL INTELLIGENCE AND SOFT COMPUTING	L	T	P	Credit
		3	0	0	3

OBJECTIVES

1. To introduce the concepts and techniques of building blocks of Artificial Intelligence and Soft Computing techniques and their difference from conventional techniques.
2. To generate an ability to design, analyze and perform experiments on real life problems using various Neural Network algorithms.
3. To conceptualize Fuzzy Logic and its implementation for various real-world applications.
4. To provide the understanding of Genetic Algorithms and its applications in developing solutions to real-world problems.
5. To introduce the need and concept of hybrid soft computing algorithms.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand AI concepts used to develop solutions that mimic human like thought process on deterministic machines for real-world problems.

CO2: Analyze and evaluate whether a problem can be solved using AI techniques and analyze the same using basic concepts of AI.

CO3: Understand the fundamental concepts of Neural Networks, different neural network architectures, algorithms, applications and their limitations.

CO4: Apply Fuzzy Logic, the concept of fuzziness and fuzzy set theory in various systems. 5. **CO5**: Apply Genetic Algorithms in problems with self-learning situations that seek global optimum.

CO6: Create solutions to real-world problems using Neural Network, Genetic Algorithms, Fuzzy Logic or their Hybrid systems.

UNIT I

FOUNDATIONS OF ARTIFICIAL INTELLIGENCE: Introduction to artificial intelligence; Application areas of artificial intelligence; State space search: Depth first search, Breadth first search;

HEURISTIC SEARCH: Best first search, Hill Climbing, Beam Search, Tabu Search; Introduction to randomized search: Simulated annealing, Genetic algorithms, Ant colony optimization; Introduction to expert systems; Introduction to AI-related fields like game playing, speech recognition, language detection machine, computer vision, robotics Supervised and unsupervised learning.

UNIT II

INTRODUCTION TO SOFT COMPUTING: Importance of soft computing; Soft computing versus hard computing; Introduction to main components of soft computing: Fuzzy logic, Neural networks, Genetic algorithms. Basic concepts of neural network; Overview of learning rules and parameters; Activation functions; Single layer perceptron and multilayer perceptron; Multilayer feed forward network;

BACKPROPAGATION NETWORKS: Architecture, Algorithm, Variation of standard backpropagation neural network; Radial basis function network; Recurrent neural network; Introduction to Associative Memory; Recent applications.

UNIT III

GENETIC ALGORITHMS: Difference between traditional algorithms and Genetic Algorithm (GA); Basic concepts of GA; Working principle; Encoding methods; Fitness function; GA Operators:

Reproduction, Crossover, Mutation; Convergence of GA; Detailed algorithmic steps; Adjustment of parameters; Multi-criteria optimization; Solution of typical problems using genetic algorithm; Recent applications.

UNIT IV

FUZZY LOGIC: Concepts of uncertainty and imprecision; Concepts, properties and operations on classical sets and fuzzy sets; Classical & fuzzy relations; Membership functions and its types; Fuzzification; Fuzzy rule-based systems; Defuzzification; Fuzzy propositions; Fuzzy extension principle; Fuzzy inference system; Recent applications.

INTRODUCTION TO HYBRID SYSTEMS: Fuzzy-neural systems, Genetic fuzzy systems, Neuro-genetic systems; Details of any one method for each hybrid system.

UNIT V

RESEARCH-BASED STUDY: The advances and the latest trends in the course as well as the latest applications of the areas covered in the course. The latest research conducted in the areas covered in the course. Discussion of latest research published in IEEE/ACM transactions, SCI/SCIE/Web of Science/SCOPUS indexed journals and Tier-1 conference of this area. Discussion on some of the latest products available in the market based on the areas covered in the course and patents filed in the areas covered.

TEXT-BOOKS

1. Artificial Intelligence: A Modern Approach by S. Russell and P. Norvig, Prentice Hall.
2. S. Rajasekaran and G. A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications, PHI.
3. S. N. Sivanandam and S. N. Deepa, Principles of Soft Computing, 2 nd ed., Wiley India.

REFERENCE BOOKS

1. Artificial Intelligence by Elaine Rich, Kevin Knight and Shivashankar B Nair, Tata McGraw Hill.
2. Introduction to Artificial Intelligence and Expert Systems by Dan W. Patterson, Pearson Education.
3. J. Zurada, Introduction to Artificial Neural Systems, Jaico Publishing House.
4. D. Goldberg, Genetic Algorithms in Search, Optimization and Machine Learning, AddisonWesley
5. G. Klir, B. Yuan, Fuzzy Sets & Fuzzy Logic: Theory and A: Theory & Applications, Pearson

CS-504B	RESEARCH METHODOLOGY AND IPR	L	T	P	Credit
		3	0	0	3

COURSE OUTCOMES

After completing this course, the students will be able:

CO1: To discuss research methodology and the technique of defining a research problem

CO2: To explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.

CO3: To explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections.

CO4: To explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research reports

CO5: To discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR

UNIT I

Research Methodology: Introduction, Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, and Problems Encountered by Researchers in India.

Defining the Research Problem: Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration.

UNIT II

Reviewing the literature: Place of the literature review in research, Bringing clarity and focus to your research problem, Improving research methodology, Broadening knowledge base in research area, Enabling contextual findings, How to review the literature, searching the existing literature, reviewing the selected l/iterature, Developing a theoretical framework, Developing a conceptual framework, Writing about the literature reviewed. Research Design: Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs. ■

UNIT III

Design of Sampling: Introduction, Sample Design, Sampling and Non-sampling Errors, Sample Survey versus Census Survey, Types of Sampling Designs.

Measurement and Scaling: Qualitative and Quantitative Data, Classifications of Measurement Scales, Goodness of Measurement Scales, Sources of Error in Measurement Tools, Scaling, Scale Classification Bases, Scaling Technics, Multidimensional Scaling, Deciding the Scale.

Data Collection: Experimental and Surveys, Collection of Primary Data, Collection of Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method. •

UNIT IV

Testing of Hypotheses: Hypothesis, Basic Concepts Concerning Testing of Hypotheses, Testing of Hypothesis, Test Statistics and Critical Region, Critical Value and Decision Rule, Procedure for Hypothesis Testing, Hypothesis Testing for Mean, Proportion, Variance, for Difference of Two Mean, for Difference of Two Proportions, for Difference of Two Variances, P-Value approach, Power of Test, Limitations of the Tests of Hypothesis.

Chi-square Test: Test of Difference of more than Two Proportions, Test of Independence of Attributes, Test of Goodness of Fit, Cautions in Using Chi Square Tests.

UNIT V

Interpretation and Report Writing: Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports.

Intellectual Property: The Concept, Intellectual Property System in India, Development of TRIPS Complied Regime in India, Patents Act, 1970, Trade Mark Act, 1999,The Designs Act, 2000, The Geographical Indications of Goods (Registration and Protection) Act1999, Copyright Act,1957,The Protection of Plant Varieties and Farmers' Rights Act, 200l,The Semi-Conductor Integrated Circuits Layout Design Act, 2000, Trade Secrets, Utility Models, IPR and Biodiversity, The Convention on Biological Diversity (CBD) 1992, Competing Rationales for Protection of IPRs, Leading International Instruments Concerning IPR, World Intellectual Property Organisation (WIP0),WIP0 and WTO, Paris Convention for the Protection of Industrial Property, National Treatment, Right of Priority, Common Rules, Patents, Marks, Industrial Designs, Trade Names, Indications of Source, Unfair Competition, Patent Cooperation Treaty (PCT), Advantages of PCT Filing, Berne Convention for the Protection of Literary and Artistic Works, Basic Principles, Duration of Protection, Trade Related Aspects of Intellectual Property Rights(TRIPS) Agreement, Covered under TRI PS Agreement, Features of the

Agreement, Protection of Intellectual Property under TRIPS, Copyright and Related Rights, Trademarks, Geographical indications, Industrial Designs, Patents, Patentable Subject Matter, Rights Conferred, Exceptions, Term of protection, Conditions on Patent Applicants, Process Patents, Other Use without Authorization of the Right Holder, Layout- Designs of Integrated Circuits, Protection of Undisclosed Information, Enforcement of Intellectual Property Rights, UNSECO

TEXT BOOKS

1. Research Methodology: Methods and Techniques, C.R. Kothari, Gaurav Garg, New Age International, 4th Edition, 2018.
2. Research Methodology a step-by-step guide for beginners. Ranjit Kumar, SAGE Publications, 3rd Edition, 2011. (For the topic Reviewing the literature under module 2),
3. Study Material, (For the topic Intellectual Property under module 5), Professional Programme Intellectual
4. Property Rights, Law and Practice, The Institute of Company Secretaries of India, Statutory Body Under an Act of Parliament, September 2013.

REFERENCE BOOKS

1. Research Methods: the concise knowledge base, Trochim, Atomic Dog Publishing, 2005.
2. Conducting Research Literature Reviews: From the Internet to Paper, Fink A, Sage Publications, 2009.

CS-506B	DATA MINING & DATA WAREHOUSING	L	T	P	Credit
		3	0	0	3

COURSE OUTCOMES

CO1: Understand the functionality of the various data mining and data warehousing component

CO2: Appreciate the strengths and limitations of various data mining and data warehousing models

CO3: Explain the analyzing techniques of various data

CO4: Describe different methodologies used in data mining and data ware housing.

CO5: Compare different approaches of data ware housing and data mining with various technologies.

UNIT I

DATA WAREHOUSE FUNDAMENTALS: Introduction to Data Warehouse, OLTP Systems; Differences between OLTP Systems and Data Warehouse, Characteristics of Data Warehouse; Functionality of Data Warehouse, Advantages and Applications of Data Warehouse; Top-Down and Bottom-Up Development Methodology, Tools for Data warehouse development: Data Warehouse Types, Components of Data warehouse Architecture: Different Data warehouse architectures

DIMENSIONAL MODELING: Introduction: E-R Modeling: Dimensional Modeling: E-R Modeling VS Dimensional Modeling: Data Warehouse Schemas; Star Schema, Inside Dimensional Table, Inside Fact Table, Fact Less Fact Table, Granularity, Star Schema Keys: Snowflake Schema: Fact Constellation Schema:

UNIT II

EXTRACT, TRANSFORM AND LOAD: ETL Overview or Introduction to ETL: ETL requirements and steps: Data Extraction; Extraction Methods, Logical Extraction Methods, Physical Extraction Methods: Data Transformation; Basic Tasks in Transformation, Major Data Transformation Types: Data loading; Data Loading Techniques: ETL Tools

UNIT II

DATA WAREHOUSE & OLAP: Introduction: What is OLAP, Characteristics of OLAP, Steps in the OLAP Creation Process, Advantageous of OLAP: What is Multidimensional Data: OLAP Architectures; MOLAP, ROLAP, HOLAP: Data Warehouse and OLAP: Hypercube & Multicubes

META DATA MANAGEMENT IN DATA WAREHOUSE: Introductions to Metadata: Categorizing Meta data: Meta data management in practice; Meta data requirements gathering, Meta data classification, Meta data collection strategies: Meta Data Management in Oracle and SAS: Tools for Meta data management:

UNIT IV

INTRODUCTION TO DATA MINING: Introduction, categories of web mining – web content mining, web structure mining, web usage mining, Scope of Data Mining, How does Data Mining Works, Data Mining VS Data Warehousing: Architecture for Data Mining, Applications of Web Mining, and Web mining Software.

DATA MINING TECHNIQUES I- An Overview, Classification and Prediction – Basic Concepts – Decision Tree Induction , Bayesian Classification, Rule Based Classification, Classification by Back

propagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods and Prediction.

UNIT V

DATA MINING TECHNIQUES II- Introduction of Cluster Analysis, Categorization of Major Clustering Methods: K-means, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid Based Methods, Model-Based Clustering Methods, Clustering High Dimensional Data, Constraint – Based Cluster Analysis & Outlier Analysis, Agglomerative clustering, Divisive clustering, clustering and segmentation software, evaluating clusters.

REFERENCES

1. Alex Berson and Stephen J.Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw – Hill Edition, Thirteenth Reprint 2008.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Third Edition, Elsevier, 2012.
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2007.
4. K.P. Soman, Shyam Diwakar and V. Aja, "Insight into Data Mining Theory and Practice", Eastern Economy Edition, Prentice Hall of India, 2006.
5. G. K. Gupta, "Introduction to Data Mining with Case Studies", Eastern Economy Edition, Prentice Hall of India, 2006.
6. Daniel T.Larose, "Data Mining Methods and Models", Wiley-Interscience, 2006.

CS - 508B	CLOUD COMPUTING	L T P	Cr
		3-0-0	3

OBJECTIVE

This course gives students an insight into the basics of cloud computing along with virtualization, cloud computing is one of the fastest growing domain from a while now. It will provide the students basic understanding about cloud and virtualization along with it how one can migrate over it.

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To learn the basic concepts of CLOUD computing.

CO2: To aware about the.Cloud Insights Architectural influences

CO3: To know about the Cloud Architecture .

CO4: To aware about Cloud Simulators

CO5: To learn about the basic of VMWare.

UNIT I

CLOUD COMPUTING OVERVIEW : Origins of Cloud computing – Cloud components - Essential characteristics – On-demand selfservice, Broad network access, Location independent resource pooling ,Rapid elasticity , Measured service, Comparing cloud providers with traditional IT service providers, Roots of cloud computing.

UNIT II

CLOUD INSIGHTS ARCHITECTURAL INFLUENCES :High-performance computing, Utility and Enterprise grid computing, Cloud scenarios – Benefits: scalability ,simplicity ,vendors ,security, Limitations – Sensitive information - Application development- security level of third party - security benefits, Regularity issues: Government policies.

UNIT III

CLOUD ARCHITECTURE : Layers and Models Layers in cloud architecture, Software as a Service (SaaS), features of SaaS and benefits, Platform as a Service (PaaS), features of PaaS and benefits, Infrastructure as a Service (IaaS), features of IaaS and benefits, Service providers, challenges and risks in cloud adoption. Cloud deployment model: Public clouds – Private clouds – Community clouds - Hybrid clouds - Advantages of Cloud computing.

UNIT IV

CLOUD SIMULATORS : CloudSim and GreenCloud Introduction to Simulator, understanding CloudSim simulator, CloudSim Architecture(User code, CloudSim, GridSim, SimJava) Understanding Working platform for CloudSim, Introduction to GreenCloud .

UNIT-V

Introduction to VMWare Simulator : Basics of VMWare, advantages of VMware virtualization, using Vmware workstation, creating virtual machines-understanding virtual machines, create a new virtual machine on local host, cloning virtual machines, virtualize a physical machine, starting and stopping a virtual machine.

TEXT BOOK :

1. Architecting the Cloud: Design Decisions for Cloud Computing Service Models(SaaS, PaaS, and IaaS) (Wiley CIO) by Michael J. Kavis(Author)
2. Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile,Security and More by Kris Jamsa(Author)

REFERENCES :

1. Cloud Computing ñ An Introduction bySubuSangameswar
2. Mastering Cloud Computing Paperback by Buyya (Author), Vecchiola (Author),Selvi (Author)
3. Cloud Computing for Complete Beginners: Building and Scaling High- PerformanceWeb Servers on the Amazon Cloud by IkramFatah

CS-552	TRENDS IN AI AND SOFT COMPUTING LAB	L	T	P	Credit
		0	0	4	2

COURSE OUTCOMES

CO1: Implement the AI concepts used to develop solutions that mimic human like thought process on deterministic machines for real-world problems.

CO2: Analyze and evaluate whether a problem can be solved using AI techniques and analyze the same using basic concepts of AI.

CO3: Implement the the fundamental concepts of Neural Networks, different neural network architectures, algorithms, applications and their limitations.

LIST OF EXPERIMENTS

- **Case based lab sessions will be conducted in this laboratory.**
- **Implementation of AI and Soft Computing techniques to understand, analyse, compare and visualize the performance of the induced models will be done using Python with Pytorch, Numpy, NLTK, Scikit-learn, etc.**
- **Packages and MATLAB.**
- **The research based real problems will be decided by the course faculty and students.**

CS-554B	DATA MINING LAB	L T P	CR
		0-0-4	2

COURSE OUTCOMES

CO1: Use and Demonstrate the Data Mining Tools : Tanagra, Weka
CO2: Learn the counterparts of the business intelligence like data warehouse, Tanagra, Weka, ERP etc.
CO3: Visualization of the data and dashboards

LIST OF EXPERIMENT

1 Study Of Tanagra As A Data-Mining Tool

2 Study Of Weka As A Data-Mining Tool

3 Importing and viewing data in TANAGRA

4 Defining status of data using Tanagra

5 Program to apply instance selection on given data using Tanagra.

6 Program to apply clustering algorithms on given data by using Tanagra tool.

7 Program to apply A Priori algorithms on given data using Tanagra:

8 Program to generate decision tree using Weka tool

9 Program to use Weka tool to perform clustering:

10 Program to visualize all attributes of Preprocess using Weka

11 Program for processing the data using Weka

12 Program for Classification of Data using Neural Network

13 Program for Classification of Data using Bayesian Network

14 What attributes do you think might be crucial in making the analysis of diabetes? Come up with some simple rules in plain English using your selected attributes using diabetes. arff database

15 What attributes do you think might be crucial in making the analysis of contact-lenses? Come up with some simple rules in plain English using your selected attributes using contact Lenses. arff

CS-556B	PROJECT WITH SEMINAR	L T P	CR
		0-0-8	4

OBJECTIVES

The objective of the seminar is to impart training to the students in collecting materials on a specific topic in the broad domain of Engineering/Science from books, journals and other sources, compressing and organizing them in a logical sequence, and presenting the matter effectively both orally and as a technical report.

COURSE OUTCOMES

After undergoing this course, the students will be able to:

CO1: Organize and illustrate technical documentation with scientific rigor and adequate literal standards on the chosen topic strictly abiding by professional ethics while reporting results and stating claims

CO2: Demonstrate communication skills in conveying the technical documentation via oral presentations using modern presentation tools.

CO3: To impart training to students to face audience and present their ideas and thus creating in them self esteem and courage that are essential for engineers.

CO4: To assess the debating capability of the student to present a technical topic.

CO5: To learn real working condition and technologies of Industry.

Individual students are required to choose a topic of their interest. A committee consisting of at least three faculty members preferably Expertise in respective fields shall assess the presentation of the seminar and award marks to the students.

Each student shall submit two copies of a write up of his/her seminar topic. One copy shall be returned to the student after duly certifying it by the chairman of the assessing committee and the other will be kept in the departmental library. Internal continuous assessment marks are awarded based on the relevance of the topic, presentation skill, quality of the report and participation.

Syllabus

of

M.Tech(CSE) –

LINGAYA'S VIDYAPEETH
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SCHOOL OF COMPUTER SCIENCE

1st Year

3rd Semester

LINGAYA'S VIDYAPEETH
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SCHOOL OF COMPUTER SCIENCE

CS-601B	DIGITAL IMAGE PROCESSING	L T P	Cr
		3-0-0	3

OBJECTIVES

This course will equip the students with understanding of digital image processing, segmentation and feature extraction techniques of images, registration and image fusion, and 3D image visualization.

COURSE OUTCOMES

After completion of course, students would be able to:

CO1: Explain the essentials of digital image processing.
CO2: Describe various segmentation techniques for image analysis.
CO3: Outline the various feature extraction techniques for image analysis.
CO4: Discuss the concepts of image registration and fusion.
CO5: Illustrate 3D image visualization.

UNIT I

REVIEW OF DIGITAL IMAGE PROCESSING: Steps in digital image processing-Elements of visual perception- brightness adaptation, Mach band effect. Image enhancement in spatial and frequency domain, Histogram equalization

UNIT II

SEGMENTATION & FEATURE EXTRACTION: Edge detection, Thresholding, Region growing, Fuzzy clustering, Watershed algorithm, Active contour models, Texture feature based segmentation, Graph based segmentation,Wavelet based Segmentation - Applications of image segmentation. **Feature Extraction:** First and second order edge detection operators, Phase congruency, Localized feature extraction -detecting image curvature, shape features, Hough transform, shape skeletonization, Boundary descriptors, Moments, Texture descriptors- Autocorrelation, Co-occurrence features, Runlength features, Fractal model based features, Gabor filter, wavelet features.

UNIT III

REGISTRATION AND IMAGE FUSION:NRegistration - Preprocessing, Feature selection - points, lines, regions and templates Feature correspondence - Point pattern matching, Line matching, Region matching, Template matching.Transformation functions - Similarity transformation and Affine Transformation. Resampling – NearestNeighbour and Cubic Splines. Image Fusion - Overview of image fusion, pixel fusion, wavelet based fusion -region based fusion.

UNIT IV

3D IMAGE VISUALIZATION: Sources of 3D Data sets, Slicing the Data set, Arbitrary section planes, The use of color, Volumetric display, Stereo Viewing, Ray tracing, Reflection, Surfaces, Multiple connected surfaces, Image processing in 3D, Measurements on 3D images.

UNIT V

RESEARCH-BASED STUDY: The advances and the latest trends in the course as well as the latest

applications of the areas covered in the course. The latest research conducted in the areas covered in the course. Discussion of latest research published in IEEE/ACM transactions, SCI/SCIE/Web of Science/SCOPUS indexed journals and Tier-1 conference of this area. Discussion on some of the latest products available in the market based on the areas covered in the course and patents filed in the areas covered.

TEXT-BOOKS

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing',Pearson,Education, Inc.,Second Edition, 2004.
2. Mark Nixon, Alberto Aguado, "Feature Extraction and Image Processing", Academic Press, 2008.

REFERENCE-BOOKS

1. Ardeshir Goshtasby, " 2D and 3D Image registration for Medical, Remote Sensing and Industrial Applications",John Wiley and Sons,2005.
2. John C.Russ, "The Image Processing Handbook", CRC Press,2007.
3. Anil K. Jain, Fundamentals of Digital Image Processing', Pearson Education, Inc., 2002.

Rick S.Blum, Zheng Liu, "Multisensor image fusion and its Applications", Taylor&Francis,2006.

CS-603B	DATA SCIENCE USING PYTHON	L T P	Cr
		3 0 0	3

OBJECTIVES

It will cover Python programming and its various package such as NUMPY, SCIPY and MATPLOTLIB. This course provides knowledge and expertise to become a proficient data

scientist. It helps demonstrate an understand the statistics and machine learning concepts that are vital for data science.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Explain how data is collected, managed and stored for data science.

CO2: Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists.

CO3: Implement data collection and management scripts using Python Pandas.

CO4: Understand how to use the Python standard library to write programs, access the various data science tools, and document and automate analytic processes.

CO5: understand the data science processes, data exploration, data visualization, hypothesis building, and testing; and the basics of statistics.

CO6: analyze data as well as perform data manipulation using data structures and tools provided in the Pandas package.

CO7: Understand an integrated analysis environment for doing data science with Python.

CO8: Understand supervised learning and unsupervised learning models such as linear regression, logistic regression, clustering, dimensionality reduction, K-NN, and pipeline.

UNIT I

PYTHON BASICS AND PROGRAMMING CONCEPTS:N Introducing Python, Types and Operations - Numbers, Strings, Lists, Tuples, Dictionaries, Files, Numeric Types, Dynamic Typing; Statements and Syntax – Assignments, Expressions, Statements, Loops, iterations, comprehensions; Functions -Function Basics, Scopes, Arguments, Advanced Functions; Modules – Module Coding Basics, Module Packages, Advanced Module Topics; Classes and OOP -Class, Operator Overloading, Class Designing; Exceptions and Tools – Exception Basics, Exception Coding Details, Exception Objects, Designing With Exceptions, Parallel System Tools

UNIT II

GUI PROGRAMMING:N Graphical User Interface - Python gui development options, Adding Widgets, GUI Coding Techniques, Customizing Widgets; Internet Programming - Network Scripting, Client-Side scripting, Pymailgui client, server-side scripting, Pymailcgi server; Tools and Techniques -databases and persistence, data structures, text and language, python/c integration

UNIT III

PANDAS AND NUMPYNNUMPY BASICS - Fast Element wise array functions, Multidimensional Array, Data Processing using arrays, file i/o with arrays; Pandas - Data Structures, Essential Functionality, Summarizing and Computing Descriptive Statistics, Handling Missing Data, Hierarchical Indexing

UNIT III

DATA PREPROCESSING: Data Loading, Storage, and FileFormats -Reading and Writing data in text format, binary data formats, interacting with html and web apis, interacting with databases;

Data Wrangling: Clean, Transform, Merge, Reshape - Combining and Merging Data Sets, Reshaping and Pivoting, Data Transformation, String Manipulation; Data Aggregation

UNIT IV

GROUP OPERATIONS – Group by Mechanics, Data Aggregation, Groupby Operations and Transformations, Pivot Tables and Cross-Tabulation

DATA VISUALIZATION: A Brief matplotlib API Primer, Plotting FunctionsNin pandas, Time Series, Financial and Economic Data Applications

UNIT V

RESEARCH-BASED STUDY:N The advances and the latest trends in the course as well as the latest applications of the areas covered in the course. The latest research conducted in the areas covered in the course. Discussion of latest research published in IEEE/ACM transactions, SCI/SCIE/Web of Science/SCOPUS indexed journals and Tier-1 conference of this area. Discussion on some of the latest products available in the market based on the areas covered in the course and patents filed in the areas covered.

TEXT-BOOKS

1. Python For Data Analysis (O Reilly, Wes Mckinney)
2. Rakshith Vasudev, Introduction to Numpy -1 : An absolute beginners guide to Machine Learning and Data science., 2017.

REFERENCE-BOOKS

1. Python: The Complete Reference, Martin C. Brown, McGraw Hill Education
2. Head First Python, Paul Barry, O′Reilly
3. Learning Python , OReilly, Mark Lutz
4. Programming Python, OReilly, Mark Lutz

CS-605B	MACHINE LEARNING	L T P	Cr
		3 0 0	3

OBJECTIVES

- To understand and apply both supervised and unsupervised machine learning algorithms to detect and characterize patterns in real-world data.
- To understand complexity of machine learning algorithms, their limitations and open-issues

COURSE OUTCOMES

After completion of course, students would be able to:

CO1: Understand the fundamentals of machine learning.
CO2: Analyze the performance of machine learning algorithms, and effect of parameters.
CO3: Develop an understanding what is involved in learning models from data.
CO4: Understand a wide variety of learning algorithms.
CO5: Apply principles and algorithms to evaluate models generated from data.
CO6: Apply the algorithms to a real-world problem.

UNIT I

INTRODUCTION TO MACHINE LEARNING: Learning - Types of machine learning - Supervised learning - The brain and the neurons, Linear Discriminants -Perceptron - Linear Separability -Linear Regression - Multilayer perceptron – Examples of using MLP - Back propagation of error. Problems, data, and tools, Visualization tools, Artificial Neural Networks, Regression Techniques, Linear regression, SSE, gradient descent, closed form, normal equations, features, Overfitting and complexity, training, validation, test data,

UNIT II

CLASSIFICATION ALGORITHMS: Maximum-Likelihood estimation; Maximum a posteriori estimation; Naïve Bayes and Bayesian classifiers; K-nearest neighbour method; Support Vector Machines; Algorithms for clustering: K-means, Hierarchical and other methods, Ensemble Classifiers: Need and usefulness of ensemble classifiers; Bagging; Boosting, Random forests; Decorate; Vote; Stacking. Decision trees - Constructing decision trees - Classification of regression trees - Regression example - Probability and Learning: Turning data into probabilities - Some basic statistics - Gaussian mixture models - Nearest Neighbor methods.

UNIT III

ANALYSIS: The k-Means algorithm - Vector Quantization's - Linear Discriminant Analysis - Principal component analysis - Factor Analysis - Independent component analysis - Locally Linear embedding – Isomap - Least squares optimization - Simulated annealing.

UNIT IV

OPTIMIZATION TECHNIQUES: The Genetic algorithm - Genetic operators - Genetic programming - Combining sampling with genetic programming - Markov Decision Process - Markov Chain Monte Carlo methods: sampling - Monte carlo -Proposal distribution.

UNIT V

RESEARCH-BASED STUDY: The advances and the latest trends in the course as well as the latest applications of the areas covered in the course. The latest research conducted in the areas covered in the course. Discussion of latest research published in IEEE/ACM transactions, SCI/SCIE/Web of Science/SCOPUS indexed journals and Tier-1 conference of this area. Discussion on some of the latest products available in the market based on the areas covered in the course and patents filed in the areas covered.

TEXT-BOOKS

1. Machine Learning: An Algorithmic Perspective by Stephen Marsland, Chapman and Hall/CRC.
2. T. Mitchell, Machine Learning, McGraw Hill.
3. M. Gopal, Applied Machine Learning, McGraw Hill.
4. Sutton R. S. and Barto, A. G., Reinforcement Learning: An Introduction, The MIT Press (2017).

REFERENCE-BOOKS

1. Introduction to Machine Learning by Ethem Alpaydin, PHI Learning.
2. M. Evangelia, Supervised and Unsupervised Pattern Recognition, CRC Press.
3. C. Bishop, Neural Networks for Pattern Recognition, Oxford University Press.
4. G. James, D. Witten, T. Hastie, R. Tibshirani, Introduction to Statistical Learning, Springer.

OBJECTIVES

- To explain the leading trends and systems in natural language processing.
- To understand the concepts of morphology, syntax, semantics and pragmatics of the language.
- To recognize the significance of pragmatics for natural language understanding.
- To enable students to describe the application based on natural language processing and to show the points of syntactic, semantic and pragmatic processing.

COURSE OUTCOMES (COS):

After completion of course, students would be able to:

CO1: Understand fundamentals of Natural Language Processing.
CO2: Model linguistic phenomena with formal grammars.
CO3: Design, implement and analyze Natural Language Processing algorithms.
CO4: Understand approaches to syntax, semantics and discourse generation in natural language processing.
CO5: Apply NLP techniques to design real world NLP applications, such as machine translation, text categorization, text summarization, information extraction, etc.
CO6: Implement proper experimental methodology for training and evaluating empirical NLP systems.

UNIT I

INTRODUCTION: History of NLP; Generic NLP system; Levels of NLP; Knowledge in language processing problem; Ambiguity in natural language; Stages in NLP; Challenges of NLP; Role of machine learning; Brief history of the field; Applications of NLP: Machine translation, Question answering system, Information retrieval, Text categorization, text summarization & Sentiment analysis.

UNIT II

WORDS & WORD FORMS: Morphology analysis survey of English morphology, inflectional morphology & derivational morphology; Regular expressions; Finite automata; Finite state transducers (FST); Morphological parsing with FST; Lexicon free FST, Porter stemmer, N-Grams, N-gram language model, N-gram for spelling correction.

UNIT III

SYNTAX PASSING: Part-of-Speech tagging (POS); Lexical syntax tag set for English (Penn Treebank); Rule based POS tagging; Stochastic POS tagging; Issues: Multiple tags & words, unknown words, class-based n-grams, HM Model ME, SVM, CRF; Context Free Grammar; Constituency; Context free rules & trees; Sentence level construction; Noun Phrase; Coordination; Agreement; Verb phrase & sub categorization.

UNIT IV

SEMANTIC ANALYSIS: Attachment for fragment of English sentences, noun phrases, verb phrases, prepositional phrases; Relations among lexemes & their senses; Homonymy, Polysemy based disambiguation & limitations, Robust WSD; Machine learning approach and dictionary-based approach.

UNIT V

DISCOURSE, APPLICATIONS AND CASE STUDIES: Discourse reference resolution; Reference

phenomenon; Syntactic & semantic constraints on co reference; Preferences in pronoun interpretation; Algorithm for pronoun resolution; Text coherence; Discourse structure. Implementation of applications like Machine translation, Information retrieval, Question answers system, Categorization, Summarization; Sentiment analysis; Case Studies and recent researches in Natural Language Processing

TEXT-BOOKS

1. Géron, Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, O'Reilly.
2. T. Siddiqui, Natural Language Processing and Information Retrieval, Oxford University Press.
3. S. Bird, Natural Language Processing with Python, 1st edition, O'Reilly

REFERENCE-BOOKS

1. D. Rao and B. McMahan, Natural Language Processing with PyTorch: Build Intelligent
2. Language Applications Using Deep Learning, O'Reilly.
3. D. Jurafsky and J. Martin, Speech and Language Processing, 2nd edition, Prentice Hall.
4. Kao, Natural Language Processing and Text Mining, Elsevier.
5. James, Natural Language Understanding, 2nd edition, Pearson

CS-609B	DATA COMPRESSION	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

After completing this course, the students will be able:

CO1: To learn about the fundamental techniques used by many compression algorithms as well as compression methods behind the standards compressed formats in widespread use today.
CO2: To know about when and why various compression techniques are effective.
CO3: To design new compression algorithms specialized for new types of data.
CO4: To create encoding and decoding compression software.
CO5: To read and understand some of the current compression research literature.

UNIT I

Introduction, Lossless Compression - Compression techniques; Modeling and coding. Mathematical preliminaries for lossless compression: Overview; Basic concepts of Information Theory; Models; Coding; Algorithmic information theory; Minimum description length principle. Huffman coding: Overview; The Huffman coding algorithm, Minimumvariance Huffman codes; Application of Huffman coding for text compression.

UNIT II

Lossless Compression – Dictionary Techniques: Overview; Introduction; Static dictionary; Adaptive dictionary; Applications: UNIX compress, GIF, PNG, V.42. Lossless image compression: Overview; Introduction; Basics; CALIC; JPEG- LS; Multiresoution approaches; Facsimile encoding: Run-length coding, T.4 and T.6.

UNIT III

Basics of Lossy Coding: Some mathematical concepts: Overview; Introduction; Distortion criteria; Models. Scalar quantization: Overview; Introduction; The quantization problem; Uniform quantizer; Adaptive quantization.

UNIT IV

Vector Quantization, Differential Encoding: Vector quantization: Overview; Introduction; Advantages of vector quantization over scalar quantization; The LBG algorithm. Differential Encoding: Overview; Introduction; The basic algorithm; Prediction in DPCM; Adaptive DPCM; Delta modulation; Speech coding; Image coding.

UNIT V

Some Mathematical Concepts, Transform coding: Some mathematical concepts: Linear systems; Sampling; Discrete Fourier transform; Z-transform. Transform coding: Overview; introduction; The transform; Transforms of interest; Quantization and coding for transform coefficients; Application to image compression – JPEG; Application to audio compression – MDCT.

TEXT BOOKS

1. Data Visualization: A Practical Introduction.
2. Mead Composition Notebooks, 3 Pack, College Ruled Paper, 9-3/4″ x 7-1/2″, 100 Sheets per Notebook, Black Marble...

REFERENCES

1. The Phoenix Project: A Novel about IT, DevOps, and Helping Your Business Win.
2. Samsonite Compression Packing Bags, Clear, 12-Piece Kit (2-Pouch/4-Carry-On/4-Large/2-X-Large.
3. NETGEAR Wi-Fi Range Extender EX3700 – Coverage Up to 1000 Sq Ft and 15 Devices with AC750 Dual Band Wireless Signal...

LINGAYA'S VIDYAPEETH
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SCHOOL OF COMPUTER SCIENCE

CS-653B	DATA SCIENCE USING PYTHON LAB	L T P	Cr
		0 0 4	2

COURSE OUTCOMES

CO1 To Access the .txt file by using Python Libraries.
CO2 Demonstrate the output of data in .txt file.
CO3 Practical Knowledge of Data Analysis, Understanding structured and unstructured data
CO4 Importing and Exporting Data, Basic Insights from Datasets, Cleaning and Preparing the Data

Implementation of Exploratory data analysis, Statistical techniques, Evaluation methods, Machine Learning and Data Science techniques will be done using Python.

LIST OF EXPERIMENTS

Experiment 1: Write a Python Program to Find the Sum of the Series: 1 + 1/2 + 1/3 + .. + 1/N.

Experiment 2: Write a Python Program to Split the array and add the first part to the end.

Experiment 3: Write a Python Program to Create a List of Tuples with the First Element as the number and Second Element as the Square of the Number.

Experiment 4: Write a Python program to count number of vowels using sets in given string.

Experiment 5: Write a program to implement permutation of a given string using inbuilt function.

Experiment 6: Write a python program to sort list of dictionaries by values in Python – Using lambda function.

Experiment 7: Write a Python Program for following sorting: i. Quick Sort ii. Heap Sort

Experiment 8: Write a Python Program to Reverse a String Using Recursion.

Experiment 9: Write a Python Program to Count the Number of Words in a Text File.

Experiment 10: Write a Python Program to Read the Contents of a File in Reverse Order.

Experiment 11: Write a program to Merge and Join DataFrames with Pandas in Python.

Experiment 12: Write a program to implement Merge and Join DataFrames with Python Pandas.

Experiment 13: Write a Python Program to Append the Contents of One File to Another File.

Experiment 14: How to install and Load CSV files to Python Pandas.

Experiment 15: Write a program to implement Data analysis and Visualization with Python.
using pandas.

Experiment 16: Write a program to Implement Plotting Functions in python pandas.

CS-614B	CRYPTOGRAPHY & CYBER SECURITY	L	T	P	Credit
		3	0	0	3

OBJECTIVES

- In depth understanding of the Cryptographic Techniques.
- To apply cryptographic techniques in computer systems.
- To learn threats and risks within context of the cyber security architecture.
- Student should learn and Identify security tools and hardening techniques.
- To learn types of incidents including categories, responses and timelines for response.

COURSE OUTCOMES

After completion of course, students would be able to:

CO1: Analyse and compare symmetric-key encryption public-key encryption schemes based on different security models.
CO2: Apply cyber security architecture principles.
CO3: Distinguish system and application security threats and vulnerabilities.
CO4: Describe risk management processes and practices.
CO5: Identify security tools and hardening techniques.

UNIT I

SYMMETRIC KEY ENCRYPTION: Introduction: Security Trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security, **Symmetric Cyphers:** Classical Encryption Techniques, Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Stream Ciphers, Block Ciphers, Data Encryption Standard (DES), Advanced Encryption Standard (AES), Triple DES, Block Cipher Modes of Operation.

UNIT II

ASSYMETRIC KEY ENCRYPTION: Public-Key Encryption: Introduction to Number Theory, Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms, Principles of Public-Key Cryptosystems, The RSA Algorithm, Key Management, Diffie-Hellman Key Exchange,

MESSAGE AUTHENTICATION AND HASH FUNCTIONS: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and Macs,

HASH AND MAC ALGORITHMS: Secure Hash Algorithm, HMAC,

DIGITAL SIGNATURES AND AUTHENTICATION PROTOCOLS: Digital Signatures, Authentication Protocols, Digital Signature Standard.

UNIT III

CYBER SECURITY: Introduction to Cyber security: Cyber security objectives, Cyber security roles, Differences between Information Security & Cyber security, **Cyber security Principles:** Confidentiality, integrity, &availability Authentication & non-repudiation, **Incident Response:** Incident categories, Incident response **Incident recovery and Operational security protection:** Digital and data assets, ports and protocols, Protection technologies, Identity and access Management, configuration management.

UNIT IV

SYSTEM SECURITY: Threat Detection and Evaluation (DE): Monitoring, Vulnerability Management, Security Logs and Alerts, Monitoring Tools and Appliances. **Analysis:** Network traffic Analysis, packet capture and analysis, **Introduction to backdoor System and security:** Introduction to metasploit, Backdoor, demilitarized zone(DMZ), Digital Signature, Brief study on Harding of operating system.

UNIT V

RESEARCH-BASED STUDY: The advances and the latest trends in the course as well as the latest applications of the areas covered in the course. The latest research conducted in the areas covered in the course. Discussion of latest research published in IEEE/ACM transactions, SCI/SCIE/Web of Science/SCOPUS indexed journals and Tier-1 conference of this area. Discussion on some of the latest products available in the market based on the areas covered in the course and patents filed in the areas covered.

TEXT-BOOKS

1. William Stallings, "Cryptography and Network Security": Principles and Standards", Prentice Hall India, 5 th Edition, 2007.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security: Private Communication in a public world", Prentice Hall India, 2nd Edition, 2011.

REFERENCE-BOOKS

1. Eric Cole, "Network Security Bible", John Wiley & Sons, 31-Mar-2011.

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SCHEME FOR M.Sc Chemistry

M.Sc Chemistry			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCH-111	Organic Chemistry-I	4	1	0	5
2	MCH-112	Physical Chemistry-I	4	1	0	5
3	MCH-120	Inorganic Chemistry-I	4	1	0	5
4	MCH-161	Organic Chemistry –I Lab	0	0	4	2
5	MCH-162	Physical Chemistry-I Lab	0	0	4	2
6	MCH-170	Inorganic Chemistry Lab-I	0	0	4	2
		Total---->	**12**	**3**	**12**	**21**

M. SC. Chemistry			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCH-114	Inorganic Chemistry- II	4	1	0	5
2	MCH-115	Organic Chemistry-II	4	1	0	5
3	MCH-116	Physical Chemistry- II	4	1	0	5
4	MCH-117	Analytical Chemistry	4	1	0	5
5	MCH-164	Inorganic Chemistry Lab-II	0	0	4	2
6	MCH-165	Organic Chemistry Lab-II	0	0	4	2
7	MCH-166	Physical Chemistry Lab-II	0	0	4	2
8	MCH-167	Analytical Chemistry Lab-I	0	0	4	2
9	MCH-168	Summer Project	0	0	4	2
		Total---->	**16**	**4**	**20**	**30**

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M. SC. Chemistry			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCH-212	Heterocyclic Compounds	3	1	0	4
2	MCH-213	Physical Chemistry III	3	1	0	4
3	MCH-219	Nuclear & Radioactive Chemistry	4	1	0	5
4	MCH-220	Bio Inorganic &Environmental Chemistry	4	1	0	5
5	MCH-260	Inorganic Chemistry- III Lab	0	0	4	2
6	MCH-261	Organic Chemistry- III Lab	0	0	4	2
7	MCH-263	Physical Chemistry-III Lab	0	0	4	2
		Total---->	**14**	**4**	**12**	**24**

M. SC. Chemistry			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MCH-221	Organo Transition metal Chemistry	4	1	0	5
2	MCH-222	Electro Analytical Chemistry	4	1	0	5
3	MCH-223	Medical aspects of Inorganic Chemistry	4	1	0	5
4	MCH-224	Industrial Chemistry	4	1	0	5
5	MCH-271	Inorganic Chemistry- IV Lab	0	0	4	2
6	MCH-272	Inorganic Chemistry-V Lab	0	0	4	2
7	MCH-267	Dissertation/ Major Project	0	0	8	4
		Total---->	**16**	**4**	**16**	**28**

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Semester: I

(2020-2021)

INORGANIC CHEMISTRY-I: (MCH-120)

Course Objective:

1. The learners should be able to analyse the mechanism of selected catalytic organic reactions from
2. Organometallic reaction mechanisms are thoroughly discussed with emphasis on ligandsubstitution, oxidative addition, reductive elimination, insertion and elimination reactions.
3. The application of organometallics in catalysis is highlighted with selected important industrial processes.

Course Outcomes:

1. Identify the structure and bonding aspects of simple organometallic compounds
2. Apply different electron counting rules to predict the shape/geometry of low and highnuclearity metal carbonyl clusters Identify the different types of organometallic reactions
3. Apply the above concepts to explain different catalytic reactions.
4. To know about the bioinorganic compounds, trace elements, and essential humanrequired compounds

Unit-I Organometallic Chemistry:

Basic concept of organometallic chemistry, Metal carbonyl, Phosphine's, alkenes, alkynes & allyl complexes. Hydride, carbenes ,carbynes, metallocene, metal arenes compresses. Fluxonality in Organometallic compound.

Unit-II Organometallic Chemistry:

Homogeneous & Heterogeneous catalysis: Oxidative all & reductive elimination, Insertion reaction, Agostic Interaction, Hydroformylation, Zeigler Natta catalyst, Wilkinson catalyst,Syntheses gas. Monasto process &waker process, catalytic.

Unit- III Inorganic Reaction mechanism:

Mechanism of substitution reaction of tetrahedral, trigonal bipyramidal, square planar & octahedral complexes. Potential energy diagram. Factors affecting reactivity of square planercomplex. Trans effect & its application to synthesis of complexes.

Unit-IV Molecular rearrangement Process:

Electron transfer reaction: outer & inner sphere complexes formation & rearrangement, Nature of bridging ligands, fission of successor complex, two electron transfers, syntheses ofcoordination compounds using electron transfer reaction.

Unit-V Bioinorganic Chemistry:

Basic Introduction (Porphyrin Ring, metallo porphyrin ring) , oxygen transport & oxygen storage system (Hemoglobin, myoglobin, hamocyanin, Hemerythrin), Metalloeneyme- CAE , CP, LADH , Xanthine Oxidase, Tyrosine, Cytochrome –C, Cyt-P-450, Vitamin B-12), Coenzyme-12.Electron transfer protean, Fe-Sulphur protein, cytochrome.Metal storage & metal transfer system ferritin , transferrin.

Reference Books:

1. Principle of Bioinorganic chemistry – Lippard and Berg, Univ. Science Books,1994.

2. Bio-coordination chemistry – Fenton, Oxford chemistry primer,1995.

3. Bioinorganic chemistry: Inorganic perspective in the chemistry of Life, KaimandSchwederski,1994.

4. Inorganic chemistry – Shriver, Atkins, and Langford, 1994.

5. Bioinorganic Chemistry – Bertini, Gray, Lippard and Valentine Viva books Pvt. Ltd.1998.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2
CO4	1	-	-	3	1	-	2	3	1	2

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PRACTICAL INORGANIC CHEMISTRY-I: (MCH-170)

Course Objectives:

1. **Students will get acquainted with the unifying techniques of synthesis and characterization of inorganiccompounds.**

Course Outcomes:

1. The students have the detailed knowledge of synthesis of different inorganic compound
2. Students will learn error analysis, statistical data analysis, volumetric analysis, chromatography, flamephotometry.
3. Students will be capable of characterizing Organic compounds.

Practical Description

1. Preparation of Hexaamminecobalt(lII)chloride

2. Synthesis of CHLOROPENTAAMMINECOBALT(III) CHLORIDE

3. Preparation of ChloropentaamminecobaIt (III) chloride

4. To determine the molar conductance of [Co(NH3)5]Cl3, and [Co(NH3)5Cl]Cl2 bymeasuring conductivity of thesecompounds.

5. To determine the number of chloride ions in the [Co(NH3)5]Cl3 and[Co(NH3)5Cl]Cl2.

6. Synthesis of trans-dichlorobis (ethylenediamine) cobalt (III)Chloride

7. Synthesis of cis-Dichlorobis(ethylenediamine)cobalt (III)Chloride

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2

ORGANIC CHEMISTRY-I: (MCH-111)

Course Objectives:

1. Differentiate chiral and achiral molecules.
2. Recognize and draw structural isomers (constitutional isomers), stereoisomers including enantiomers and diastereomers, racemic mixture, and meso-compounds.
3. Identify the stereocenters in a molecule and assign the configuration as R or S.
4. Know the relationship between enantiomers and their specific rotations.

Course Outcomes:

1. Draw all the stereoisomers of organic compounds, and recognize diastereomers, enantiomers,meso compounds and centres of symmetry
2. Calculate optical purity and enantiomeric excess, Discuss the relative stability of conformationalisomers of cyclohexanes and related compounds.
3. Recognise and discuss the stereoisomers of chiral compounds that do not contain a stereogeniccarbon centre and assign the configuration of the stereoisomers.
4. To learn the involvement of reactive intermediates and understand their structure and reactivitythrough various organic reactions.

Unit-1: Stereochemistry-I:

Molecular Symmetry and Chirality: Symmetry operations and elements, point groups and symmetry number, Stereoisomerism: classification, racemisation, molecules with one, two ormore chiral centres, DL, RS and EZ nomenclature. Planar and axial chirality. Stereochemistry of allenes, spiranes, alkylidine cycloalkanes, adamantanes, catenanes, biphenyls(atropisomerism), bridged biphenyls andcyclophanes.

Unit-2 Stereochemistry-II:

Topicity and prostereoisomerism: topicity of ligands and faces and their nomenclature, stereogenicity, pseudoasymmetry, stereogenic and prochiralcentres.Simple chemical correlation of configurations with examples, quasiracematesCyclostereoisomerism: configuration, conformation, stability of cyloheanes(mono, di and tri- substituted), cyclohexenes, cyclohexanones, halocyclohexanones. Asymmetry induction: Cram's, prelog's and Horeau's rules; Dynamic stereochemistry (acyclic and cyclic) Curtin-HammettPrinciple, circular dichromism and cotton effect.

Unit-3 Study of reactive intermediates-I:

Linear free energy relationships and their applications (Hammett equation and modifications) Carbocations: Classical and non-classical, NGP (Neighbouring group participation), ion- pairs, molecular rearrangements in acyclic, monocyclic and bicyclic systems, stability and reactivity of bridged-head carbocations.

Unit-4 Carbanions:

Generation, structure and stability, ambident ions and their general reactions; HSAB principle and its application Radicals: Generation, structure and stability and reactions, radical cations and anions.

Unit-5 Carbenes:

Formation and structure, reactions invovingcarbenes and carbenoids. Nitrenes: Formation, structure, reactions of nitrenes Nucleophilic aromatic substitution: Benzynes. SNAr and SRN1 mechanisms; Ipso effect.

Reference Books:

1. F. A. Carey and R. A. Sundberg, Advanced Organic Chemistry, Part B: Reactions andSynthesis, 5th edition, Springer, New York,2007.

2. W. Carruthers and I. Coldham, Modern methods of Organic Synthesis, First South AsianEdition 2005, Cambridge UniversityPress.

3. J. March and M. B. Smith, March's Advanced Organic Chemistry: Reactions, Mechanisms,and Structure, 6th Edition, Wiley,2007.

4. I. Fleming, Frontier Orbitals and Organic Chemical Reactions, Wiley, London,1976.

5. S. Sankararaman, Pericyclic Reactions- A text Book, Wiley VCH,2005.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	-	2	2	1	1	1
CO2	1	2	1	-	-	2	3	2	1	2
CO3	1	2	-	-	-	2	3	3	2	2
CO4	2	2	2	-	-	2	3	3	2	2

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PRACTICAL ORGANIC CHEMISTRY-I: (MCH-161)

Course Objectives:

1. Students will get acquainted with the unifying principles of spectroscopy.
2. Students will learn atomic absorption spectroscopy, its basic principle, instrumentation and applications.

Course Outcomes:

1. Study detailed knowledge of analytical ore analysis of different element, quantitative organic compound analysis and also have the spectroscopic determination method.
2. Learn error analysis, statistical data analysis, volumetric analysis, chromatography, flame photometry.
3. Capable of synthesizing Organic compounds.

PRACTICAL DESCRIPTION

I) Qualitative analysis of mono and bifunctional compounds.

II) Small Scale organic synthesis using one of the followingreactions:

i) Acylationreaction

ii) Bromination and bromineaddition

iii) Diazotizationreactions

iv) Couplingreactions.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	-	2	2	1	1	1
CO2	1	2	1	-	-	2	3	2	1	2
CO3	1	2	-	-	-	2	3	3	2	2

PHYSICAL CHEMISTRY-I: (MCH-112)

Course Objectives:

1. Recognize the most significant and elementary solutions of Schrodinger equation in molecular quantum mechanics.
2. Differential equations, partial differential equations, series solutions and special functions, linear vector spaces, transformations of coordinate matrix, representation of operators, eigenvalue problem.

Course Outcomes:

1. Know about the elementary principles of quantum mechanics with particle in 1D box.
2. You understand the electronic structure of atoms and their periodicity.
3. Know about the electronic structure of molecules and chemical bonding.
4. You have a basic understanding of chemical structure determination.

Unit-I Quantum chemistry:

Postulates of quantum mechanics, Linear and Hermition operator, Commutation of operators and uncertainty principles.Differential equations, partial differential equations, series solutions and special functions, linear vector spaces, transformations of coordinate matrix, representation of operators, eigenvalue problem, orthonormal sets Fourier and Laplace transforms.

Unit-II-Some exactly soluble problems:

Particle in a box and ring. Concept of degeneracy and Jahn-Teller distortion. Simple harmonic oscillator problem and its solution using series solutions or factorization method. Calculation of various average values using ladder operators and recursion relations of Hermitepolynomials. Angular momentum operators. Eigenvalues and eigenfunctions. Ladder operators. Rigid rotator and hydrogen atom: Complete solution. Radial distributions. Virial theorem.

Unit-III-HMO method and its applications:

π-Electron approximation, Huckel molecular orbital theory of conjugated systems, calculation of properties- delocalization energy, electron density, bond order, alternant and nonalternant hydrocarbons, pairingtheorem.

Unit-IV-Approximate methods-I:

First order time-independent perturbation theory for non degenerate states. Variation theorem and variational methods. Use of these methods illustrated with some examples (particle in a box with a finite barrier, anharmonic oscillator, approximate functions for particle in a box and hydrogen atom).

Unit-V-Approximate methods-II:

Ground and excited state of helium atom.Pauli's exclusion principle. Many-electron atoms. Concept of spin and determinantal wave functions.

Reference Books:

1. P. W. Atkins and R. S. Friedman, Molecular Quantum Mechanics, Oxford UniversityPress, Oxford, 2004. (Must for Quantum Chemistrybasics)
2. Quantum Chemistry by RKPrasad
3. Quantum Chemistry by Era Levine (For Advance Quantum Chemistry)
4. Introduction to Quantum Chemistry by Clifford Dykstra
5. Elementary Quantum Chemistry by Frank Pilar, Mineola, N.Y. Dover,2001
6. Quantum chemistry and spectroscopy by Thomas Engel, Pearson/Benjamin Cummings,2006
7. Quantum chemistry: fundamentals to applications by Tamás Veszprémi, KluwerAcademic/Plenum,1999.
8. J. P. Lowe and K. Petersen, Quantum Chemistry, Elsevier Academic Press, MA,USA, 2006

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	3	-	1	-	2	1	1	1
CO2	3	2	2	-	1	-	3	-	1	2
CO3	1	2	2	-	-	-	3	2	-	2
CO4	-	2	2		-	-	2	2	2	2

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PRACTICAL PHYSICAL CHEMISTRY-I: (MCH-162)

Course Objectives

1. **Students will get acquainted with the unifying principles of conductometry,potentiometry and chemical kinetics.**

Course Outcomes:

1. The students have the detailed knowledge of analytical ore analysis of different element,
2. Students will learn error analysis, statistical data analysis, volumetric analysis,chromatography, flame photometry.
3. Students will be capable of understanding the principle of potentiometry and conductometry.

PRACTICAL DESCRIPTION

Chemical kinetics:

1. Determine the specific rate constant for the acid catalysed hydrolysis of methyl acetate by the initial rate method. Study the reaction at two different temperatures and calculate the thermodynamic parameters.
2. Study the saponification of ethyl acetate with sodium hydroxide volumetrically.

Conductometry:

1. Determine the cell constant of the given conductivity cell at room temperature and study the equivalent conductance versus square root of concentration relationship of a strong electrolyte (KCl or NaCl) and weak electrolyte (aceticacid).
2. Determine the equivalent conductance at infinite dilution for acetic acid by applying Kohlrausch's law of independent migration ofions
3. Determine the equivalent conductance, degree of dissociation and dissociation constant (Ka) of aceticacid.
4. Study the conductometric titration of acetic acid vs. sodiumhydroxide

Potentiometry:

1. Prepare and test Calomel electrode.
2. Titrate hydrochloric acid and sodium hydroxide potentiometrically.
3. Determine the dissociation constant of acetic acid potentiometrically.
4. Titrate oxalic acid and sodium hydroxide potentiometrically.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	-	2	2	1	1	1
CO2	1	2	1	-	-	2	3	2	1	2
CO3	1	2	2	-	-	2	3	3	2	3

SEMESTER II

INORGANIC CHEMISTRY-II: (MCH-114)

Course Objectives:

1. Apply the concept of linear combination of atomic orbitals to hybridization and directedbonding in polyatomic molecules.
2. Solve the real-world problem using advanced numerical programs through Gaussianorbitals.
3. Show that molecular symmetry operations form a group and can be characterized byfundamental representations of groups known as irreducible

Course Outcomes:

1. Analyze point group theory to the study of electrical, optical and magnetic properties andselection rules for absorption.
2. Apply time independent perturbation theory to complex problems ofmolecular energy levels in the presence of external electric and magnetic fields.
3. Determine the symmetry operations of any small and medium-sized molecule.
4. Explain various symmetry elements and operations of different molecules

Course A: Group Theory and its Applications:

Symmetry elements and symmetry operations, Groups, subgroups, classes and its characteristics, products, classes and application of symmetry operations.

Equivalent atoms, equivalent symmetry elements, relation between symmetry elements andoperations.

Point group classification along with the Optical activity and Dipole moment based applications.

Reducible and irreducible representations, position vector, base vector for representation, character table, Wave functions for irreducible representations (p- and d- block only), Correlation diagram, Russell-Saunders coupling, vibronic coupling, non-cetrosymmetric complexes.

Infrared and Raman spectroscopy, SALCs, Hybridization and its applications, LCAO.

Course B: d- and f- block elements:

Russel Saunders state, Term and symbols, CFT and splitting in Td, D4h, C4v systems, Determination of Dq and Racah parameters, Orgel and Tanabe sugano diagrams, electronic absorption spectra (complex ions), Magnetic properties (Transition metal complexes) Structure and bonding in complexes containing π-acceptor ligands. Spectrochemical and nephelauxetic series.

Reference Books:

1. D. M. P. Mingos and D. J. Wales; Introduction to Cluster Chemistry, Prentice Hall,1990.
2. N. N. Greenwood and E. A. Earnshaw; Chemistry of elements, Second Edition,Butterworth- Heinemann,1997.
3. T. P. Fehlner, J. F. Halet and J-Y. Saillard; Molecular Clusters: A Bridge to solid-stateChemistry, Cambridge University press,2007.
4. B. D. Gupta and A. J. Elias; Basic Organometallic Chemistry: Concepts, Synthesis, andApplications, Universities Press (India),2010.

5. D. M. P. Mingos, Essential Trends in Inorganic Chemistry, Oxford, University Press,1998.
6. C. E. Housecroft, Metal-Metal Bonded Carbonyl Dimers and Clusters, Oxford ChemistryPrimers (44), Oxford, University Press,1996.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	-	3	-	-	-	-	2	3	1	1
CO2	-	2	1	-	1	-	3	2	1	2
CO3	-	3	-	-	1	-	3	3	3	2
CO4	-	3	-	-	1	-	3	3	3	2

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PRACTICAL INORGANIC CHEMISTRY-II: (MCH-164)

Course Objectives

1. **The objective of this course is to get the knowledge of analysis of various mixture ofinorganic salts.**

Course Outcomes:

1. The students have the detailed knowledge of qualitative analysis of mixture of inorganicsalts,
2. Students will learn about the titration, volumetric analysis and chromatography.
3. Anayse the various inorganic mixtures.

PRACTICAL DESCRIPTION

1. Qualitative analysis of mixtures of inorganic salts including rare earthsalts.
2. Quantitative analysis of mixtures of metal ions by complexometric titrations using maskingand de masking agents.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	-	2	2	1	1	1
CO2	1	2	1	1	1	2	3	2	1	1
CO3	1	2	1	1	1	1	2	2	1	1

ORGANIC CHEMISTRY-II: (MCH-115)

Course Objectives:

1. The course aims to improve a student's understanding of fundamental organic reactions and to add further transformations and principles to their knowledge base.
2. They will encounter anion, radical, pericyclic and organometallic mediated processes, gaining new insights into the factors governing the mechanistic, stereo-chemical and region-chemical course of such reactions.
3. Throughout the course the usefulness of the chemistry discussed with be highlighted through applications.

Course Outcomes:

1. Delineate the mechanistic and stereochemical course of some sophisticated cascade.
2. Can learn different reducing and other reagents with stereoselectivity
3. Can describe different approaches to the formation of carbanions, discuss their structures,stabilities/reactivities and applications in synthesis
4. Radical reactions and appreciate their value in target oriented synthesis.

Course A: Organic Synthetic methodology:

Reduction Chemistry: Stereochemistry and selectivity of catalytic hydrogenation along with the mechanism, Applications of Lithium aluminium hydride, Sodium borohydride, sodium cyanohydride, alkoxy substituted LAH, DIBAL, diborane, diisoamylborane, thexyborane, 9-BBN as reducing agents, Homogeneous hydrogenation mechanism using Ru and Rh metal complexes along with its applications.

Oxidation Chemistry: Sharpless epoxidation, Applications of DDQ, SeO_2, $Tl(NO_3)_3$.

Coupling Reactions with Pd(0) and Pd(II): Stille, Suzuki and Sonogashira coupling, Heck reaction and Negishicoupling.

Reductions: stereochemistry, stereoselection and mechanism of catalytic hydrogenation andmetal-liquid ammonia reactions.

Course B: Spectroscopy:

PMR**: Effect of external magnetic field on the spinning nucleus, precessional motion and frequency. Energy transitions, Chemical shift and its measurements. Factors influencing chemical shift, anisotropic effects. Integrals of protons, spin-spin coupling, magnitude of coupling constant. Chemical and magnetic equivalence, proton exchange, factors affecting the coupling-first and non-first order spectra. Simplification of complex spectra and NOE experiments. Applications of PMR in structural elucidation of simple and complex compounds.**

CMR**: Resolution and multiplicity of ^{13}C NMR. ^{1}H-decoupling, noise decoupling, broad band decoupling, deuterium, fluorine and phosphorus coupling. NOE signal enhancement, off-resonance, proton decoupling, structure applications of CMR, DEPT**

and INEPT experiments. Introduction to 2D-NMR, COSY, HMQC and HETCORspectra.

ESR**: Hyperfine splitting, g-values, ESR spectra of molecules.**
MASS**: Unit mass and molecular ions, Singly, doubly/multiple charged ions, metastable peak, base peak, isotopic mass peaks, Recognition of M^+ ion peak, Ionization methods (CI, EI and FAB), general fragmentation rules, fragmentation of various classes of organic**

molecules, McLafferty rearrangement, ESI, APCI and MALDIetc.

Reference Books:

1. P. W. Atkins, Molecular Quantum Mechanics, 2nd edition, Oxford University Press,1983.

2. P. F. Bernath, Spectra of Atoms and Molecules, 2nd Edition, Oxford University Press,2005.

3. E. B. Wilson, Jr., J. C. Decius and P. C. Cross, Molecular Vibrations: The TheoryofInfrared and Raman Spectra, Dover Publications, 1980.

4. W. Demtroder, Molecular Physics, Wiley-VCH,2005.

5. J. A. Weil and J. R. Bolton, (Eds), Electron Paramagnetic Resonance: Elementary Theoryand Practical Applications, Second Edition, Wiley Interscience, John Wiley & Sons, Inc., 2007.

6. A. E. Derome, Modern NMR Techniques for Chemistry Research, Pregamon,1987.

7. C. P. Slichter, Principles of Magnetic Resonance, Third Edition, Springer-Verlag,1990.

8. T. C. Farrar and E. D. Becker, Pulse and Fourier Transform NMR, Academic Press,NewYork,1971.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2
CO4	1	1	1	-	1	1	-	1	2	3

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PRACTICAL ORGANIC CHEMISTRY-II: (MCH-165)

Course Objectives

1. **The objective of this course is to understand the basic principle of organic synthesis.**

Course Outcomes:

1. Study about the different functional groups.
2. Learn the basic principle of qualitative analysis.
3. Synthesize the various organic compounds.

PRACTICAL DESCRIPTION

I) Qualitative analysis of mono and bifunctional compounds.

II) Small Scale organic synthesis using one of the followingreactions:

i) Oxidation andreduction

ii) Condensations

iii) Diazotizationreactions

iv) Acylationreaction

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	2	2	1	-	1	-	3	-	1	1
CO3	2	1	1	-	1	-	2	1	1	1

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PHYSICAL CHEMISTRY-II: (MCH-116)

Course Objectives:

1. The learners should be able to apply principles and laws of equilibrium thermodynamicsto multicomponent systems.
2. Can use spectroscopic data to calculate thermodynamic properties of ideal gases, real gases, solids and metals using the principles and techniques of statistical thermodynamics.
3. The learners can to apply elementary laws of chemical kinetics and analyze reaction mechanisms and changes in transport properties of chemical reactions and collision processes.

Course Outcomes:

1. Understand and calculate change in thermodynamic properties, equilibrium constants,partial molar quantities, chemical potential.
2. Apply phase rule and, draw phase diagrams for one, and two component systems, identifythe dependency of temperature and pressure on phase transitions.
3. Calculate the absolute value of thermodynamic quantities (U, H, S, A, G) and equilibriumconstant (K) from spectroscopic data.
4. Predict heat capacity (Cv, Cp) of an ideal gas of linear and non-linear molecules from thenumber of degrees of freedom, rotational and vibrational wave numbers.

Course A:

Statistical mechanics, thermodynamics, kinetics and macromolecules statistical mechanics and thermodynamics.

Fundamentals:

Concept of distribution. Thermodynamic probability and most probable distribution. Canonical and other ensembles. Statistical mechanics for systems of independent particles and its importance in Chemistry. Types of statistics: Maxwell-Boltzmann. Thermodynamic probability (W) for the three types of statistics. Derivation of distribution laws (most probabledistribution) for the three types of statistics. Lagrange's undetermined multipliers. Stirling's approximation, molecular partition function and its importance. Assembly partitionfunction.

Application to ideal gases:

The molecular partition function and its factorization. Evaluation of translational, rotational and vibrational partition function of monatomic, diatomic and polyatomic gases. The electronic and nuclear partition functions. Calculation of thermodynamic properties of ideal gases in terms of partition function. Statistical definition of entropy. Third law of Thermodynamics, Residual entropy.

Macromolecules:

Concepts of number average and mass molecular weights. Methods of determining molecular weights (osmometry, viscometry, sedimentation equilibrium methods). Distribution of chainlengths. Average end-to-end distance.

Course B: Kinetics:

Theories of reaction rates: Collision theory. Potential energy surfaces (basic idea). Transition

state theory (both thermodynamic and statistical mechanics formulations). Theory of unimolecular reactions, Lindemann mechanism, Hinshelwood treatment, RRKM model(qualitative treatment).

Solution kinetics:

Factors affecting reaction rates in solution. Effect of solvent and ionic strength (primary salt effect) on the rate constant. Secondary salt effects.

Electrochemistry:

Solutions: Activity coefficients and ion-ion interactions. Physical significance of activity coefficients, mean activity coefficient of an electrolyte and its determination. Derivation of Debye-Huckel theory of activity coefficients (both point ion size and finite ion size models).Excess functions.

Reference Books:

1. P. Atkins and J. Paula, Physical Chemistry, 10th Edition, Oxford University Press,Oxford2014.
2. D. A. McQuarrie and J. D. Simon, Molecular Thermodynamics, University ScienceBooks,California2004

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	2	2	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2
CO4	2	2	2	2	3	1	2	2	3	2

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PRACTICAL PHYSICAL CHEMISTRY-II: (MCH-166)

Course Objectives

1. **Students will get acquainted with the unifying principles of conductometry,potentiometry and chemical kinetics.**

Course Outcomes:

1. The students have the detailed knowledge of chemical kinetics and electrochemistry.
2. Students will learn error analysis, statistical data analysis, volumetric analysis,chromatography, flame photometry.
3. Students will be capable of understanding the principle of potentiometry and conductometry.

Practical Description

Chemical kinetics:

1. Compare the strength of hydrochloric acid and sulphuric acid studying the rate ofhydrolysis of methylacetate.
2. Study the kinetics of iodination of acetone in the presence of acid by the initial ratemethod.

Conductometry:

1. Study the conductometric titration of hydrochloric acid with sodium carbonate anddetermine the concentration of sodium carbonate in commercial sample of sodaash.
2. Study the conductometric titration of acetic acid vs. ammoniumhydroxide
3. Study the conductometric titration of sodium acetate vs.HCl

Potentiometry:

1. Prepare and test Calomelelectrode.
2. Titrate a mixture of strong and weak acids (Hydrochloric and aceticacids)
3. Titrate a mixture of weak acid (acetic acid) and dibasic acid (oxalicacid)
4. Titrate a mixture of strong acid (hydrochloric acid) and dibasic acid (oxalic acid) versussodiumhydroxide.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	2	2	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2

ANALYTICAL CHEMISTRY-I (MCH-117)

Course Objectives:

1. The learners should be able to apply the conceptual understanding of the principles and implementation modes of several analytical instruments to chemical systems.
2. To know that mixtures are composed of constituents which are not combined
3. To apply methods of distillation, sublimation, chromatography, filtration (including buchner filtration), evaporation, decantation, using magnetism, sieving and skimming toseparate mixtures.
4. To understand the terms filtrate, residue, filtration, sediment, decant, distil, distillate, chromatogram and solventfront.

Course Outcomes:

1. Solve the problems based on various analytical concepts
2. Design experiments with improved sample preparation.
3. Understand new measurement procedures and tools, Quantify analytes with proper data handling and analysis.
4. Describe qualitatively and model quantitatively the operation and design of economicallyviable processes

Course A: Introduction to analytical chemistry:

Scope & objectives, Analytical chemistry and chemical analysis, Classification of analyticalmethods, Method selection, Sample processing, Steps in a quantitative analysis, Quantitative range (bispartite classification), Data organization, Analytical validations, Limit of detection and limit of quantitation, The tools of analytical chemistry and good lab practices.

Errors in Chemical Analysis and Statistical Evaluation of Data:

Systematic and random errors, Accuracy and precision, Ways of expressing accuracy and precision, Normal error curve and its equation, Propagation of error, Useful statistical test: test of significance, the F test, the student 't' test, the chi-test, the correlation coefficient, confidence limit of the mean, comparison of two standard values, comparison of standard deviation with average deviation, comparison of mean with true values, significant figures, regression analysis (least-square method for linear plots), statistics of sampling and detectionlimitevaluation.

Course B: Separation Methods:

(a) Multiple liquid-liquidextraction:

Countercurrent extraction, Craig's tube and Craig's apparatus, distribution of single solute, Gaussian treatment in describing distribution pattern of solute fraction in r^{th} tube after n- transfers.

(b) FractionalDistillation:

Temperature composition diagram of a binary system, concept of theoretical plates, HETP, Bubble-cap distillation column and derivation of Fenske equation.

(c) Chromatography:

General description of Chromatography, Principle of chromatography, Classifications of chromatography, Techniques of planar and column chromatography, Gas chromatography, High-performance liquid chromatography.

Gas Chromatography:

Introduction, principle of gas chromatography, instruments for gas-liquid chromatography, detectors:- thermal conductivity detector, flame ionization detector, electron capture detector and others, gas chromatographic columns and stationary phases, factors affecting the efficiency of the column, Van-Deemter equation, resolution, retention time and other basic parameters. Interpretation of gas chromatograms. Qualitative analysis, Kovats retention index (I), Quantitative analysis, measurement of peak area, response factor; Temperature programming in gas chromatography, Applications of gas chromatography.

High Performance Liquid Chromatography (HPLC):

Basic difference between HPLC and conventional liquid chromatography with respect to sample applications, packing materials and equipments, detectors. Advantages and applications.

Reference Books:

1. Wilson, Ian D.; Adlard, Edward R.; Cooke, Michael; et al., eds. (2000).

2. Encyclopediaof separation science. San Diego: Academic Press. ISBN978-0-12-226770-3

3. D. A. Skoog, F. J. Holler and S. R. Crouch, Principles of Instrumental Analysis, 6thEdition, Brooks/Cole Cengage Course, Belmont, CA,2007
4. J. Wang, Analytical Electrochemistry, 3rd Edition, Wiley – VCH,2006
5. P.T. Kissinger and W. R. Heineman, Laboratory Techniques in ElectroanalyticalChemistry, 2nd Edition, Marcel Dekker Inc.,1996.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2
CO4	-	3	3	-	-	1	2	3	2	2

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PRACTICAL ANALYTICAL CHEMISTRY-I (MCH-167)

Course Objectives:

1. **Students will get acquainted with the analytical techniques of and characterization ofinorganic compounds.**

Course Outcomes:

1. The students have the detailed knowledge of synthesis of different inorganic compound
2. Students will learn error analysis, statistical data analysis, volumetric analysis,chromatography, flame photometry.
3. Students will be capable of characterizing Inorganic compounds.

Practical Description

1. Determination of accuracy, precision, mean deviation, standard deviation, coefficient of variation, normal error curve and least square fitting of certain set of experimental data in ananalysis.
2. Composition of two sets of results in terms of significance (Precision and accuracy) by (I)student's t-test, (ii)F-test.
3. Determination of Fe (III) by chloride extraction inether.
4. Determination of Fe (III) as the 8-hydroxy quinolate (oxinate) by extraction inchloroform.
5. Separation of Cd^{+2} and Zn^{+2} quantitativelythrough an anion exchanger.
6. Separation of nickel, manganese, cobalt and zinc and determination of Rfvalues by thinlayer or paper striptechniques.
7. Determination of ferrous ammonium sulfate potentiometrically with standard ceric sulfatesolution (Direct and backtitration).

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	2	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2

SEMESTER-III

HETEROCYCLIC COMPOUNDS (MCH-212)

Course Objectives:

1. Rationalization of the reactivity of heteroaromatic compounds.
2. Knowledge of methods to prepare some heterocyclic compounds with Five and Sixmembers, fused rings and heterocyclic compounds two or more heteroatom's.
3. Improving the students' knowledge of the methods of preparation followed by theReaction Mechanism.
4. Application for the Synthesis and Design of some biologically active compounds derivedfrom heterocyclic compounds.

Course Outcomes:

1. Be familiar with the structures of important classes of heterocyclic aromatic organiccompounds.
2. Classify simple heterocyclic aromatic compounds as electron deficient or electron rich and explain their reactivity based on these properties.
3. Know how selected organometallic reactions can be applied in heterocyclic chemistry.
4. Explain on a mechanistic level, reactions and synthesis of important electron deficient nitrogen containing heterocycles.

Unit-I Introduction toheterocycles:

Nomenclature, spectral characteristics, reactivity and aromaticity

Unit-II Synthesis and reactions of three and four membered

heterocycles: Aziridine, azirine, azetidine, oxiranes, thiarines, oxetanes

and thietanes.

Unit-III Five-membered rings with two heteroatoms:

pyrazole, imidazole, oxazole, thiazole, isothiazole, benzofused analogs.

Unit-IV Chemistry of bicyclic compounds containing one or more heteroatoms.

Bezofused six membered rings with one, two and three heteroatoms: benzopyrans, quinolones, isoquinolines, quinoxazalines, acridines, phenoxazines, phenothiazines, benzotriazines,pteridines.

Unit-V Seven and large membered heterocycles:

azepines, oxepines, thiepines. Chemistry of porphyrins and spiro heterocycles.

Recommended Texts:

1. "Heterocyclic Chemistry" by J A Joule and KMills
2. "Name Reactions in Heterocyclic Chemistry" by Jie JackLi
3. "Advances in Heterocyclic Chemistry" by Alan RKatritzky
4. "Synthesis of some heterocyclic compounds by advanced techniques" by Sandip Sadaphal **and MurlidharShingare**
5. "Heterocyclic Chemistry" by Raj KBansal
6. "Heterocyclic Chemistry" byGILCHRIST
7. "HETEROCYCLIC CHEMISTRY" by Ahluwalia VK
8. "Heterocyclic Chemistry" by John A Joule and KeithMills

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2
CO4	1	-	-	2	1	1	1	2	2	2

Organic Chemistry –III Practical: (MCH-261)

Course Objectives:

1. Students will get acquainted with the unifying principles of spectroscopy.
2. Students will learn atomic absorption spectroscopy, its basic principle, instrumentation and applications.

Course Outcomes:

1. The students have the detailed knowledge of analytical ore analysis of different element, quantitativeorganic compound analysis and also have the spectroscopic determination method.
2. Students will learn error analysis, statistical data analysis, volumetric analysis, chromatography, flamephotometry.
3. Students will be capable of synthesizing Organic compounds.

PRACTICAL DESCRIPTION

1. QualitativeAnalysis:

   a) Less common metal ions- Tl, Se, Te, Mo, W, Ti, Zr, U&V

   b) Insolubles- Oxides(WO_3, Silica, Alumina); Sulphates(Lead Sulphate, Barium Sulphate Strontium Sulphate and Calcium Sulphate);

   Halides(Calcium fluoride and silver halides)

   (2 less common metal ions and 1 insoluble to be given)

2. QuantitativeAnalysis:

   a) Separation and determination of two metal ions such as Ag- Cu, Cu- Ni, Cu- Zn, Ni- Zn, Cu-Fe etc. involving volumetric and gravimetric methods.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	1	-	-	2	2	1	1

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PHYSICAL CHEMISTRY-III (MCH-213)

Course objectives:

1. Student is able to determine the (most important) quantum states of a given material (atoms, small molecules).
2. Student is able to determine which quantum state(s) belong(s) to the ground state.
3. Student can rationalize which transitions between quantum states as a result of an absorption, emission or scattering event have a more than zero probability of taking place.

Course Outcomes:

1. Discuss the basics of Spetroscopy.
2. Study the principles of NMR, UV, Raman and Mass spectroscopy.
3. Able to characterize and interpret various organic compounds through IR NMR spectroscopy,.
4. Explain about elemental analysis technique, working basic and using of elemental analysis device.

Unit I-Rotational spectroscopy:

Introduction to molecular spectroscopy, Rotational spectroscopy of diatomic molecules based on rigid rotator approximation, Determination of bond lengths and/ or atomic masses from microwave data, effect of isotopic substitution, non-rigid rotator, classification of polyatomic molecules, energy levels and spectra of symmetric top molecules and asymmetric top molecules, First order Stark effect.

Unit II-Vibrational spectroscopy:

Normal coordinate analysis of mononuclear and heteronuclear diatomic molecules, Extension to polyatomic linear molecules, Derivation of selection rules for diatomic molecules based on Harmonic oscillator approximation, Force constants and amplitudes, Anharmonic oscillator, Overtones and combination bands, Dissociation energies from vibrational data, Vibration- rotation spectra, P, Q and R branches, Breakdown of the Born-Oppenheimer approximation, Nuclear spin effect.

Unit III-Raman Spectroscopy:

Stokes and anti-stokes lines, Polarizability ellipsoids, Rotational and Vibrational Raman spectroscopy. Selection rules, Polarization of Raman lines.

Unit IV-Atomic Spectra:

(i) Characterization of atomic states, Microstate and spin factoring methods, Hund's rules, Derivation of spin and orbital selection rules (based on recursion relations of Legendre polynomials), spectra of complex atoms. Zeeman and Stark effect, Atomic photoelectron spectroscopy.

(ii) Electronic spectroscopy: Diatomic molecules, Selection rules. Breakdown of selection rules, Franck-Condon factors, Dissociation energies, Photoelectron spectroscopy ofdiatomic (N_2) and simple polyatomic molecules (H_2O, formaldehyde), Adiabatic and vertical ionization energies, Koopmans'theorem.

Unit V-NMR spectroscopy:

Larmor precession. Mechanism of spin-spin and spin-lattice relaxation and quantitative treatment of relaxation, Quantum mechanical treatment of the AB system, Selection rules andrelative intensities of lines.

Recommended Texts books:

1. Hollas. J.M Modern Spectroscopy 4th Ed. Wiley &Sons(2004)
2. Barrow. G. M. introduction to Molecular Spectroscopy Mc Graw-Hill(1962)
3. Brand. J.C.D. & Speakman. J.C. Molecular Structure the Physical Approach 2nd Ed.Edward Arnold London(1975)
4. Chang. R. Basic Principles of Spectroscopy McGraw- Hall. New York, N.Y.(1970)
5. Moore, W.J. Physical Chemistry 4th Ed. Prentice-Hall(1972)
6. Warren, B.E. X-Ray Diffraction Dover Publications(1990)

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	2	-	-	-	2	2	2	2
CO4	-	1	1	1	-	1	2	2	1	2

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PRACTICAL PHYSICAL CHEMISTRY-III: (MCH-263)

Course Objectives

1. **Students will get acquainted with the unifying principles of conductometry,potentiometry and chemical kinetics.**

Course Outcomes:

1. The students have the detailed knowledge of chemical kinetics and electrochemistry.
2. Students will learn error analysis, statistical data analysis, volumetric analysis,chromatography, flame photometry.
3. Students will be capable of understanding the principle of potentiometry and conductometry.

Practical Description

1. Titrate a moderately strong acid (salicylic/mandelic acid) by the
(a) Salt-line method
(b) Double alkali method

2. Titrate a mixture of copper sulphate, acetic acid and sulphuric acid with sodium hydroxide.
3. Titrate a tribasic acid (phosphoric acid) against NaOH and Ba(OH)2 conductometrically.
4. Titrate

(i) Magnesium sulphate against BaCl2 and its reversetitration
(ii) HCl Vs NH4OH
(iii) Sodium oxalate Vs HCl

5. Estimate the concentration of each component of a mixture of AgNO3 and HNO3 byconductometrictitration against NaOH.
6. Determine the degree of hydrolysis of aniline hydrochloride.
7. Determine the critical micelle concentration of a surfactant (sodium lauryl sulphate) by theconductivity method.
8. Study the effect of dielectric constant on the nature of the conductometric titration between maleic acidand sodium methoxide using different mixtures of benzene and methanol as solvents.
9. Determine the velocity constant for the saponification of ethyl acetate conductometrically.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	1	1	1	1	-	2	-	1	1
CO3	1	2	1	-	-	-	2	1	2	2

Nuclear & Radio Chemistry (MCH-219)

Course Objectives:

1. Improve their knowledge of the basic information of Radiation and Nuclear chemistry; requirements, methods of preparation, uses of radio-elements series, nuclear models, nuclear properties, Mass energy, relationships, nuclear reactions, rates of radioactive decay, interaction of radiation with matter.
2. Improve their knowledge of instrumentation and Introduction to health – physical applications in nuclear and radiochemistry.

Course Outcomes:

1. Know the significance of Radio Chemical Techniques
2. Apply the basic principle and methodology of Radio Chemical Techniques
3. Understand the applications of Radio Chemical Techniques.
4. Analyze and calculate the half life and decay rates of various radioactive elements

Section-A:

Nuclear Binding Energy:

Justifications and applications; nuclear stability rules and decay of unstable nuclei. Nuclear Structure: Nuclear force, Liquid drop model, shell model andcollective mode.

Section-B:

Interaction of Radiation with matter

Physical and chemical effects of radiation on matter (photoelectric effect, Compton effect and pair production).

Radiochemical Techniques:

NAA:**Principle, Application and Limitation**

IDA: **Principle, Application and Limitation, Radiometric titrations.**

Section-C:

Detection of Nuclear Radiation:

Various methods of detecting nuclear radiations, Gas-filled counters –Ionization chamber;Proportional counter and G.M. counters, Scintillation detectors; Solid state detectors.

Section-D:

Nuclear Reactions:

Energetics of nuclear reactions; various types of nuclear reactions including photonuclear, thermonuclear and spallation reactions; mechanism of nuclear reaction by compound nucleus model.

Nuclear fission:

Fission probability; energy release; theories of fission.

Nuclear Fussion:

Brief idea about breeder reactors,; accelerators and cyclotron.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	3	2	2	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	2	2	2	2	2	2	2	2
CO4	1	1	2	1	1	1	1	2	2	2

Bioinorganic & Environmental Chemistry (MCH-220)

Course Objectives:

1. Students will demonstrate the ability to plan and execute experiments that demonstrate the use and understanding of modern instrumentsand appropriate use of Bioinorganic Chemistry.
2. Students will demonstrate their ability to communicate effectively about environmentalchemistry, demonstrating the ability to create an awareness about environment.
3. Students will develop a sense of community responsibility by becoming aware of scientific issues in the larger social on text.

Course Outcomes:

1. Acquire broad knowledge of the field of Environmental Chemistry including basicprinciples, target organ toxicity and the toxicity of a select group of chemical compounds.
2. Use technical and analytical skills to quantify the level and effects of BioinorganicChemistry.
3. Understand relationships between chemical exposure and effects on physiologicalsystem
4. Design strategies for study of harmful effects of different pollutants.

Section-A:

Metal Ions in Biological Systems:

General survey of essential and trace metals, Disturbing factors in metabolicprocess and causes of diseases, different classes of drugs.

Alkali and alkaline earth metals in biological systems:

Ionophores, active transport of cations across membranes, sodium pump, Calcium pump, Calcium carriers, role of carriers in muscle contraction, bloodclotting and hormones.

Interaction of metal ions with Nucleotides:

metal ions in nucleotide systems, effect of metal ions on nuclei acids.

Section-B:

Oxygen carriers: Porphyrins, metalloporphyrins, Hemoproteins, structure and functions of hemoglobin and myoglobin, synthetic oxygen carrier modelsystems.

Nitrogen fixation:

Biological nitrogen fixation, Nitrogenase, model for nitrogenase, metal-N_2 complexes, photosynthesis and chlorophyll.

Metal transport and storage:

Transferrin, Ferritin, Siderophores

Section-C:

Environmental Chemistry:

Atmosphere: Chemical composition of atmosphere, atmospheric structure, Earth's radiation balance; oxides of N,C,S and their effects, Green house effect, acid rain, photochemical smog , air quality standards, depletion of ozone, particulate matter in atmosphere , mechanism of aerosol formation in air, Noise pollution and their health hazards.

Reference Books:

1. "Advances in Inorganic Biochemistry: Metal Ions in Genetic InformationTransfer **v. 3" by Luigi G Marzilli and Gunther L Eichhorn.**
2. "Mechanisms of Metallocenter Assembly (Advances in inorganicbiochemistry)" by Luigi G Marzilli and Gunther LEichhorn.
3. "Molecular Design in Inorganic Biochemistry (Structure andBonding)" by Daniel Rabinovich.
4. "Fundamental Concepts of Environmental Chemistry" by G S Sodhi,Narosa Book Distributors PvtLimited.
5. "Environmental Chemistry" by Anil Kumar De, NEW AGE; 7Edition.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	2	3	-	2	1	1	1
CO2	3	2	1	2	2	-	3	-	1	2
CO3	2	2	2	3	3	2	3	2	2	2
CO4	2	2	2	3	3	2	3	2	2	2

Inorganic Chemistry –III Practical: (MCH-260)

Course Objectives

1. **Students will get acquainted with the unifying principles of synthesis and characterizationof metal complexes.**

Course Outcomes:

1. The students have the detailed knowledge of chemical kinetics and electrochemistry.
2. Students will learn error analysis, statistical data analysis, volumetric analysis,chromatography, flame photometry.
3. Students will be capable of understanding the principle of potentiometry and conductometry.

Practical Description

Preparation of selected Inorganic compounds/complexes and their characterization using techniques/methods such as elemental analysis, conductance measurement, molecular weight determination, magnetic susceptibility measurements, infrared, UV, visible, Mossbauer and ESR spectra etc. Handling of air and moisture sensitive compounds.

i) Chromous Acetate
ii) Hg[Co(SCN)4]
iii) Ni(dmg)2
iv) $[Cu(NH_3)_4]SO_4.H_2O$
v) $[Ni(NH_3)_6]Cl_2$
vi) $K_3[Fe(C_2O_4)_3]$
vii) $VO(acac)_2$
viii) $Mn(acac)_3$
ix) Prussianblue
x) $[Co(NH_3)_5Cl]Cl_2$; $[Co(NH_3)_5NO_2]Cl_2$;$[Co(NH_3)_5ONO]Cl_2$
xi) $K_3[Al(C_2O_4)_3]$
xii) $[Ni(en)_3]S_2O_3$etc.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	2	3	-	2	1	1	1
CO2	3	2	1	2	2	-	3	-	1	2
CO3	2	2	2	1	2	2	1	1	2	2

Semester-IV

ORGANO-TRANSITION METAL CHEMISTRY: MCH-221

Course Objectives:

The objective of this course is that students will gain the detailed knowledge of synthesis, bonding,

Reaction and application of transition metals compounds in organometallic chemistry.

Course Outcome:

1. The students can gain the knowledge of synthesis of alkyl and aryl transition metals
2. Students can learn the synthesis, bonding and reactions of transition metal complexes.
3. Students can utilize the knowledge of different types of carbine complexes.
4. Students can learn the application of transition metal organometallic compounds as catalysts.

Section-A:

Organo metallic Compounds: Introduction and Classification of organometallic compounds by bond types viz.covalent, ionic, electron deficient and cluster compounds.

Alkyls and Aryls of Transition Metals:

Types, routes of synthesis, stability and d decomposition pathways, organo copper in organic synthesis.

Section-B:

Transition Metal –Complexes:

Transition metal –complexes with unsaturated molecules- alkenes, alkynes, allyl, & dienyl(metallocene) complexes, preparation, properties and nature of bonding and structural features, important reactions related to nucleophilic and electrophilic attack on ligands and to organic synthesis.

Section-C:

Compounds of Transition Metal-Carbon Multiple Bonds:

Transition metal-carbenecomplexes: Fischer type and Schrock type carbene complexes, their synthesis, reactionsand structures & bonding; Transition metal-carbyne complexes: their synthesis, reactions and structural features.

Section-D:

Fluxional Organometallic Compounds:

Fluxionality & dynamic equilibria in compounds such as acyclic alkenes, -bonded and –bonded cyclic alkenes, rotation of ligands on metals, ligand scrambling on metals.

Applications of Transition metal Organometallics as Catalysts:

Zeigler-Natta polymerization ; homogeneous catalytic hydrogenation; alkene hydrogenation-Wilkinson Catalyst; Oxidation of olefins-Wacker's process; hydroformylation of olefins – the oxo process.

Reference Books:

1. Principles and Applications of Organotransition Metal Chemistry by James, P. Collman , University Science Book, First Edition.
2. Transition Metals in the Synthesis of Complex Organic Molecules 2nd Edition by Louis , S. Hegedus, Hegedus, Bjorn C. G. Soderberg, University Science Book, Third Edition.
3. Organo-transition metal chemistry: from bonding to catalysis by John Hartwig , University Science Books; 2010 edition.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	-	2	2	1	1	1
CO2	1	2	1	-	-	2	3	2	1	2
CO3	1	2	-	-	-	2	3	3	2	2
CO4	2	2	2	-	-	2	3	3	2	2

ELECTRO ANALYTICAL CHEMISTRY: MCH-222

Course Objectives:

The objective of this course is that students will gain the detailed knowledge of electrochemical reaction, stability, polarography and their applications along with different types of voltammetry.

Course Outcome:

1. To understand the detailed concept of electrochemical reactions and different electrodes.
2. To know about the principle of polarography and their applications.
3. To study the different types of polarography and coulometry.
4. To know about various techniques of voltammetry and their application in inorganic system.

SECTION –A:

Electrons at and across interfaces, Electro-chemical and chemical reactions**,** Basic principles, residual current, migration current, diffusion current and limiting current, saturated calomel electrode(SCE) and dropping mercury electrode(DME). Ilkovic equation, Koutecky equation for diffusion current, Polarographic waves (anodic and cathodic), Half wave potentials.

Oxygen interference, maxima function of supporting electrolytes.

SECTION-B:

Determination of stability constant complex by D.C.Polarography, Catalytic hydrogen wave. Principles of Amperometric titrations, types of titration curves, apparatus and techniques.Hanging mercury drop electrode, rotating droping mercury electrode, platinum electrodes(RPE), Gold electrode, carbon paste electrode, glassy carbon electrode and graphite electrode.

Section-C:

Super imposed a.c. Polarography, voltametry in quiet and stirred solution with electrode other than mercury, square-wave polarography, normal and differential pulse polarography, chronopotentiometry, chronoamperometry and coulometry.

Section-D:

Theory of anodic stripping voltametry, concentration process, rest period, stripping process, Cathodic stripping voltametry, Anodic deposition, Cathodic redissolution, Experimental and applications of above system to Inorganic systems. Theory of ion selective electrodes, Experimental and applications of ISE to Inorganic systems.

Reference Books:

1. "Electrochemical Methods: Fundamentals and Applications" by A J Bard

2. "Fundamentals of Electroanalytical Chemistry" by P S Monk

3. "Electrochemical Reactions: The Electrochemical Methods of Analysis" by Gaston Charlot

4. "Modern Modified Electrochemical Methods for Pharmaceutical Analysis" by Dar Riyaz Ahmad and Brahman Pradeep Kumar

5. "Electrochemical Methods of Process Analysis" by D E Smith

6. "Electrochemically Engineered Nanoporous Materials (Springer Series in Materials Science)" by Dusan Losic and Abel Santos

7. "Electroanalytical Methods: Guide to Experiments and Applications" by Fritz Scholz

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2
CO4	1	-	-	3	1	-	2	3	1	2

MEDICAL ASPECTS OF INORGANIC CHEMISTRY: MCH-223

Course Objectives:

1. To emphasize the importance of inorganic entities in pharmaceuticals

2. To provide knowledge about important inorganic pharmaceuticals in pharmacopoeia regarding their preparation, quality standard and pharmaceutical uses

3. To highlight the domain of radiopharmaceuticals used in the diagnostics and therapy

4. To describe typical therapeutic classes and inorganic agents associated with them

Course Outcomes:

1. Explain the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals
2. Explain the method of preparation, assay, properties, and medicinal uses of acids, bases, buffers, extra and intracellular electrolytes.
3. Explain the method of preparation, assay, properties, and medicinal uses of dental products.
4. Explain the method of preparation, assay, properties, and medicinal uses of astringent, poison and antidote.

Section-A:

Metals in Medicine:

Biochemical bases of essential metal deficient diseases; Iron, copper and zinc deficiencies and their therapies, carcinogens and carcinostatic agents, zinc in tumour growth and inhibition, anticancer activity and mechanism of platinum complexes, anticancer activity of Rhodium, copper and Gold complexes, anti cancer activity of Selenium, antibacterial and antiviral properties of metal complexes, polyamino carboxylic acids and polyethylene amines as chelating drugs.

Section-B:

Miscellaneous applications of Inorganic compounds as medicines:

Drugs in hypo and hyper activity of thyroids, Inorganic drugs in dental carries, clinical disorders of alkali and alkaline earth metals and their remedies, lithium drugs in psychiatry.

Heavy metals in Biological systems:

Toxicity of heavy metals – and their detoxification, role of Selenium in Biological systems with reference to its essentiality and toxicity, mechanism of metal ion induced toxicity, interaction between orally administered drugs & metal ions in guts.

Section-C:

Ligand Therapy:

Ligand induced toxicity, interference with haemoglobin in oxygen transport system, intefererence with metallo-enzymes, beneficial effects of ligand chelation; carcinogenic ligands, carcinostatic ligands, alkylating agents as anticancer drugs, Thiosemicarbazones as anticancer drugs, macrocyclic antibiotic ligands and prodable mechanism of the drug, antiviral activity of chelating agents, aspirin chelation,drugs where chelation and therapeutic activity are unrelated.

Section-D:

Hydrosphere:

Chemical composition of water bodies-lakes, streams & rivers; water quality parameters- dissolved oxygen, BOD, water quality standards; Purification and treatment of water.Radio pharmacology, nuclear medicines, radioiodine-131, technetium-99m, gallium and indium scan.

Reference Books:

1. Helmut Sigel (1973): Metal ions in biological system, Vol.9, Marcel Dekker INC, New York and Basel.

2. Helmut Sigel (1973): Metal ions in biological system (Concepts on metal ion toxicity), Vol.7 Marcel Dekker INC, New York and Basel.

3. Kaim, Wand Schewederski,B (1994):Bioinorganic Che mistry : Inorganic E l e m e n t s in the Chemistry of Life, John Wiley & Sons, NewYork, USA.

4. Guy Berthon (1995): Handbook of Metal-Ligand interactions in Biological fluid, Bioinorganic medicine, Vol.2, Marcel Dekker INC, New York and Basel.

5. Rosette M. Roat- Malone (2007): Bioinorganic Chemistry: A Short Course, Wiley.

6. Ivano Bertini (1994): Bioinorganic Chemistry, Mill Valley, CA: University Science Books.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	1	-	3	2	-	2	1	1	1
CO2	1	2	1	-	1	-	3	-	1	2
CO3	1	2	-	2	-	2	-	2	2	2
CO4	1	1	2	1	1	1	1	2	-	2

Industrial Chemistry: MCH-224

Course Objective:

The aim of this course is that the students will learn the essential principles used in industrial pollution abatement and understand important issues in industrial pollution abatement and pertinent environmental legislations.

Course Outcomes:

1. Understand the different types of wastes generated in an industry, their effects on living and non-living things.
2. Understand environmental regulatory legislations and standards and climate changes.
3. Understand about the quantification and analysis of wastewater and treatment.
4. Understand about analysis and quantification of hazardous and nonhazardous solid waste.

UNIT I Raw Materials for Chemical Industry:

Raw materials – Characteristics of raw materials and their resources – methods of raw material concentrations–integral utilization of raw materials. Energy for chemical industry–Fuels–classification of fuels–coal–fuel gases and liquid fuels–petroleum–cracking–Octane number–cetane number–composition and uses of coal gas, water gas, producer gas, oil gas and gobar gas.

UNIT II Explosive and Pesticides:

Explosives:

Classification, characteristics, preparation of nitrocellulose-T.N.T, Picric acid, Dynamite- cordite and Gunpowder, Dynamite, HMX, PETN, Cyclonite, plastic explosives, gelatin, RDX, cordite and seismic explosives, propellants-manufacture of liquid and solid propellants-hydrazine, incendiaries and smoke screens. Industrial applications.

Pesticides:

Introduction, classification, synthesis of few common pesticides of chlorinated (DDT, BHC, Chlordane, Aldrin), organophosphorus and carbamate (parathion, malathion, carbaryl) compounds family, Plant pesticides, Pesticide formulations.

UNIT III Cement, Ceramics, Polymeric Materials, Glass, Paints and Fertilizers

Cement:

Manufacture – Wet Process and Dry process. Types, Analysis of major constituents, setting of cement, reinforced concrete. Cement industries in India.

Ceramics:

Important clays and feldspar, glazing and verification.

Polymeric Materials:

Industrial polymers (Thermoplastics polymers and thermosetting Polymers) and composite materials–their constitutions, chemical and physical properties, Industrial applications.

Glass:

Types, Composition, manufacture of Optical glass, colored glasses, lead glass and neutron absorbing glass.

UNIT IV Industrial Chemical Analysis:

Sampling procedures, sampling of bulk materials, techniques of sampling–solids, Liquids and gases. Collection and processing of data. Chromatography: Principles, working and applications of paper chromatography, TLC, GLC, HPLC.

Particle size determination, rheological properties of liquids, plastics and their analysis. Modern Instrumental Methods of analysis–UV-visible spectroscopy-IR spectroscopy and non-dispersive IR- Raman spectroscopy-NMR Spectroscopy-Electron spin resonance spectroscopy-Atomic absorption spectroscopy-Flame photometry-Neutron diffraction-X-ray fluorescence-Ion chromatography

UNIT V Industrial Hygiene and Chemical Safety:

Classification of hazaradous chemicals, storage, transportation, handling, risk assessments, challenges/solutions (d) Eco-friendly effluents disposal: Water pollutants, health hazards, sampling and analysis of water, water treatment, different industrial and domestic effluents and their treatment and disposal, advanced waste water treatment, effluent quality standards and laws, chemical industries, tannery, dairy, textile effluents, common treatment.

Text Books:

1. Mukhlyonov (ed.) (1979): Chemical Technology, Vol.1, 3rd Edition, Mir publication, Moscow.
2. De.,A.K. (1989): Environmental Chemistry,WileyEasternLtd.,11th edn., Meerut.
3. Sharma, B.K (1997): Industrial Chemistry, Goel publishing house.

References:

1. Norris Shreve, R. and J.A. Brink (1977): Jr. Chemical Process Industries. 4thedn.McGrawHill, Tokyo.
2. Chakrabarty, B.N (1981): Industrial Chemistry, Oxford & IBH Publishing Co., New Delhi.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	1	-	2	2	1	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	2	-	2	3	2	2	2
CO4	1	-	2	1	1	-	1	2	2	2

Inorganic Chemistry IV-Practical: MCH-271

Course Objectives:

The objective of this course is that students can get the practical knowledge of atomic absorption spectrophotometry, flame photometry, polarograpgy and amperometric titrations.

Course Outcome:

1. The students can learn the experimental knowledge of metal ion estimation by atomic absorption spectrophotometry.
2. To learn the polarographic determination of metals.
3. To understand the amperometric titration for mixtures.

Practical Description:

1. Estimation of metal ions by atomic absorption spectrophotometry and Flame Photometry.
2. Spectrophotometric determination of Fe, Ni,Mn,Cr,V,Ti and fluoride, Nitrate and phosphate etc.
3. Determination of pK value of an indicator spectrophotometrically.
4. Study of Complexation (Stoichiometry and stability constant) between Fe- thiocynate, Fe-Phenanthroline and Cu- ethylenediamine by Job's method/ slope ratio method.
5. Polarographic determination of metal ions such as Zn, Cd,
6. **Mg, Tl etc.(including mixtures). Amperometric titrations.**

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2

Inorganic Chemistry V-Practical: MCH-272

Course Objectives:

The laboratory component of the course will aim to develop skills in the handling of air-sensitive compounds and the purification of compounds using chromatographic techniques.

Course Outcomes:

1. The students have the detailed knowledge of analytical or analysis of different element, quantitative analysis
2. Learn error analysis, statistical data analysis, volumetric analysis, chromatography, flame photometry.
3. Capable of synthesizing Inorganic compounds.

PRACTICAL DESCRIPTION

1. Quantitative estimation of aniline, phenol, ethyl methyleketone and glucose (by both Betrane's
and Lane and Bynon methods).

2. Semi-micro Qualitative Analysis Analysis of mixtures containing two familar and two less familiar cations from among the following:
Ti, W, Se, Te, Mo, Ce,Th,Ti,Zr,V,B 0 e,U and Li.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	1	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2

Major Project/Dissertation:MCH:267

Description

Dissertation will carry marks for continuous assessment, dissertation write-up, its presentation and viva-voce.This will be evaluated at the end of fourth semester.

Students will work on a research topic assigned to him/her by their supervisor/mentor with a purpose to develop a collective approach to study, analyze and solve the problem. Students are required to collect, analyzethe data, and submit their dissertation at the end of the semester.

S.No.	Course details
1.	Research work
2.	Seminar
3.	Evaluation by Research committee
4.	Thesis writing
5.	Research work by taking 260 credit hours

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SCHOOL OF BASIC & APPLIED SCIENCES

B. SC. (Hons.) CHEMISTRY			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BCH-110	Inorganic Chemistry – I	3	1	0	4
2	BCH-114	Organic Chemistry – I	3	1	0	4
3	BCH-120	Physical Chemistry – I	3	1	0	4
4	BMA-115	Calculus (Elective)	5	1	0	6
5	BEN-101	CommunicationSkill (English)	2	0	0	2
6	BCH-160	Inorganic Chemistry – I Lab	0	0	4	2
7	BCH-170	Physical Chemistry – I Lab	0	0	4	2
8	BCH-164	Organic Chemistry – I Lab	0	0	4	2
9	PDP-101	Induction & Nurturing Hobby	0	0	2	1
		Total---->	**19**	**4**	**14**	**27**

B. SC. (Hons.) CHEMISTRY			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BCH-115	Physical Chemistry – II	3	1	0	4
2	BCH-121	Inorganic Chemistry –II	3	1	0	4
3	BCH-122	Organic Chemistry –II	3	1	0	4
4	BPH-125	Thermal Physics	3	1	0	4
5	CEA-101A	EnvironmentalScience and Ecology	2	0	0	2
6	BCH-165	Physical Chemistry – IILab	0	0	4	2
7	BPH-175	Thermal physics Lab	0	0	4	2
8	BCH-171	Inorganic Chemistry –IILab	0	0	4	2
9	BCH-172	Organic Chemistry –IILab	0	0	4	2
10	PDP-102	People Connect	1	0	0	1
		Total---->	**15**	**4**	**16**	**27**

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B. SC. (Hons.) CHEMISTRY			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BCH-219	Physical Chemistry-III	3	1	0	4
2	BCH-221	Inorganic Chemistry –III	3	1	0	4
3	BCH-222	Organic Chemistry –III	3	1	0	4
4	BMA-230/231	DifferentialEquation-I/ Elementary Mathematics	3	1	0	4
5	BCS-201	Computer for Chemists/Skill Based Subject –I	3	0	0	3
6	BA- 272-A	Entrepreneurship	3	0	0	3
7	BCH-271	Inorganic Chemistry –IIILab	0	0	4	2
8	BCH-272	Organic Chemistry –IIILab	0	0	4	2
9	BCH-269	Physical Chemistry-III Lab	0	0	4	2
10	BCS-251	Computer forChemist Lab	0	0	2	2
		Total---->	**18**	**4**	**14**	**30**

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B. SC. (Hons.) CHEMISTRY			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BCH-225	Organic Chemistry –IV	3	1	0	4
2	BCH-223	Physical Chemistry-IV	3	1	0	4
3	BCH-226	Analytical Chemistry /Discipline SPCCific Elective-I	3	1	0	4
4	BA-264A	Managerial Skill/ Skill Enhancementt Subject –II	3	0	0	3
5	BMA-241	Elementary Mathematics -II	3	1	0	4
6	BCH-275	Organic Chemistry –IV Lab	0	0	4	2
7	BCH-273	Physical Chemistry- IV Lab	0	0	4	2
8	BCH-276	AnalyticalChemistrylab/Discipline Specific Elective-I- Lab	0	0	4	2
9		Total---->	**15**	**4**	**12**	**25**

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SCHEME FOR B. Sc CHEMISTRY

B. SC. (Hons.) CHEMISTRY			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BCH-324	Inorganic Chemistry –IV	3	1	0	4
2	BCH-325	Organic Chemistry-V	3	1	0	4
3	BCH-321	Physical Chemistry-V	3	1	0	4
4	BCH-322	Spectroscopy & and Some Important Compounds/ Discipline Specific Elective-II	3	1	0	4
5	PD-301	Leadership and Entrepreneurship Development	2	0	0	2
6	BCH-371	Physical Chemistry-V Lab	0	0	4	2
7	BCH-374	Inorganic Chemistry –IVLab	0	0	4	2
8	BCH-375	Organic Chemistry -VLab	0	0	4	2
9	BCH-378	Workshop onChemical Sciences	0	0	4	2
		Total---->	**14**	**4**	**16**	**26**

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B. SC. (Hons.) CHEMISTRY			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BCH-326	Discipline Specific Elective /Polymer Chemistry	3	1	0	4
2	BCH-327	Discipline Specific Elective-IV/Fuel Chemistry	3	1	0	4
3	BCH-377	Project/ Dissertation/Industrial	0	0	10	5
4		Total---->	**6**	**2**	**10**	**13**

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SCHOOL OF BASIC & APPLIED SCIENCES

B.SC. HONS. (CHEMISTRY)(FIRST SEMESTER)

BCH 110: INORGANIC CHEMISTRY-I

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

1. **Here in this course we are trying to enlightening the student about the periodic properties ofmain group elements and role of periodic table in the field of inorganic chemistry.**
2. **Students can categories the elements in the groups on the basis similar chemical and physical behavior.**

Course Outcomes:

1. After study of these five units student must aware with the atomic structure and role of Periodic table and their properties in the field of inorganic chemistry.
2. Student must also know the reasons and relationship between the elements situated into similar groups and similar periods.
3. Students also learn characteristic feature of different families of the element.
4. The student will gain knowledge of main group element chemistry.

UNIT-1: S & P-BLOCK ELEMENT

Comparative study of the elements includes diagonal relationship, salient features of hydrides,solvation and complexation tendencies including their function.
Emphasis on comparative study of periodic properties of p-block elements (including diagonal relationship and excluding methods of preparation). Preparation and properties of some important compounds - sodium carbonate, sodium chloride, sodium hydroxide and sodium hydrogen carbonate.

UNIT-2: CHEMISTRY OF NOBLE GASES

Occurrence and uses of noble gases; Chemical properties of noble gases with emphasis on their low chemical reactivity, chemistry of xenon, structure and bonding of fluorides, oxides and oxyflourides of xenon.

UNIT-3: BORON FAMILY

Oxide of boron (B_2O_3), Oxyacid of boron (H_3BO_3)-preparation, properties and uses. Preparation, properties and structure of diborane and borazine. Trihalides of boron-preparation,properties and relative strengths of trihalides of boron as Lewis acid.

UNIT-4: CARBON FAMILY

Catenation, carbides, fullerenes, fluorocarbons, silicates (structural aspects), silicones-generalmethods of preparations, properties and uses. Silicon tetrachloride, silicates, zeolites.

UNIT-5: NITROGEN & OXYGEN FAMILY

Oxides: structures of oxides of N, P. Oxyacids: structure and relative acid strengths of oxyacids of nitrogen and phosphorus. Structure of white, yellow and red phosphorus.Oxyacids of sulphur- structures and acidic strength of H_2O_2- structure, properties and uses. Preparation,

properties, structure and uses of ammonia, nitric acid, phosphine and phosphorus halides,(PCl3, PCl5); Structures of oxides and oxoacids of nitrogen and

Reference Books:

- Lee, J.D. Concise Inorganic Chemistry, ELBS, 1991.
- Douglas, B.E. and Mc Daniel, D.H., Concepts & Models of Inorganic Chemistry, Oxford, 1970
- Atkins, P.W. & Paula, J. Physical Chemistry, Oxford Press, 2006.
- Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications 1962.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	3	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2
CO4	1	2	3	-	1	-	3	-	1	2

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SCHOOL OF BASIC & APPLIED SCIENCES

B.SC. HONS. (CHEMISTRY)(FIRST SEMESTER)

BCH 120: PHYSICAL CHEMISTRY-I

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

To develop scientific curiosity about physical chemistry and to understand the concept ofkinetics, conduction, gaseous state and its application.

Course Outcomes:

1. Relate the concepts of chemical kinetics and its application
2. Interrelate the study of conductance and electrochemistry.
3. Correlate the solid state of an element to its physical and chemical properties.
4. Student must learn the liquid and gaseous state in detail.

UNIT-1: CHEMICAL KINETICS

Rate of reaction, Rate equation, Factors influencing the rate of reaction- concentration, temperature, pressure, catalyst. Order of reaction, integrated rate expression for zero order, first order, second order reaction. Half-life period of a reaction, methods for determination of orderof reaction.

Effect of temperature on the rate of reaction.

UNIT-2 ELECTROCHEMISTRY-I

Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance, equivalent conductance and relation among them, Arrhenius theory of ionization, Ostwald's dilution law, Debye-Huckel equation, Transport number, definition and determination of Hittorf's methods.

UNIT-3 SOLID STATE

Classification of solids, laws of crystallography- (i) Law of constancy of interfacial angles (ii)Laws of rationality of indices (iii) Law of symmetry

Definition of unit cell and space lattice, Bravais lattices, crystal system. X-ray diffraction by crystals, derivation of Bragg equation,

UNIT-4 LIQUID STATE

Structure of liquids, properties of liquids- surface tension, viscosity, vapor pressure, Refractive Index and Types of Crystals.

UNIT-5 GASEOUS STATE

Maxwell's distribution of velocities and energies(derivation excluded), average velocity and most probable velocity, collision diameter, collision number, collision frequency, deviation of real gases from ideal behavior, derivation of vander Waal's equation of state.

Reference Books:

- Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry Ed., Oxford University Press Ball, **D. W. Physical Chemistry Thomson Press, India (2007).**
- Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
- Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	-	2	1	-	2	3	1	1
CO2	2	2	1	3	1	-	3	2	2	-
CO3	1	2	-	-	-	2	1	3	-	2
CO4	1	2	3	-	1	-	3	-	1	2

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SCHOOL OF BASIC & APPLIED SCIENCES

B.SC. HONS. (CHEMISTRY)(FIRST SEMESTER)

BCH 114: ORGANIC CHEMISTRY-I

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

Students must have knowledge of basic of organic chemistry by studying the hybridization and reaction intermediates to predict the reaction mechanism

Course Outcomes:

Students will gain:

1. Understanding of hybridization and geometry of atoms and the three-dimensional structure of organic molecules
2. Analyze reactivity and stability of an organic molecule based on structure, including conformation and stereochemistry
3. Predict the mechanisms for organic reactions by knowing the nucleophiles, electrophiles, electronegativity, and resonance
4. Use their understanding of organic mechanisms to predict the outcome of reactions

UNIT-1 BASICS OF ORGANIC CHEMISTRY-I

Organic Compounds: Classification, and Nomenclature, Hybridization, Shapes of molecules, Influenceof hybridization on bond properties.

Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications; Dipole moment; Organic acids and bases; their relative strength.

UNIT-2 BASICS OF ORGANIC CHEMISTRY-II

Homolytic and Heterolytic fission with suitable examples. Curly arrow rules, formal charges; Electrophiles and Nucleophiles; Nucleophlicity and basicity; Types, shape and their relative stability ofCarbocations, Carbanions, Free radicals and Carbenes.

Introduction to types of organic reactions and their mechanism: Addition, Elimination and Substitutionreactions.

UNIT-3 STEREOCHEMISTRY:

Fischer Projection, Newmann and Sawhorse Projection formulae and their interconversions; Geometrical isomerism: cis–trans and, syn-anti isomerism E/Z notations with C.I.P rules.

Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Distereoisomers, meso structures, Racemic mixture and resolution. Relative and absolute configuration: D/L and R/S designations.

UNIT-4 CHEMISTRY OF ALIPHATIC HYDROCARBONS

(i) A. Carbon-Carbon sigma bonds
Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz-Fittig Reactions, Free radical substitutions: Halogenation -relative reactivity and selectivity.

(ii) Carbon-Carbon pi bonds:
Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, E1cb reactions. Saytzeff and Hofmann eliminations.

Reactions of alkenes: Electrophilic additions their mechanisms (Markownikoff/ Anti Markownikoff addition), mechanism of oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, reduction (catalytic and chemical), syn and anti-hydroxylation (oxidation). 1,2-and 1,4-addition reactions in conjugated dienes and, Diels-Alder reaction; Allylic and benzylic bromination and mechanism, e.g. propene, 1-butene, toluene, ethyl benzene.

Reactions of alkynes: Acidity, Electrophilic and Nucleophilic additions. Hydration to form carbonyl compounds, Alkylation of terminal alkynes.

UNIT-5 CYCLOALKANES AND CONFORMATIONAL ANALYSIS

Types of cycloalkanes and their relative stability, Baeyer strain theory, Conformation analysis of alkanes: Relative stability: Energy diagrams of cyclohexane: Chair, Boat and Twist boat forms; Relativestability with energy diagrams.

Reference Books:

- Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds; Wiley: London, 1994.
- Kalsi, P. S. Stereochemistry Conformation and Mechanism; New Age International, 2005.

POs Cos	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PO 8	PSO1	PSO2
CO1	1	2	-	1	1	-	2	1	1	1
CO2	2	2	1	2	1	-	3	2	1	-
CO3	1	2	-	-	-	2	3	2	-	1
CO4	1	2	-	-	1	1	3	-	1	

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SCHOOL OF BASIC & APPLIED SCIENCES

B.SC. HONS. (CHEMISTRY)

(FIRST SEMESTER)

BMA-115: CALCULUS

L-4, T-0 P-0 **Credits –4** **Max Marks:** 75

Course Objectives:

1. Understand the major problems of differential and integral calculus.
2. Appreciate how calculus allows us to solve important practical problems in an optimal way.

Course Outcomes:

Upon completion of the course, the student will be able to:

1. Interpret a function from an algebraic, numerical, graphical and verbal perspective and extract information relevant to the phenomenon modeled by the function.
2. Calculate the limit of a function at a point numerically and algebraically using appropriate techniques including L'Hospital's rule.
3. Explain the relationship between the derivative of a function as a function.
4. Compare and contrast the ideas of continuity and differentiability.

UNIT-1: LIMIT & CONTINUITY **: The real line and its geometrical representation; *e-δ* treatment of limit and continuity; Properties of limit and classification of discontinuities; Properties of continuous functions.**

UNIT-2: DIFFERENTIABILITY**: Successive differentiation; Leibnitz Theorem; Statement of Rolle's Theorem; Mean Value Theorem; Taylor and Maclaurin's Theorems; Indeterminate forms.**

UNIT 3: APPLICATIONS OF DIFFERENTIATION*:* Asymptotes; Concavity, convexity and points of inflection; Curvature; Extrema; elementry curves, tangent and normal in parametric form; Polar Coordinates.

UNIT-4: PARTIAL DIFFERENTIATION**: Limits and continuity of functions of two variables; Partial derivatives; Taylor's theorem and Maclaurin's Theorem for function of twovariable; Maxima and minima for function of two variable.**

UNIT-5: DOUBLE AND TRIPLE INTEGRALS; **Change of order in double integrals. Application of Integration : length of a curve; Arc length as a parameter; Evoute & Envelope;Volumes and surface areas of solids of revolution.**

Reference Books:

1. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd. Allahabad, 2000.
2. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd. Allahabad, 2000.
3. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar Inc. New York 1975.
4. Shanti Narayan, Elements of Real Analysis, S. Chand & Company, New Delhi.

5Shanti Narayan, A Text Book of Vector Calculus, S. Chand & Company, New Delhi.

6. G.B. Thomas and R.L. Finney, *Calculus*, 9th Ed., Pearson Education, Delhi, 2005.
7. M.J. Strauss, G.L. Bradley and K. J. Smith, *Calculus*, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007.
8. H. Anton, I. Bivens and S. Davis, *Calculus*, 7th Ed., John Wiley and Sons (Asia) P. Ltd.,Singapore, 2002.

POs Cos	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	1	-	1	1	-	1	1	1	1
CO2	2	2	1	2	1	-	1	2	1	-
CO3	1	2	-	-	-	2	1	2	-	-
CO4	1	1	1	2	1	1	2	1	1	1

B.SC. HONS. (CHEMISTRY)(FIRST SEMESTER)

BEN 101: Communication Skill-I

L-3, T-0 P-0 **Credits –3** **Max Marks: 75**

Course Objectives:

1. Will be able to integrate their ideas with those of others using summary, paraphrase, quotation,analysis, and synthesis of relevant sources.
2. Assist students in the development of intellectual flexibility, creativity, and cultural literacy so thatthey may engage in life-long COURSE.
3. Will be able to Document their work using appropriate conventions.

Course Outcomes:

1. Students should be able to apply critical and theoretical approaches to the reading and analysis ofliterary and cultural texts in multiple genres.
2. Students should be able to write analytically in a variety of formats, including essays, research papers,reflective writing, and critical reviews of secondary sources.
3. Students should be proficient in oral communication and writing.
4. Develop Coherence, Cohesion and Competence in Oral Discourse through Intelligible Pronunciation

UNIT 1: COMMUNICATION AND ITS ELEMENTS: An introduction to the need of communication competency; Role of vocabulary in effective communication**;** Word formation; A set of selected 50 synonyms, antonyms, homonyms & homophones; suffixes & prefixes

UNIT 2: LISTENING AND READING SKILLS: Listening comprehension & reading comprehension; Listening to recorded speeches, TV News and other audio materials to test listening comprehension with given exercises

UNIT 3: WRITING SKILLS: Ad Creation; Slogan making; Picture composition; Expanding hints, proverbs; Movie review.

UNIT 4: LETTER WRITING: Types of letter writing; Structure & Lay out; Leave application; Letter of enquiry & response with respect to educational & official matters; Informal letter expressing or discussing social or educational issues.

UNIT5: SPOKEN SKILLS: Introduction to oral communication; Importance of Pronunciation; Importance of phonetics; Usage of Phonetics; Types of Conversation; Strategies for effective conversation for social and official interaction; Developing conversation on topics of current importance. Soft Skills Non-verbal Importance of Body Language and its usage to communicate better.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	-	1	-	1	1	-	2	1	1	1
CO2	2	2	1	2	1	-	3	2	1	-
CO3	1	2	-	-	-	2	3	2	-	1
CO4	1	2	-	2	-	1	2	1	1	-

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SCHOOL OF BASIC & APPLIED SCIENCES

B.SC. HONS. (CHEMISTRY)(FIRST SEMESTER)

BCH 160: INORGANIC CHEMISTRY-I LAB

L-0, T-0 P-2 **Credits –1** **Max Marks: 60**

Course Objectives

The objective of this course is to get the knowledge of quantitative analysis of various inorganic compounds

Course Outcomes:

1. The students can able to calibrate the apparatus and prepare solutions of different concentrations.
2. The students have the detailed knowledge of quantitative analysis of mixture of inorganic compounds.
3. Students will learn about the titration and volumetric analysis.

List of Experiments:

S.No	Experiment	Unit
1	**(A) Titrimetric Analysis** (i) Calibration and use of apparatus (ii) Preparation of solutions of different Molarity/Normality of titrants	1-5
2	**(B) Acid-Base Titrations** (i) Estimation of carbonate and hydroxide present together in mixture. (ii) Estimation of carbonate and bicarbonate present together in a mixture. (iii) Estimation of free alkali present in different soaps/detergents	1
3	**(C) Oxidation-Reduction Titrimetry** (i) Estimation of Fe(II) and oxalic acid using standardized $KMnO_4$ solution. (ii) Estimation of oxalic acid and sodium oxalate in a given mixture. (iii) Estimation of Fe(II) with $K_2Cr_2O_7$ using internal (diphenylamine, anthranilic acid) and external indicator.	1-5

Reference text:

1. Vogel, A.I. A Textbook of Quantitative Inorganic Analysis, ELBS.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	-	2	8	1	1
CO2	3	2	1	-	1	-	3	-	1	2
CO3	1	2	-	-	-	-	3	2	-	2

B.SC. HONS. (CHEMISTRY)(FIRST SEMESTER)

YEAR:1, SEMESTER:1

BCH 170: PHYSICAL CHEMISTRY- LAB

L-0, T-0 P-2 **Credits –1** **Max Marks: 60**

Course Objectives:
The objective of this course is to get the knowledge of analysis of a compound for its physical properties
Course Outcomes:

1. The students can able to determine the viscosity of solutions of different concentrations.
2. The students have the detailed knowledge of determining the surface tension of compounds/solution.
3. Students will learn about the pH metry of strong acid and strong base.

List of Experiments

S.No	Experiment	Unit
1	**Surface tension measurements.** a. Determine the surface tension by (i) drop number (ii) drop weight method. b. Study the variation of surface tension of detergent solutions with concentration.	5
2	**Viscosity measurement using Ostwald's viscometer**. c. Determination of viscosity of aqueous solutions of (i) polymer (ii) ethanol and (iii) sugar at room temperature. d. Study the variation of viscosity of sucrose solution with the concentration of solute.	4
3	**Indexing of a given powder diffraction pattern of a cubic crystalline system.**	3
4	**pH metry** b. Study the effect on pH of addition of HCl/NaOH to solutions of acetic acid, sodium acetate and their mixtures. c. Preparation of buffer solutions of different pH i. Sodium acetate-acetic acid ii. Ammonium chloride-ammonium hydroxide	2

Reference Books

- Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).
- Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. *Experiments in Physical Chemistry 8th Ed.*; McGraw-Hill: New York (2003).
- Halpern, A. M. & McBane, G. C. *Experimental Physical Chemistry 3rd Ed.;* W.H. Freeman & Co.: New York (2003).

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	1	-	1	1	1
CO2	3	2	1	-	1	1	-	-	1	2
CO3	1	2	-	1	-	2	-	2	-	2

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B.SC. HONS. (CHEMISTRY)(FIRST SEMESTER)

YEAR:1, SEMESTER:1

BCH 164: ORGANIC CHEMISTRY- LAB

L-0, T-0 P-2 **Credits –1** **Max Marks: 60**

Course Objectives:
The objective of this course is to get the knowledge of analysis of an organic compound and separation of mixture

Course Outcomes:

1. The students can able to calibrate the apparatus and prepare solutions of different concentrations.
2. The students can able to determine the melting and boiling point of different organic compounds
3. The students have the detailed knowledge of determining the purification and crystallization of compounds/solution. Students will learn about the separation of compounds by chromatography.

List of Experiments

1. Checking the calibration of the thermometer
2. Purification of organic compounds by crystallization using the following solvents:
   a. Water
   b. Alcohol
   c. Alcohol-Water
3. Determination of the melting points of above compounds and unknown organic compounds (Kjeldahl method and electrically heated melting point apparatus)
5. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds, Determination of boiling point of liquid compounds. (boiling point lower than and more than 100 °C by distillation and capillary method)
6. Chromatography
   a. Separation of a mixture of two amino acids by ascending and horizontal paper chromatography
   b. Separation of a mixture of two sugars by ascending paper chromatography
   c. Separation of a mixture of o-and p-nitrophenol or o-and p-aminophenol by thin layer chromatography (TLC)

Reference Books

- Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009)
- Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. *Practical Organic Chemistry, 5th Ed.*, Pearson (2012)

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	1	-	-	1	1	-	1	1	1
CO2	3	2	1	-	1	1	-	-	1	2
CO3	1	2	-	1	-	2	-	2	-	2

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SCHOOL OF BASIC & APPLIED SCIENCES

B.SC. HONS. (CHEMISTRY)

SECOND SEMESTER

BCH 115: PHYSICAL CHEMISTRY

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

1. **The various topics of the syllabus are grouped under different units in order to bring forth the importance of academic and laboratory skills for the undergraduate students.**
2. **To use solution thermodynamic concepts to compute phase & reaction equilibrium data and also aware the chemical equilibria and colligative properties of a solution**

Course Outcomes:

Students will gain an understanding of:

1. The relationship between microscopic properties of molecules with macroscopic thermodynamic observables
2. The differences between classical and quantum mechanics
3. Students will estimate equilibrium conversion in reversible reactions at given pressure and temperature following rigorous thermodynamic method
4. The student will learn the chemical equilibria and colligative properties of a solution.

UNIT-1: Thermochemistry-I:

Intensive and extensive variables; state and path functions; isolated, closed and open systems;zeroth law of thermodynamics.

First law: Concept of heat, q, work, w, internal energy, U, and statement of first law; enthalpy, H, relation between heat capacities, calculations of q, w, U and H for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabaticconditions.

UNIT-2: Thermochemistry-II :

Heats of reactions: standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions. Adiabatic flame temperature, explosion temperature.

Second Law: Concept of entropy; thermodynamic scale of temperature, statement of the second law of thermodynamics; molecular and statistical interpretation of entropy. Calculation of entropy change for reversible and irreversible processes.

Third Law: Statement of third law, concept of residual entropy, calculation of absolute entropyof molecules.

UNIT-3: Systems of Variable Composition:

Partial molar quantities, dependence of thermodynamic parameters on composition; Gibbs- Duhem equation, chemical potential of ideal mixtures, change in thermodynamic functions inmixing of ideal gases.

UNIT-4: Chemical Equilibrium:

Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases, concept of fugacity. Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Coupling of exoergic and endoergic reactions. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration. Free energy of mixing and spontaneity;

thermodynamic derivation of relations between the various equilibrium constants K_p , K_c and K_x. Le Chatelier principle (quantitative treatment); equilibrium between ideal gases and a pure condensed phase.

UNIT-5: Solutions and Colligative Properties:

Dilute solutions; lowering of vapour pressure, Raoult's and Henry's Laws and their applications. Excess thermodynamic functions.

Thermodynamic derivation using chemical potential to derive relations between the fourcolligative properties [(i) relative lowering of vapour pressure, (ii) elevation of boiling point,

(iii) Depression of freezing point, (iv) osmotic pressure] and amount of solute. Applications in calculating molar masses of normal, dissociated and associated solutes in solution.

Reference Books

- Peter, A. & Paula, J. de. *Physical Chemistry 9th Ed.*, Oxford University Press (2011).
- Castellan, G. W. *Physical Chemistry 4th Ed.*, Narosa (2004).
- Engel, T. & Reid, P. *Physical Chemistry 3rd Ed.*, Prentice-Hall (2012).
- McQuarrie, D. A. & Simon, J. D. *Molecular Thermodynamics* Viva Books Pvt. Ltd.: New Delhi (2004).
- Assael, M. J.; Goodwin, A. R. H.; Stamatoudis, M.; Wakeham, W. A. & Will, S. *Commonly Asked Questions in Thermodynamics.* CRC Press: NY (2011).
- Levine, I .N. *Physical Chemistry* 6th Ed., Tata Mc Graw Hill (2010).
- Metz, C.R. *2000 solved problems in chemistry,* Schaum Series (2006)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	-	1	-	2	3	1	1
CO2	2	3	1	-	1	-	2	3	1	-
CO3	1	3	2	-	-	-	1	2	-	-
CO4	1	2	1	-	1	-	3	2	1	-

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SCHOOL OF BASIC & APPLIED SCIENCES

B.SC. HONS. (CHEMISTRY)
SECOND SEMESTER
BCH 122: ORGANIC CHEMISTRY

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives

The present curriculum enhance the knowledge of organic chemistry of students; they should aware with alkenes, dienes their properties and chemical activity. Nomenclature of halide improves the knowledge of student in term of nomenclature and all.

Course Outcomes:

1. After finishing this curriculum students are able to differentiate between alkyl aryl and aldehyde.
2. Student aware the nomenclature of benzene derivatives
3. Student learn synthesis of naphthalene, and other poly nuclear hydrocarbons.
4. Here with this curriculum electrophilic and substitution reaction are define the properties ofchemical compounds.

UNIT-1: ALKENES & DIENES

Nomenclature of alkenes, mechanism of dehydration of alcohols and dehydrohalogenation of alkyl halides. Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes.Chemical reactions of alkenes – mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration- oxidation, reduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4, polymerization of alkenes, substitution at allylic and vinylic positions of alkenes. Industrial application of ethylene and propene. Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene, Chemical reactions – 1, 2 and 1, 4 additions (elecrophilic & free radical mechanisms), Diels –Alder reaction.

UNIT-2: ALKYNES

Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of elecrophilic and nucleophilic addition reactions, hydroboration – oxidation of alkynes, metal –ammonia reductions, oxidation and polymerization.

UNIT-3: ALKYL & ARYL HALIDES

Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, SN_2 and SN_1 reactions with energy profile diagrams.
Methods of formation and reactions of aryl halides, the addition elimination and the elimination – addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.

UNIT-4: ARENES AND AROMATICITY

Nomenclature of benzene derivatives: Aromatic nucleus and side chain, Structure of benzene: Molecular formula and Kekule structure Aromaticity: Huckel rule, aromatic ions, anti- aromatic, non -aromatic compounds.Aromatic electrophilic substitution –

general pattern of the mechanism, mechanism of nitration, halogenations, sulphonation, and friedel – crafts reaction. Energy profile diagrams. Activating deactivating substituent, orientation and ortho/para ratio. Side chain reactions of benzene derivatives, Birch reduction. Methods of formation and chemical reactions of alkyl benzenes, alkyl benzenes and byphenyl.

UNIT-5: POLY NUCLEAR HYDROCARBONS

Haworth synthesis of naphthalein and phenanthene, Pschorr synthesis of phenanthrene, synthesis of anthracene involving Friedal craft acylation of benzene with phthalic anhydride and Diels-Alder reaction between 1,3-butadiene and 1,4- naphthaquinone, reaction of naphthalene, anthracene and phenanthrene, relative reactivities at different positions and mechanism of electrophilic substitution reactions in naphthalene, anthracene and phenanthracene.

Reference Books:

- Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds; Wiley: London, 1994.
- Kalsi, P. S. Stereochemistry Conformation and Mechanism; New Age International, 2005.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	3	-	-	1	-	2	2	1	1
CO2	2	3	1	-	1	-	1	2	1	-
CO3	1	3	-	-	-	-	1	2	-	-
CO4	1	2	1	-	1	-	2	1	1	-

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B.SC. HONS. (CHEMISTRY)
SECOND SEMESTER
BCH 121: INORGANIC CHEMISTRY

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

The students can gain the knowledge of inorganic compounds have industrial application including metallurgy and polymers

Course Outcome:

Here in this course work we design for student to understand following objects:

1. Student would learn theory of acid and base in practical chemistry.
2. Student also easily understands the reason of corrosion and principle of metallurgy.
3. Oxidation reduction would help the student to determine the reaction activity of any chemicalcompound.
4. Students can learn the concept of inorganic polymers and their importance.

UNIT-1 ACID AND BASE:

Brönsted-Lowry concept of acid-base reactions, solvated proton, relative strength of acids, types of acid-base reactions, levelling solvents, Lewis acid-base concept, Classification of Lewis acids, Hard and Soft Acids and Bases (HSAB) Application of HSAB principle

UNIT-2: GENERAL PRINCIPLES OF METALLURGY

Chief modes of occurrence of metals based on standard electrode potentials. Ellingham diagrams for reduction of metal oxides using carbon and carbon monoxide as reducing agent.Electrolytic Reduction, Hydrometallurgy. Methods of purification of metals: Electrolytic Kroll process, Parting process, van Arkel-de Boer process and Mond's process, Zone refining.

UNIT- 3 CORROSION AND ITS CONTROL

Types of Corrosion: Wet corrosion, dry corrosion, galvanic corrosion, water-line corrosion, differential aeration corrosion & stress corrosion, Factors effecting corrosion, Protection from corrosion: Barrier, sacrificial, cathodic and anodic protection.

UNIT-4 OXIDATION AND REDUCTION

Use of redox potential data - analysis of redox cycle, redox stability in water - Frost,Latinmer and Pourbaix diagrams, Principles involved in the extraction of elements. UNIT-5 INORGANIC POLYMER

Types of inorganic polymers, comparison with organic polymers, synthesis, structural aspectsand applications of silicones and siloxanes. Borazines, silicates and phosphazenes, and polysulphates.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	3	-	-	1	-	2	2	1	1
CO2	2	3	1	-	1	-	1	2	1	-
CO3	1	3	-	-	-	-	1	2	-	-
CO4	2	3	-	-	1	-	1	2	1	2

BPH-125:THERMAL PHYSICS

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives:The objective of this course is to develop a working knowledge of the laws and methods of thermodynamics and elementary statistical mechanics and to use this knowledge to explore various applications.

Course outcomes:

CO1: Identify and describe the statistical nature of concepts and laws in thermodynamics, in particular: entropy, temperature, chemical potential, Free energies, partition functions.
CO2: Use the statistical physics methods, such as Boltzmann distribution, Gibbs distribution, Fermi-Dirac and Bose-Einstein distributions to solve problems in some physical systems.
CO3: Apply the concepts and principles of black-body radiation to analyze radiation phenomena in thermodynamic systems.
CO4: Apply the concepts and laws of thermodynamics to solve problems in thermodynamic systems such as gases, heat engines and refrigerators etc.

Unit I: Introduction to Thermodynamics (14 Lectures)

Zeroth and First Law of Thermodynamics: Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Zeroth Law of Thermodynamics & Concept of Temperature, Concept of Work & Heat, State Functions, First Law of Thermodynamics and its differential form, Internal Energy, First Law & various processes, Applications of First Law: General Relation between CP and CV, Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Co-efficient.

Unit II: Second Law of Thermodynamics: (8 Lectures)

Reversible and Irreversible process with examples. Conversion of Work into Heat and Heat into Work. Heat Engines. Carnot's Cycle, Carnot engine & efficiency. Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence. Carnot's Theorem. Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.

Unit III: Entropy (10 Lectures)

Thermodynamics in terms of Entropy. Entropy of a perfect gas. Principle of Increase of Entropy. Entropy Changes in Reversible and Irreversible processes with examples. Entropy of the Universe. Entropy Changes in Reversible and Irreversible Processes. Principle of Increase of Entropy. Temperature–Entropy diagrams for Carnot's Cycle. Third Law of Thermodynamics. Unattainability of Absolute Zero.

Thermodynamic Potentials: Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy. Their Definitions, Properties and Applications. Surface Films and Variation of Surface Tension with Temperature. Magnetic Work, Cooling due to adiabatic demagnetization, First and second order Phase Transitions with examples, Clausius Clapeyron Equation and Ehrenfest equations.

Unit IV: Maxwell's Thermodynamic Relations (10 Lectures)

Derivations and applications of Maxwell's Relations, Maxwell's Relations:(1) Clausius Clapeyron equation, (2) Values of Cp-Cv, (3) TdS Equations, (4) Joule-Kelvin coefficient for Ideal and Van der Waal Gases, (5) Energy equations, (6) Change of Temperature during Adiabatic Process.

Kinetic Theory of Gases:Distribution of Velocities: Maxwell-Boltzmann Law of Distribution of Velocities in an Ideal Gas and its Experimental Verification. Doppler Broadening of Spectral Lines and Stern's Experiment. Mean, RMS and Most Probable Speeds. Degrees of Freedom. Law of Equipartition of Energy (No proof required). Specific heats of Gases.

UNIT V: Molecular collisions: (11 Lectures)

Mean Free Path. Collision Probability. Estimates of Mean Free Path. Transport Phenomenon in Ideal Gases: (1) Viscosity, (2) Thermal Conductivity and (3) Diffusion. Brownian Motion and its Significance.

Real Gases: Behavior of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO2 Gas. Critical Constants. Continuity of Liquid and Gaseous State. Vapour and Gas. Boyle Temperature. Van der Waal's Equation of State for Real Gases. Values of Critical Constants. Law of Corresponding States. Comparison with Experimental Curves. P-V Diagrams. Joule's Experiment. Free Adiabatic Expansion of a Perfect Gas. Joule-Thomson Porous Plug Experiment. Joule- Thomson Effect for Real and Van der Waal Gases. Temperature of Inversion. Joule- Thomson Cooling.

Reference books:

- Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.
- A Treatise on Heat, MeghnadSaha, and B.N.Srivastava, 1958, Indian Press
- Thermal Physics, S. Garg, R. Bansal and Ghosh, 2nd Edition, 1993, Tata McGraw-Hill
- Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer.
- Thermodynamics, Kinetic Theory & Statistical Thermodynamics, Sears & Salinger. 1988, Narosa.
- Concepts in Thermal Physics, S.J. Blundell and K.M. Blundell, 2nd Ed., 2012, Oxford University Press
- Thermal Physics, A. Kumar and S.P. Taneja, 2014, R. Chand Publications.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	2	2	2	1	1
CO2	1	3	1	-	1	2	1	-
CO3	1	3	3	2	1	2	2	-
CO4	2	3	-	-	2	1	-	2

B.SC. HONS. (CHEMISTRY)
SECOND SEMESTER
CEA-101 A: ENVIRONMETAL SCIENCE AND ECOLOGY

L-2, T-0 P-0 **Credits –2** **Max Marks: 50**

Course Objectives:

1. Environmental Studies is a multidisciplinary area, the issues of which everyoneshould know.
2. The aim of the course is to make everyone aware of environmental issues like continuing problems of pollution, loss of forest, solid waste disposal, and degradationof environment.
3. Issues like economic productivity and national security, global warming, the depletionof ozone layer and loss of biodiversity are other serious concerns before the mankind.

Course Outcomes:

On the completion of the course, students should be able to:

1. understand fundamental terms related to environment and aware of environmental problems;
2. Analyze the complexities of environmental problems and should know remedies available to them and implement them at their own level;
3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
4. Demonstrate proficiency in quantitative methods, qualitative analysis and critical thinking

UNIT 1.THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:

Basic definitions related to environment; Scope, vis-à-vis environmental science and environmental engineering; a uses of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principals involved in environmental education, environmental awareness, Environmental ethics, environmental organization and their involvement.

UNIT-2 NATURAL RESOURCES:

Renewable and non-renewable resources; forest resources, over-exploitation, and deforestation

afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; Food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non-renewable energy sources, solar energy, wind energy, hydro energy, biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT-3 ECOSYSTEMS:

Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids; characteristic features, structure and function of the following ecosystem

-forest ecosystem, grassland ecosystem desert ecosystem and aquatic ecosystems.

UNIT-4 BIODIVERSITY AND ITS CONSERVATION:

Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT-5 ENVIRONMENTAL POLLUTION AND SOCIAL ISSUES:

Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution; solid waste management, e-waste management; disaster management –floods, earthquake, cyclone and landslides. Water conservation, rain water harvesting, watershed management; climate change, global warming, acid rain, ozone layer depletion; Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest ConservationAct.

Reference Book:

1. Agarwal, K.C., "Environmental Biology", 2nd Edition, Nidhi Publ. Ltd., Bikaner, 2001.
2. Bharucha Erach, "The Biodiversity of India", 2nd Edition, Mapin Publishing Pvt. Ltd., 2006.
3. Kaushik, Anubha, and Kaushik, C.P., "Perspectives in Environmental Studies", 4th Edition,

4. New Age International Publishers, 2004
5. Brunner R. C., "Hazardous Waste Incineration", 1st Edition McGraw Hill Inc., 1989.
6. Clark R.S., "Marine Pollution", 1st Edition Clanderson Press Oxford,1989
7. .Cunningham, W.P., Cooper, T.H. Gorhani, E. & Hepworth, M.T., Environmental Encyclopedia", 2nd Edition, Jaico Publ. House, 2001.
8. De, A. K., "Environmental Chemistry", 2nd Edition, Wiley Eastern, 1989
9. Jadhav, H. and Bhosale, V.M ., "Environmental Protection and Laws", 1st Edition, Himalaya Pub. House, Delhi, 1995.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	3	-	-	1	-	2	2	1	1
CO2	2	3	1	-	1	-	1	2	1	-
CO3	1	3	-	-	-	-	1	2	-	-
CO4	1	2	1	1	1	1	1	2	-	1

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SCHOOL OF BASIC & APPLIED SCIENCES

B.SC. HONS. (CHEMISTRY)

SECOND SEMESTER

BCH 172: ORGANIC CHEMISTRY- LAB II

L-0, T-0 P-2 **Credits –1** **Max Marks: 60**

Course Objectives

The objective of this course is to get the knowledge of analysis of an organic compound and separation of mixture

Course Outcomes:

1. The students can able to calibrate the apparatus and prepare solutions of different concentrations.
2. The students can able to determine the melting and boiling point of different organic compounds
3. The students have the detailed knowledge of determining the purification and crystallization of compounds/solution.Students will learn about the separation of compounds by chromatography.

List of Experiments

S. No	Experiment	Unit
1	Checking the calibration of the thermometer	3
2	4. Purification of organic compounds by crystallization using the following solvents: a. Water b. Alcohol c. Alcohol-Water	1
3	Determination of the melting points of above compounds and unknown organic compounds (Kjeldahl method and electrically heated melting point apparatus)	1
4	Effect of impurities on the melting point – mixed melting point of two unknown organic compounds, Determination of boiling point of liquid compounds. (boiling point lower than and more than 100 °C by distillation and capillary method)	1

5	Chromatography d. Separation of a mixture of two amino acids by ascending and horizontal paper chromatography e. Separation of a mixture of two sugars by ascending paper chromatography f. Separation of a mixture of o-and p-nitrophenol or o-and p-aminophenol by thin layer chromatography (TLC)	5

Reference Books

- Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009)
- Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. *Practical Organic Chemistry, 5th Ed.*, Pearson (2012)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	-	1	-	2	3	1	1
CO2	2	3	1	-	1	-	2	3	1	-
CO3	1	3	2	-	-	-	1	2	-	-

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SCHOOL OF BASIC & APPLIED SCIENCES

B.SC. HONS. (CHEMISTRY)

SECOND SEMESTER

BCH 171: INORGANIC CHEMISTRY-II LAB

L-0, T-0 P-3 **Credits –1** **Max Marks: 60**

Course Objectives

The objective of this course is to get the knowledge of gravimetric analysis of an inorganic compound, preparation of complexes and separation of salt mixture by chromatography

Course Outcomes:

1. The students can estimate the metal ions present in different inorganic compounds.
2. The students can synthesize inorganic coordination compounds or complexes.
3. The students have the detailed knowledge of separation of compounds by chromatography.

List of Experiments

S. No.	Experiment	Unit
1	**Gravimetric Analysis:** i. Estimation of nickel (II) usingDimethylglyoxime (DMG). ii. Estimation of copper as CuSCN iii. Estimation of iron as Fe_2O_3 byprecipitating iron as $Fe(OH)_3$. iv. Estimation of Al (III) by precipitatingwith oxine and weighing as $Al(oxine)_3$ (aluminium oxinate	1
2	**Inorganic Preparations:** i. Tetraamminecopper (II) sulphate,$[Cu(NH_3)_4]SO_4.H_2O$ ii. *Cis* and *trans* $K[Cr(C_2O_4)_2.(H_2O)_2]$ Potassium dioxalatodiaquachromate(III) iii. Tetraamminecarbonatocobalt (III) ion iv. Potassium tris(oxalate)ferrate(III)	3
3	**Chromatography of metal ions** Principles involved in chromatographic separations. Paper chromatographic separation of following metal ions: i. Ni (II) and Co (II) ii. Fe (III) and Al (III)	2

Reference Book:

1. Vogel, A.I. A text book of Quantitative Analysis, ELBS 1986.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	-	1	-	2	3	1	1
CO2	2	3	1	-	1	-	2	3	1	-
CO3	1	3	2	-	-	-	1	2	-	-

B.SC. HONS. (CHEMISTRY)

SECOND SEMESTER

BCH 165: PHYSICAL CHEMISTRY- II LAB

L-0, T-0 P-2 **Credits –1** **Max Marks: 60**

Course Objectives

The objective of this course is to get the knowledge of analysis of thermodynamic parameters of a system

Course Outcomes:

1. The students can able to determine the heat capacity of different concentrations.
2. The students can able to calculate the ionization and hydration enthalpy of different compounds.
3. The students have the detailed knowledge of determining the basicity and solubility of compounds.

List of Experiments

S.No	Experiment	Unit
1	Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization).	
2	Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.	
3	Calculation of the enthalpy of ionization of ethanoic acid.	
4	Determination of heat capacity of the calorimeter and integralenthalpy (endothermic and exothermic) solution of salts.	
5	Determination of basicity/proticity of a polyprotic acid by the thermochemical method in terms of the changes of temperatures observed in the graph of temperature versus time for differentadditions of a base. Also calculate the enthalpy of neutralization of the first step.	
6	Determination of enthalpy of hydration of copper sulphate	
7	Study of the solubilityΔ of benzoic acid in water and determinationof H	

Reference Books

- Khosla, B. D.; Garg, V. C. & Gulati, A., *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).
- Athawale, V. D. & Mathur, P. *Experimental Physical Chemistry* New Age International: New Delhi (2001).

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	-	1	-	2	3	1	1
CO2	2	3	1	-	1	-	2	3	1	-
CO3	1	3	2	-	-	-	1	2	-	-

BPH-175:THERMAL PHYSICS LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

Objective:The aim of this Lab is skill the students with various experiments involved in thermal physics.

Course outcomes:

CO1: Students will learn about thermal measurements.
CO2: understand the concept thermometer and variable resistance.
CO3: determination ofthermal conductivity of the materials.
CO4: understand the thermodynamics of materials.

1. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.
2. To determine the Coefficient of Thermal Conductivity of Cu by Searle's Apparatus.
3. To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method.
4. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.
5. To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).
6. To study the variation of Thermo-Emf of a Thermocouple with Difference of Temperature of its Two Junctions.
7. To calibrate a thermocouple to measure temperature in a specified Range using (1) Null Method, (2) Direct measurement using Op-Amp difference amplifier and to determine Neutral Temperature.

Note: Each student is required to perform at least seven experiments.

Reference Books

- Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House
- A Text Book of Practical Physics, I.Prakash& Ramakrishna, 11th Ed., 2011, Kitab Mahal
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
- A Laboratory Manual of Physics for undergraduate classes,D.P.Khandelwal,1985, Vani Pub.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	1	2	2	1	1
CO2	3	3	1	-	1	2	1	-
CO3	1	3	-	1	1	2	2	2
CO4	2	3	-	1	2	1	-	-

B.SC. HONS. (CHEMISTRY) THIRD SEMESTER

BCH 222: ORGANIC CHEMISTRY- III

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

1. **The present curriculum enhance the knowledge of organic chemistry of students; they should aware with alkenes, dienes their properties and chemical activity.**
2. **Benzene derivatives also plays an important role in organic chemistry to understand the students, it have their own importance.**

Course Outcomes:

1. After finishing this curriculum students are able to differentiate between alkyl aryl and aldehyde.
2. Student aware the nomenclature of benzene derivatives
3. Student learn synthesis of naphthalene, and other poly nuclear hydrocarbons.
4. Here with this curriculum electrophilic and substitution reaction are define the properties of chemical compounds.

UNIT-1: ALCOHOLS

Monohydric alcohols—nomenclature, methods of formation by reduction of aldehydes, ketones, Carboxylic acids and esters. Hydrogen bonding. Acidic nature, Reactions of alcohols. Dihydric alcohols- nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$Pb(OAc)_4$ and HIO_4] and pinacol-pinacolone rearrangement.

UNIT-2: EPOXIDES

Synthesis of epoxides, acid and base-catalyzed ring opening of epoxides, orientation ofepoxide ring opening, reactions of Grignard and organolithium reagents with epoxides. UNIT-3: PHENOLS

Nomenclature, structure and bonding, preparation of phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols — electrophilic aromatic substitution,Mechanisms of Fries rearrangement, Claisen rearrangement, Reimer-Tiemann reaction, Kolbe's reaction and Schotten and Baumann reactions.

UNIT-4: CARBOXYLIC ACIDS

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength, Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Synthesis of acid chlorides, esters and amides, reduction of carboxylic acids. Mechanism of decarboxylation. Methods of formation and chemical reactions of halo acids. Hydroxy acids: malic, tartaric andcitric acids. Methods of formation and chemical reactions of unsaturated monocarboxylic acids. Industrial manufacture of acetic

acid and benzoic acid (flow sheet diagram). Dicarboxylic acids: methods of formation and effect of heat and dehydrating agents.

UNIT-5: CARBOXYLIC ACID DERIVATIVES

Structure and nomenclature of acid chlorides, esters, amides (urea) and acid anhydrides, relative stability of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution, Preparation of carboxylic acid derivatives, chemical reactions. Mechanisms of esterification and hydrolysis (acidic and basic).

Reference Books:

Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt.Ltd. (Pearson Education).

Finar, I. L. *Organic Chemistry* (*Volume 1*), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Graham Solomons, T.W. *Organic Chemistry*, John Wiley & Sons, Inc

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	2	1	-	1	-	2	2	1	1
CO2	1	2	1	-	1	-	1	2	1	2
CO3	1	3	1	-	-	-	1	2	2	-
CO4	1	2	1	-	1	-	2	2	1	2

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B.SC. HONS. (CHEMISTRY)
THIRD SEMESTER
BCH 219: PHYSICAL CHEMISTRY- III

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

1. **Here in this syllabus we start COURSE with aspects of electrochemistry and thermodynamics. It became easy to understand the aspect of thermodynamic behavior of chemical reaction and their direct indirect influence on chemical activity after the study.**
2. **Student also learn the theory of phase equilibrium and their different aspect of forward and backward reactions.**

Course Outcomes:

1. On finishing these modules of chemistry we are able to surface, electro and critical phenomenon.
2. It is also easy to understand thermodynamic derivation of relations between the various equilibrium constants *Kp*, *Kc* and *Kx*. Le-Chatellier principle (quantitative treatment); equilibrium between ideal gases and a pure condensed phase.
3. Student may also able to understand the critical phenomenon
4. The students can determine the deviation of real gas from ideal behavior.

UNIT-1: THERMODYNAMICS

Definition of thermodynamics terms: system, surrounding, types of systems, intensive and extensive properties. State and path functions, Thermodynamic processes. Concept of heat and work. Zeroth Law of thermodynamics, first law of thermodynamics: statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law – joule – Thomson coefficient for ideal gas and real gas: and inversion temperature. Calculation of work done, heat, internal energy, enthalpy for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process.

UNIT-2: SURFACE CHEMISTRY

Adsorption by solids, Application of adsorption, Adsorption of gases by solids, Factors influencing the adsorption, Langmuir theory of adsorption, Adsorption from solution, Gibbs adsorption isotherm.

UNIT-3: DISTRIBUTION LAW

Nernst distribution law, conditions for the validity of Nernst distribution law, Derivation of molecular complexity from distribution law. Application of distribution law i.e. calculation of solubility of solute in solvent, determination of equilibrium constant from distribution law, distribution indicator, process of extraction and determination of degree of hydrolysis and study of complex ion formation, limitation of distribution law.

UNIT-4: ELECTROCHEMISTRY – II

Kohlarausch's Law, calculation of molar ionic conductance and effect of viscosity, temperature & pressure on it. Application of Kohlarausch's law in calculation of conductance of weak electrolytes at infinite dilution.

Application of conductivity measurements: determination of degree of dissociation, determination of K_a of acids, determination of solubility product of sparingly soluble salts, conductance titrations. Definition of pH and pKa, Buffer action, Buffer mechanism of buffer action.

UNIT-5 GASEOUS STATE

Maxwell's distribution of velocities and energies(derivation excluded), average velocity and most probable velocity, collision diameter, collision number, collision frequency, deviation of real gases from ideal behavior, derivation of vander Waal's equation of state.

Reference Books:

Peter Atkins & Julio De Paula, *Physical Chemistry 9th Ed.*, Oxford University Press (2010).

- Castellan, G. W. *Physical Chemistry*, 4th Ed., Narosa (2004).
- McQuarrie, D. A. & Simon, J. D., *Molecular Thermodynamics*, Viva Books Pvt. Ltd.: New Delhi (2004).
- Engel, T. & Reid, P. *Physical Chemistry 3rd Ed.*, Prentice-Hall (2012).
- Assael, M. J.; Goodwin, A. R. H.; Stamatoudis, M.; Wakeham, W. A. & Will, S. *Commonly Asked Questions in Thermodynamics.* CRC Press: NY (2011).

- Zundhal, S.S. *Chemistry concepts and applications* Cengage India (2011).
- Ball, D. W. *Physical Chemistry* Cengage India (2012).

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	3	-	-	1	-	2	2	1	1
CO2	1	3	1	-	1	-	1	2	1	-
CO3	1	3	-	-	-	-	1	2	-	-
CO4	1	2	-	-	1	-	1	2	-	-

B.SC. HONS. (CHEMISTRY)
THIRD SEMESTER
BCH 221: INORGANIC CHEMISTRY- III

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

1. **Here in this course we are trying to enlightening the student about the role of transition elements in the field of inorganic chemistry.**
2. **Students can categories the elements in the groups on the basis similar chemical and physical behavior.**

Course Outcomes:

1. After study of these five units student must aware with transition elements and their properties and applications in the field of inorganic chemistry.
2. Student must also know the reasons and relationship between the elements situated into similar groups and similar periods of 3d,4d and 5d transition series
3. **Students also learn characteristic feature of different families of f-block elements**
4. Students can learn the coordination and interhalogen compounds

UNIT-1: CHEMISTRY OF ELEMENTS OF IST TRANSITION SERIES:

Definition of transition elements, position in the periodic table, General characteristics & properties of Ist transition elements, Structures & properties of some compounds of transitionelements– TiO_2, $VOCl_2$, $FeCl_3$, $CuCl_2$ and $Ni(CO)_4$

UNIT-2: CHEMISTRY OF ELEMENTS OF IIND & IIIRD TRANSITION SERIES:

General characteristics and properties of the IInd and IIIrd transition elements Comparison ofproperties of 3d elements with 4d & 5d elements with reference only to ionic radii, oxidation state, magnetic and Spectral properties and stereochemistry.

UNIT-3: LANTHANIDES:

Comparative study of lanthanide elements with respect to electronic configuration atomic andionic radii, oxidation state and complex formation, lanthanide contraction. Separation of lanthanides. Application of lanthanide complexes.

UNIT-4: COORDINATION COMPOUNDS

Werner's coordination theory, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes.

UNIT-5: HALOGEN FAMILY

Basic properties of halogen, interhalogens types properties, hydro and oxyacids of chlorine – structure and comparison of acid strength.

Reference Books:

- Lee, J.D. *Concise Inorganic Chemistry*, ELBS, 1991.
- Douglas, B.E; Mc Daniel, D.H. & Alexander, J.J. *Concepts & Models of Inorganic Chemistry 3rd Ed.*, John Wiley Sons, N.Y. 1994.
- Greenwood, N.N. & Earnshaw. *Chemistry of the Elements*, Butterworth-Heinemann. 1997.
- Cotton, F.A. & Wilkinson, G. *Advanced Inorganic Chemistry*, Wiley, VCH, 1999.
- Miessler, G. L. & Donald, A. Tarr. *Inorganic Chemistry 4th Ed.*, Pearson, 2010.
- Shriver & Atkins, *Inorganic Chemistry 5th Ed.*

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	3	1	1	1	-	2	2	1	1
CO2	1	3	1	-	1	-	1	2	2	1
CO3	1	3	-	1	-	-	1	2	-	2
CO4	1	3	-	1	-	-	2	2	-	2

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B.SC. HONS. (CHEMISTRY)

THIRD SEMESTER

BMA-230: DIFFERENTIAL EQUATIONS-I

L-4, T-0 P-0 Credits –4 Max Marks: 75

Course Objectives:

1. Maintain a core of Mathematical and technical knowledge that is adaptable to changing technologies and provides a solid foundation for future learning.

COURSE OUTCOMES:

1. Students can perform abstract mathematical reasoning.
2. Students can identify and explain cases in which major results of one branch of mathematics rely nontrivially on results from another branch (e.g., the application of linear algebra to solving systems of differential equations).
3. Students will demonstrate their ability to solve problems in mathematics using appropriate technology.
4. Students will translating problems from one form to another, using various problem-solving strategies

UNIT 1:**Geometrical meaning of a differential equation. Exact differential equations, integrating factors. First order higher degree equations solvable for x,y,p Lagrange's equations,Clairaut's equations. Equation reducible to Clairaut's form.**

UNIT-2: **Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations. Equations reducible to homogeneous equation.**

UNIT -3: **Method of variations of parameters. Method of undetermined coefficients. Reduction of order of a differential equation. Linear differential equations of second order: Reduction to normal form.**

UNIT-4: **Transformation of the equation by changing the dependent variable/ the independent variable. Solution by operators of non-homogeneous linear differential equations.**

UNIT-5: **Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators x (d/dx) or t (d/dt) etc. Simultaneous equation of the form dx/P = dy/Q = dz/R. Total differential equations. Condition for Pdx + Qdy +Rdz = 0 to be exact. General method of solving Pdx + Qdy + Rdz = 0 by taking one variable constant.**

Reference Books:

1. B.Rai & D.P. Chaudhary : Ordinary Differential Equations; Narosa, Publishing House Pvt. Ltd.

2. D.A. Murray : Introductory Course in Differential Equations. Orient Longaman (India)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	1	1	1	-	2	2	1	1
CO2	1	3	1	-	1	-	1	2	2	1
CO3	1	3	-	1	-	-	1	2	-	2
CO4	1	1	1	2	-	-	1	1	1	1

B.SC. HONS. (CHEMISTRY)
THIRD SEMESTER
BA-272-A: ENTREPRENEURSHIP

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

It provides exposure to the students to the entrepreneurial cultural and industrial growth so as to prepare them to set up and manage their own small units.

Course Outcomes:

1. **You understand different methods to assess the attractiveness of business opportunities.**
2. **The students solve a specific innovation challenge and apply their knowledge into actual actionthat creates value for others.**
3. **Creates a pre-understanding and a foundation for which the students can be tested in theoretical insight,understanding and critical thinking**

UNIT I- INTRODUCTION: **The Entrepreneur: Definition, Emergence of Entrepreneurial Class; Theories of Entrepreneurship.**

UNIT 2 PROMOTION OF A VENTURE:

Opportunity Analysis; External Environmental Analysis Economic, Social and Technological; Competitive factors; Legal requirements of establishment of a new unit and Raising of Funds; Venture Capital Sources and Documentation Required.

UNIT 3 ENTREPRENEURIAL BEHAVIOUR:

Innovation and Entrepreneur; Entrepreneurial Behaviour and Psycho-theories, Social responsibility.Entrepreneurial Development Programmes (EDP): EDP, Their Role, Relevance and Achievements; Role of Government in Organizing EDP's Critical Evaluation.

UNIT 4 ROLE OF ENTREPRENEUR:

Role of an Entrepreneur in Economic Growth as an Innovator, Generation of Employment Opportunities, Complimenting and Supplementing Economic Growth, Bringing about Social Stability and Balanced Regional Development of Industries: Role in Export Promotion and Import Substitution, Forex Earnings.

Text Books**:**

1. Hisrich, Robert and Peters, Michael, (2002), Entrepreneurship, 5thEdition, McGrawHill Education.
2. Charantimani, (2006), Entrepreneurship Development and Small Business Enterprise, 1stedition, Pearson Education.

Reference Books:

1. Chandra, Ravi, (2003), Entrepreneurial Success: A Psychological Study, Sterling Publication Pvt. Ltd., New Delhi.
2. Balaraju, Theduri, (2004), Entrepreneurship Development: An Analytical Study, Akansha Publishing House, New Delhi.
3. David, Otes, (2004), A Guide to Entrepreneurship, Jaico Books Publishing House,

Delhi.

4. Kaulgud, Aruna, (2003), Entrepreneurship Management, Vikas Publishing House, Delhi.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	1	1	1	-	2	2	1	1
CO2	1	2	1	-	1	-	1	2	2	1
CO3	1	3	-	1	-	-	1	2	-	2

B.SC. HONS. (CHEMISTRY)
THIRD SEMESTER
BMA-231: ELEMENTARY MATHEMATICS-I

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

1. Maintain a core of mathematical and technical knowledge that is adaptable to changing technologies and provides a solid foundation for future learning.
2. Students will demonstrate their ability to solve problems in mathematics using appropriate technology, translating problems from one form to another, using various problem-Solving Strategies.

Course Outcomes:

1. Students' can perform abstract mathematical reasoning.
2. Students' can identify and explain cases in which major results of one branch of mathematics rely nontrivially on results from another branch (e.g., the application of linear algebra to solving systems of differential equations).
3. Conceive the concepts of analytic functions and will be familiar with the elementary complex functions and their properties
4. Understand the basic methods of complex integration and its application in contour integration.

UNIT-1: SEQUENCE AND SERIES:

Arithmetic Progression (A.P.), Arithmetic Mean (A.M.), Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P. Arithmetic and geometric series, infinite G.P. and its sum, geometric mean (G.M.). Relation between A.M. and G.M. Sumto n terms of the special series : $\sum n$, $\sum n^2$ and $\sum n^3$.

UNIT-2: MATRICES

Concept, notation, order, equality, types of matrices, zero matrix, transpose of a matrix, symmetric and skew symmetric matrices. Addition, multiplication and scalar multiplication of matrices, simple properties of addition, multiplication and scalar multiplication. Non- commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). (Here all matrices will havereal entries).

UNIT-3: DETERMINANTS

Determinant of a square matrix (up to 3 × 3 matrices), properties of determinants, minors, cofactors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of

linear equations by examples, solving system of linear equations in two or three variables(having unique solution) using inverse of a matrix.

UNIT-4: DIFFERENTIATION

Differentiability, derivative of composite functions, chain rule, , derivative of implicit function. Concepts of exponential, logarithmic functions. Derivatives of $\log e^X$ and e^X. Logarithmic differentiation. Derivative of functions expressed in parametric forms. Second order derivatives.
Rate of change, maxima and minima.Simple problems

UNIT-5: INTEGRALS

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts. Definite integrals as a limit of a sum. Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals. Applications in finding the area under simple curves

TEXT BOOKS/REFERENCE BOOKS:

1. R.D SHARMA FOR CLASS 11th AND 12TH MATHEMATICS
2. R.S. AGRAWAL FOR CLASS 12TH MATHEMATICS
3. PRADEEP'S REFERENCE BOOK FOR CLASS 11TH

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	1	1	1	-	2	2	1	1
CO2	1	3	1	-	1	-	1	2	2	1
CO3	1	2	-	-	-	1	-	1	-	1
CO4	1	1	-	1	1	1	1	1	-	2

B.SC. HONS. (CHEMISTRY)
THIRD SEMESTER
BCS-201: COMPUTER FOR CHEMISTS

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

1. Understand the principles of creating an effective web page including an in-depth consideration of information architecture.
2. Understand how to plan and conduct user research related to web usability.

Course Outcomes:

1. Develop and implement solutions to problems encountered in all phases of the design process.
2. Apply effective business practices and project management
3. An ability to analyze the local and global impact of computing on individuals, organizations, and society
4. A recognition of the need for and an ability to engage in continuing professional development

UNIT – 1: INTRODUCTION TO INTERNET

World Wide Web and concepts of website, web pages etc. Client – Server Architecture, Theidea of hypertext and hyper media: how the web works: HTTP, HTML and URLs; how the browser works: MIME types, plug-ins and helper applications, standards, Introduction to HTML, XML, XHTML and the W3C.

UNIT –2 : HYPERTEXT MARKUP LANGUAGE

HTMLS: The anatomy of an HTML document; marking up for structure and style: basic pagemarkup, ordered and unordered list, Structuring content with HTML using natural divisions, Marquee text with or without background with attributes, Working with Links Internal Links:Anchor Link, Email Link; embedding images, table creation: Table attributes Colspan, Rowspan, Table Border, Align, Valign, Table background image, Nesting tables, Frames andNesting, iframes, forms, Semantic elements of HTMLS, Media tags in HTMLS.

UNIT – 3 : CASCADING STYLE SHEET

Introduction to Cascading Style Sheet: Selector, Declaration and declaration block. Types ofCSS – Inline and Internal style specifications within HTML; external linked style specification using CSS, page and site design considerations. Types of Selector:Universal, Class and ID Selector, Building & Applying Class Selectors, ID Selector using Div Tags andspan tag.

UNIT – 4 : CLIENT SIDE PROGRAMMING:

Introduction to JavaScript syntax: output, Comments, variables, functions, operators, conditions, switch, loop. Java1Script object model: Window, Location and History objectmodel; HTML DOM: Introduction to DOM: methods, event handling, navigation, Formsvalidation.

UNIT – 5 : TESTING WEB APPLICATION

Introduction, Fundamentals, Terminology, Quality characteristics, test objectives, test levels,Test Methods and Techniques, Link Testing, Browser Testing, Usability Testing Load, stressand continuous testing; Testing Security; Test automation; Benefits and drawbacks of automation testing.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	1	-	-	1	-	2	3	1	1
CO2	1	1	1	-	1	-	1	3	2	1
CO3	1	3	2	1	1	1	-	2	-	1
CO4	1	1	2	1	2	13	1	1	1	2

B.SC. HONS. (CHEMISTRY)
THIRD SEMESTER
BCH 272: ORGANIC CHEMISTRY- II-LAB

L-0, T-0 P-3 **Credits –1** **Max Marks:60**

Course Objectives
The objective of this course is to get the knowledge of functional group analysis of an organic compound and other chemical reaction

Course Outcomes:

1. The students can able to calibrate the apparatus and prepare solutions for the functional group test.
2. The students can able to prepare amine or nitro group based organic compounds
3. The students have the detailed knowledge of amine based named reaction and reduction reaction by preparation of organic compounds.

List of Experiments

S. No	Experiment	Unit
1	Functional group tests for alcohols, phenols, carbonyl and carboxylic acid group.	3
2	Organic preparations: Acetylation of one of the following compounds: amines (aniline, *o*-, *m*-, *p*-toluidines and *o*-, *m*-, *p*-anisidine)β and phenols (-naphthol, vanillin, salicylic acid) by any one method: a. Using conventional method. b. Using green approach	2
3	Benzolyation of one of the following amines (aniline, *o*-, *m*-, *p*- toluidines and *o*-, *m*-, *p*-anisidine) andβ one of the following phenols (-naphthol, resorcinol, p-cresol) by Schotten-Baumann reaction.	
4	Oxidation of ethanol/ isopropanol (Iodoform reaction)	2
5	Bromination of any one of the following: a. Acetanilide by conventional methods Acetanilide using green approach (Bromate-bromide method.	1
6	Nitration of any one of the following: b.Acetanilide/nitrobenzene by conventional method c.Salicylic acid by green approach (using ceric ammonium nitrate).	3
7	Selective reduction of *meta* dinitrobenzene to *m*-nitroaniline	1
8	Reduction of *p*-nitrobenzaldehyde by sodium borohydride.	1
9	Hydrolysis of amides and esters.	3
10	Semicarbazone of any one of the following compounds: acetone, ethyl methyl ketone, cyclohexanone, benzaldehyde	3

11	*S*-Benzylisothiouronium salt of one each of water soluble and water insoluble acids (benzoic acid, oxalic acid, phenyl acetic acid and phthalic acid).	4
12	Aldol condensation using either conventional or green method.	3
13	Benzil-Benzilic acid rearrangement.	4

Reference Books

- Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009)
- Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. *Practical Organic Chemistry, 5th Ed.*, Pearson (2012)
- Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis*, University Press (2000).
- Ahluwalia, V.K. & Dhingra, S. *Comprehensive Practical Organic Chemistry: Qualitative Analysis*, University Press (2000).

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	-	1	-	2	3	1	1
CO2	2	3	1	-	1	-	2	3	1	-
CO3	1	3	2	-	-	-	1	2	-	-

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B.SC. HONS. (CHEMISTRY)

THIRD SEMESTER

BCH 269: PHYSICAL CHEMISTRY- III-LAB

L-0, T-0 P-3 **Credits –1** **Max Marks: 60**

Course Objectives

The objective of this course is to get the knowledge of analysis of chemical (phase and ionic) equilibria parameters of a system

Course Outcomes:

1. The students can able to determine the critical solution temperature of different concentrations.
2. The students can able to calculate the degree of freedom by phase diagram of different eutectic system.
3. The students have the detailed knowledge of adsorption isotherms and kinetics of saponification.

List of Experiments

S. No	Experiment	Unit
1	Determination of critical solution temperature and composition of the phenol-water system and to study the effect of impurities on it	1
2	II. Phase equilibria: Construction of the phase diagram using cooling curves or ignition tube method: simple eutectic and congruently melting systems	1
3	Distribution of acetic/ benzoic acid between water and cyclohexane	1
4	Study the equilibrium of at least one of the following reactions by the distribution method: (i) $I_2(aq) + I^- \rightarrow I_3^-(aq)$ *(ii)* $Cu^{2+}(aq) + n NH_3 \rightarrow Cu(NH_3)_n^{2+}$	2
5	Study the kinetics of the following reactions. 1. Initial rate method: Iodide-persulphate reaction 2. Integrated rate method: a. Acid hydrolysis of methyl acetate with hydrochloric acid. b. Saponification of ethyl acetate. 3. Compare the strengths of HCl and H_2SO_4 by studying kinetics of hydrolysis of methyl acetate.	3

6	Verify the Freundlich and Langmuir isotherms for adsorption of acetic acid on activated charcoal.	4

Reference Books:

- Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).

- Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. *Experiments in Physical Chemistry 8th Ed.*; McGraw-Hill: New York (2003).
- Halpern, A. M. & McBane, G. C. *Experimental Physical Chemistry 3rd Ed.;* W.H. Freeman & Co.: New York (2003).

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	-	1	-	2	3	1	1
CO2	2	3	1	-	1	-	2	3	1	-
CO3	2	3	2	-	-	-	1	3	-	-

B.SC. HONS. (CHEMISTRY)
THIRD SEMESTER
BCH 271: INORGANIC CHEMISTRY- II-LAB

L-0, T-0 P-3 **Credits –1** **Max Marks: 60**

Course Objectives

The objective of this course is to get the knowledge of iodimetric analysis of an inorganic compound and preparation of complexes.

Course Outcomes:

1. The students can estimate the metal ions present in different inorganic compounds by iodimetric titrations.
2. The students can synthesize inorganic coordination compounds or complexes.
3. The students have the detailed knowledge of prepared coordination compounds.

List of Experiments

S. No	Experiment	Unit
1	**(A) Iodo / Iodimetric Titrations** (i) Estimation of Cu(II) and $K_2Cr_2O_7$ using sodium thiosulphate solution (Iodimetrically). (ii) Estimation of (i) arsenite and (ii) antimony in tartar-emetic iodimetrically (iii) Estimation of available chlorine in bleaching powder iodometrically.	1
2	**(B) Inorganic preparations** (i) Cuprous Chloride, Cu_2Cl_2 (ii) Preparation of Manganese(III) phosphate, $MnPO_4.H_2O$ (iii) Preparation of Aluminium potassium sulphate $KAl(SO_4)_2.12H_2O$ (Potash alum) or Chrome alum.	5

Reference Books:

- Vogel, A.I. A Textbook of Quantitative Inorganic Analysis, ELBS. 1978

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	-	1	-	2	3	1	1
CO2	2	3	1	-	1	-	2	3	1	-
CO3	2	3	2	-	-	-	1	2	-	-

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B.SC. HONS. (CHEMISTRY)
FOURTH SEMESTER

BCH 223: PHYSICAL CHEMISTRY-IV

L-4, T-0 P-0 Credits –4 **Max Marks: 75**

Course Objectives:

1. The various topics of the syllabus are grouped under different units in order to bring forth the importance of academic and laboratory skills for the undergraduate students.
2. To use solution thermodynamic concepts to compute phase & reaction equilibrium data.

Course Outcomes:

Students will gain an understanding of:

1. The relationship between microscopic properties of molecules with macroscopic thermodynamic observables
2. The differences between classical and quantum mechanics
3. The fundamentals of nuclear decay.
4. Students will estimate equilibrium conversion in reversible reactions at given pressure and temperature following rigorous thermodynamic method

UNIT-1 THERMODYNAMICS

Second law of thermodynamics. Need of the law, Concept of entropy, entropy as a state function of V and T, entropy as a function of P and T. Entropy change in physical processes. Entropy as criteria of Spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases, work function, Gibb's free energy function. Gibbs function (G) and Helmholtz function (A) as thermodynamic function. Criteria of spontaneity of reversible processes in terms of enthalpy change, entropy change, work function and free energy function. Variation of G and A with P, V and T. Gibb Helmholtz equation and its application, Third law of thermodynamics and its applications. Partial molar quantities. Chemical potential. Gibb's Duhem equation. Gibb's adsorption equation and its application.

UNIT-2 COLLOIDAL STATES

Colloids, classification of colloids, solids in liquids (sols) properties: Kinetic, optical and Electrical, stability of colloids, protective colloids, Hardy-schulze Rule, gold number, Emulsion types of emulsion and their preparation, Emulsifier. Gels (liquid in solids): Classification and properties, General application of colloids.

UNIT-3 CRITICAL PHENOMENON

Critical temperature, critical **pressure, critical volume and their determination. PV isotherms of real gases, continuity of states, the isotherms of Vander Waal's equation, relationship between critical constants and Vander Waal's constants. Critical compressibility factor, the lawof corresponding states. Liquefaction of gases.**

UNIT-4 NUCLEAR CHEMISTRY:

Radioactivity, Properties of radiation, detection & measurement of radioactivity, types of radioactive decay, Group displacement law, rate of radioactive decay, half life, calculation of half life, radioactive dating, nuclear reactions: nuclear fission and nuclear fusion reaction. Nuclear binding energy.

UNIT-5 CHEMICAL BONDING:

Covalent bonding, valence bond and molecular orbital approaches, LCAO-MO treatment of H_2^+. Bonding and antibonding orbitals. Qualitative extension to H_2. Comparison of LCAO- MO and VB treatments of H_2 (only wavefunctions, detailed solution not required) and their limitations. Refinements of the two approaches (Configuration Interaction for MO, ionic terms in VB). Qualitative description of LCAO-MO treatment of homonuclear and heteronuclear diatomic molecules (HF, LiH). Localised and non-localised molecular orbitals treatment of triatomic (BeH_2, H_2O) molecules. Qualitative MO theory and its application to AH_2 type molecules.

Reference Books:

- Atkins, P.W & Paula, J.D. *Physical Chemistry*, 9th Ed., Oxford University Press (2011).
- Castellan, G. W. *Physical Chemistry 4th Ed.*, Narosa (2004).
- Mortimer, R. G. *Physical Chemistry 3rd Ed.*, Elsevier: NOIDA, UP (2009).
- Barrow, G. M., *Physical Chemistry 5th Ed.*, Tata McGraw Hill: New Delhi (2006).
- Engel, T. & Reid, P. *Physical Chemistry 3rd Ed.*, Prentice-Hall (2012).
- Rogers, D. W. *Concise Physical Chemistry* Wiley (2010).
- Silbey, R. J.; Alberty, R. A. & Bawendi, M. G. *Physical Chemistry 4th Ed.*, John Wiley & Sons, Inc. (2005).

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	3	1	1	1	-	2	2	1	1
CO2	1	3	1	-	1	-	1	2	2	1
CO3	1	3	-	1	-	-	1	2	-	2
CO4	1	2	-	1	-	-	1	2	-	2

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B.SC. HONS. (CHEMISTRY)
FOURTH SEMESTER
BCH 226: ANALYTICAL CHEMISTRY-III

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

The various topics of the syllabus are grouped under different units in order to bring forth the importance of academic and laboratory skills for the undergraduate students. They comprises of chemistry of soil, water, food products and cosmetics along with chromatography.

Course Outcomes:

1. The various topics of the syllabus are grouped under different units in order to bring forth the basic knowledge and importance of analytical chemistry and error measurements.
2. From this syllabus class will be able to understand about the chemistry of soil and water and their properties.
3. With this syllabus class will able to analyze the food products.
4. Students can identify and separate the mixture by chromatography and analyze the cosmetics.

UNIT-I INTRODUCTION:

Introduction to Analytical Chemistry and its interdisciplinary nature. Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures.

UNIT-II ANALYSIS OF SOIL & WATER:

Composition of soil, Concept of pH and pH measurement, Complexometric titrations, Chelation, Chelating agents, use of indicators a. Determination of pH of soil samples. b. Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration. Analysis of water: Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods. a. Determination of pH, acidity and alkalinity of a water sample. b. Determination of dissolved oxygen (DO) of a water sample.

UNIT-III ANALYSIS OF FOOD PRODUCTS:

Nutritional value of foods, idea about food processing and food preservations and adulteration. a. Identification of adulterants in some common food items like coffee powder, asafoetida, chilli powder, turmeric powder, coriander powder and pulses, etc. b. Analysis of preservativesand colouring matter.

UNIT-IV CHROMATOGRAPHY:

Definition, general introduction on principles of chromatography, paper chromatography, TLCetc. a. Paper chromatographic separation of mixture of metal ion (Fe^{3+} and Al^{3+}). b. To compare paint samples by TLC method. Ion-exchange: Column, ion-exchange chromatography etc. Determination of ion exchange capacity of anion / cation exchange resin(using batch procedure if use of column is not feasible).

UNIT-V ANALYSIS OF COSMETICS:

Major and minor constituents and their function a. Analysis of deodorants and antiperspirants, Al, Zn, boric acid, chloride, sulphate. b. Determination of constituents of talcum powder: Magnesium oxide, Calcium oxide, Zinc oxide and Calcium carbonate by complexometric titration.

Reference Books:

- Purcell, K.F & Kotz, J.C. Inorganic Chemistry W.B. Saunders Co, 1977.
- Huheey, J.E., Inorganic Chemistry, Prentice Hall, 1993.
- Lippard, S.J. & Berg, J.M. Principles of Bioinorganic Chemistry Panima Publishing Company 1994.
- Cotton, F.A. & Wilkinson, G, Advanced Inorganic Chemistry. Wiley-VCH, 1999
- Basolo, F, and Pearson, R.C., Mechanisms of Inorganic Chemistry, John Wiley & Sons, NY, 1967.
- Greenwood, N.N. & Earnshaw A., Chemistry of the Elements, Butterworth-Heinemann,1997.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	2	-	1	2	2	2	1	1
CO2	1	3	1	-	1	3	1	2	1	2
CO3	2	3	-	1	1	-	1	2	2	-
CO4	2	3	-	1	1	-	2	3	2	-

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B.SC. HONS. (CHEMISTRY)
FOURTH SEMESTER
BCH 225: ORGANIC CHEMISTRY-III

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

The objective of this course is to learn the organometallic reagents and heterocyclic compounds and their application in organic chemistry by knowing the synthesis mechanism.

Course Outcomes:

1. Student can learn the organometallic compounds that are used as reagents.
2. Student can gain the knowledge of synthesis, structure and bonding, properties and reactivity of main group organometallics (including Grignard reagents, organolithium reagents, organophosphorus compounds, etc).
3. The component of the course will aim to develop skills in the techniques of organotransition metal chemistry and organometallic catalysis.
4. Students can learn the organic synthesis via enolates and heterocyclic compounds.

UNIT-1: ORGANOMETALLIC COMPOUNDS

Reagents-formation, structure and chemical reactions. Organozinc compounds: formation and chemical reactions. Organolithium compounds: formation and chemical reactions. Organo leadcompounds: formation and chemical reactions. Organo cadmium compounds: formation and chemical reactions. Organo copper compounds: formation and chemical reactions

UNIT-2: ORGANOSULPHUR COMPOUNDS

Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates.

UNIT-3: ORGANO PHOSPHORUS COMPOUNDS

Nomenclature, Trivalent phosphorus compounds - trialkyl and triaryl phosphine (method of formation and reactions), Pentavalent phosphorus compounds, organic phosphoranes, phosphorus ylides, wittig reaction. Biological role of phosphorus.

UNIT-4: HETEROCYCLIC COMPOUNDS

Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole. Introduction to condensed five and six- membered heterocycles. Prepration and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of indole, quinoline and isoquinoline.

UNIT-5: ORGANIC SYNTHESIS *VIA* ENOLATES

Acidity of hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate. Alkylation of 1,3-dithianes. Alkylation and acylation of enamines.

Reference Books:

- Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- Finar, I. L. *Organic Chemistry* (*Volume 1*), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- Finar, I. L. *Organic Chemistry* (*Volume 2: Stereochemistry and the Chemistry of Natural Products*), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
- Graham Solomons, T.W. *Organic Chemistry*, John Wiley & Sons, Inc.
- Kalsi, P. S. *Textbook of Organic Chemistry 1st Ed.*, New Age International (P)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	2	-	1	2	2	2	2	1
CO2	2	3	1	-	1	2	1	2	1	2
CO3	1	3	1	-	-	-	1	2	2	-
CO4	1	2	2	-	-	-	1	2	2	-

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B.SC. HONS. (CHEMISTRY)
FOURTH SEMESTER
BA- 264A: MANAGERIAL SKILLS

L-4, T-0 P-0 **Credits –4** **Max Marks: 55**

Course Objectives:

1. The objective of this course is to develop a basic understanding about the management concepts as well as of human in various managerial processes in organization.
2. Will be able to learn strong working knowledge of ethics and professional responsibility.

Course Outcomes:

1. Manage the selection and initiation of individual projects and of portfolios ofprojects in the enterprise.
2. Demonstrate effective project execution and control techniques that result in successful projects.
3. Demonstrate the roles, skills and functions of management.
4. Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.

UNIT-1SKILL DEVELOPMENT

Writing Business Letter, Official letters, 7C's & 4'S in Communication , Report writing , Skills,Presentation Skills , Communication : Concept, Types , process, barriers, making Communication effective.
MANAGERIAL CREATIVITY- Business Process Re-engineering - Concept , Process, Redesign, BPR, experiences in Indian Industry , Total Quality Management(TQM) - Concept
, Systems model of Quality, Deming's approach, TQM as a business Strategy .

UNIT-2 TECHNOLOGY LED DEVELOPMENT

Knowledge Management (KM)- What , why, how, of Knowledge Management , KM process , approach, strategies, tools. E-commerce- Ideology, methodology, classification byapplication /nature of transactions , Driving Forces of EC, Impact of EC, Scope

UNIT-3 LEADERSHIP FOR MANAGERS

Concept, Traits, Styles, Types of leadership, Leadership for managers-varied case studies for identifying and imbibing leadership attributes.
Selling & Negotiation Skills-**Types of Negotiation , Negotiation Strategies ,Selling skills –Selling to customers , Selling skills – Body language, Conceptual selling, Strategic selling**

UNIT-4 CONFLICT MANAGEMENT

Conflict Management - Types of conflicts and Conflict Management, Coping strategies andConflict Management, Conflict Management Styles

UNIT-5 POSITIVE THINKING

Attitudes, Beliefs, Positive thinking – Martin Seligman's theory of Learned Helplessness, Optimism, Case Studies and Presentations.

Reference:

Kootz,O'Donnell , Weighrich : Essentials of Management
2.Michael , J. Stahl : Management -Total Quality in a global environment (Blackwell Business)
3.Newman , Warren and Summer : The Process of Management , Concept, Behaviour & Practice.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	2	-	1	2	2	2	2	1
CO2	1	3	1	-	1	2	1	2	1	2
CO3	1	3	1	-	-	-	1	2	2	-
CO4	2	2	1	-	2	1	1	2	2	2

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B.SC. HONS. (CHEMISTRY)
FOURTH SEMESTER
BMA-241 A : ELEMENTARY MATHEMATICS-II

L-4, T-0 P-0 **Credits –4** **Max Marks: 55**

CourseObjectives:

1. The ability to identify reflects upon, evaluate, integrate, and apply different typesof information and knowledge to form independent judgments.

Course Outcomes:

1. Apply mathematical concepts and principles to perform computations
2. Create, use and analyze graphical representations of mathematical relationships.
3. **Able to assess and interpret complex situations, choose among several potentially appropriate mathematical methods of solution and persist in the face of difficulty**
4. **Analyze full and cogent solutions that include appropriate justification for their reasoning.**

UNIT-1: PRINCIPLE OF MATHEMATICAL INDUCTION & BINOMIAL THEOREM

Process of the proof by induction, motivating the application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction and simple applications.
History, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, General and middle term in binomial expansion, simple applications

UNIT-2: MATHEMATICAL REASONING

Mathematically acceptable statements. Connecting words/ phrases - consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety of examples related to real life and Mathematics. Validating the statements involving the connecting words differencebetween contradiction, converse and contrapositive.

UNIT-3: STATISTICS & PROBABILITY

Measures of dispersion; Range, mean deviation, variance and standard deviation of ungrouped/grouped data. Random experiments; outcomes, sample spaces (set representation). Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events. Conditional probability, multiplication theorem on probability. independent events, total probability, Baye's theorem, Random variable and its probability distribution, meanand variance of random variable.

UNIT-4: VECTORS:

Vectors and scalars, magnitude and direction of a vector.Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), positionvector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors.

UNIT-5: LINEAR PROGRAMMING:

Introduction, related terminology such as constraints, objective function, optimization, different types of linear programming (L.P.) problems, mathematical formulation of L.P. problems, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded and unbounded), feasible and infeasible solutions, optimal feasible solutions(up to three non-trivial constraints).

TEXT BOOKS/REFERENCE BOOKS:

1. 12^{th} NCERT Text Book
2. R.D SHARMA FOR CLASS 11^{th} AND 12^{TH} MATHEMATICS
3. R.S . AGRAWAL FOR CLASS 12^{TH} MATHEMATICS
4. PRADEEP'S REFERENCE BOOK FOR CLASS 11^{TH}

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	2	-	1	2	2	2	2	1
CO2	2	3	1	-	1	2	1	2	1	2
CO3	1	3	1	-	-	-	1	2	2	-
CO4	-	1	1	-	2	1	1	2	1	1

B.SC. HONS. (CHEMISTRY)
FOURTH SEMESTER
BCH 275: ORGANIC CHEMISTRY-III LAB

L-0, T-0 P-3 **Credits –1** **Max**

Course Objectives

1. To perform and identify functional groups in organic compounds by chemical tests in the laboratory with related reactions

Course Outcomes

1. Use the scientific method to create, test, and evaluate a hypothesis
2. Engage in safe laboratory practices handling laboratory glassware, equipment, and chemical reagents
3. Characterize organic molecules by physical and spectroscopic means, including mp, bp, IR, NMR, GC

List of Experiments

S. No.	Experiment	Unit
1	Detection of extra elements	1
2	Functional group test for nitro, amine and amide groups	1
3	Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, carboxylic acids, phenols and carbonyl compounds)	1

Reference Books

- Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry*, Pearson Education (2009)
- Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. *Practical Organic Chemistry, 5th Ed.*, Pearson (2012)
- Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis*, University Press (2000).
- Ahluwalia, V.K. & Dhingra, S. *Comprehensive Practical Organic Chemistry: Qualitative Analysis*, University Press (2000).

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	3	2	1	-	1	-	2	3	1	1
CO2	2	3	1	-	1	-	2	3	1	-
CO3	1	3	2	-	-	-	1	2	-	-

B.SC. HONS. (CHEMISTRY)
FOURTH SEMESTER
BCH 273: PHYSICAL CHEMISTRY-IV LAB

L-0, T-0 P-3 **Credits –1** **Max Marks: 60**

Course Objectives

To perform and identify functional groups in organic compounds by chemical tests in the

laboratory with related reactions

Course Outcomes

1. Reporting of experimental results (including error analysis) in a publication-style (journal paper)
2. Appreciation for modern problems and scientific controversies in physical chemistry
3. Key spectroscopic techniques including FTIR, UV-vis absorption, luminescence, laser methods

List of Experiments

S. No	Experiment	Unit
	Conductometry Determination of cell constant Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid. Perform the following conductometric titrations: i. Strong acid vs. strong base ii. Weak acid vs. strong base iii. Mixture of strong acid and weak acidvs. strong base iv. Strong acid vs. dichromate vs.weak base	1
2	**Potentiometry** Perform the following potentiometric titrations: i. Strong acid vs. strong base ii. Weak acid vs. strong base iii. Dibasic acid vs. strong base iv. Potassium dichromate vs. Mohr's salt	2

Reference Books:

- Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).
- Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. *Experiments in Physical Chemistry 8th Ed.;* McGraw-Hill: New York (2003).
- Halpern, A. M. & McBane, G. C. *Experimental Physical Chemistry 3rd Ed.;* W.H. Freeman & Co.: New York (2003)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	1	1	-	1	-	2	3	1	1
CO2	2	1	1	-	1	-	1	2	1	-
CO3	1	1	2	-	-	-	1	2	-	-

B.SC. HONS. (CHEMISTRY)
FOURTH SEMESTER
BCH 276: ANALYTICAL CHEMISTRY-LAB

L-0, T-0 P-3 **Credits –2** **Max Marks: 60**

Course Objectives

To perform and identify functional groups in organic compounds by chemical tests in the laboratory with related reactions

Course Outcomes

1. **Apply principles and applications of modern chemical instrumentation, experimental design, and data analysis**
2. **Underlying chemical and physical of instrumental methods of analysis, including electronic and vibrational spectroscopy, reaction kinetics, chemical separation methods, and mass spectrometry**
3. **Formulating and solving problems in the laboratory**

List of Experiments

S. No.	Experiment	Unit
1	To find out the dissolved oxygen present in water by DO meter	1
2	Analysis of soil: (i) Determination of pH of soil. (ii) Total soluble salt (iii) Estimation of calcium, magnesium, phosphate, nitrates	4
3	To find out the total suspended solids in industrial water sample	5
4	Solvent Extractions: (i) To separate a mixture of Ni^{2+} & Fe^{3+} by complexing with DMG and extracting the Ni^{2+} in DMG complex using chloroform, and determine its concentration with spectrophotometry	3

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	1	1	-	1	-	2	2	2	1
CO2	1	1	2	-	1	-	2	2	1	-
CO3	1	1	2	-	-	-	1	2	-	1

B.SC. HONS. (CHEMISTRY)FIFTH SEMESTER

BCH 324: INORGANIC CHEMISTRY-IV

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

In order to study transition metals to understand the trends in properties and reactivity of the d-block elements, typical physical and chemical properties of the transition metals, identify simple compound classes for transition metals and describe their chemical properties.

Course Outcomes:

1. The students will be able to explain the fundamental concepts in coordination chemistry of transition metals.
2. The Students should be familiar with the basic knowledge of the non-aqueous solutions and applications of non-aqueous solvents in analytical chemistry.
3. The students will develop the ability of effective solving practical problem of analytical chemistry of non-aqueous solutions.
4. Students will be able to describe different quantitative methods of analysis of organic and inorganic substances.

UNIT-1: THEORETICAL PRINCIPLES IN QUALITATIVE ANALYSIS:

Basic principles involved in analysis of cations and anions and solubility products, common ion effect. Principles involved in separation of cations into groups and choice of group reagents. Interfering anions (fluoride, borate, oxalate and phosphate) and need to remove them after Group II

UNIT-2: REACTION KINETICS AND MECHANISM

Introduction to inorganic reaction mechanisms. Substitution reactions in square planar complexes, Trans- effect, theories of trans effect, Mechanism of nucleophilic substitution in square planar complexes, Thermodynamic and Kinetic stability, Kinetics of octahedral substitution, Ligand field effects and reaction rates, Mechanism of substitution in octahedral complexes.

UNIT-3: BIOINORGANIC CHEMISTRY

Metal ions present in biological systems, classification of elements according to their action inbiological system. Geochemical effect on the distribution of metals. Sodium / K-pump, carbonic anhydrase and carboxypeptidase. Excess and deficiency of some trace metals. Toxicity of metal ions (Hg, Pb, Cd and As), reasons for toxicity, Use of chelating agents in medicine.

UNIT-4: ORGANOMETALLIC CHEMISTRY

Definition, Nature of Metal Carbon bond, classification of organometallic compounds by

bondtypes viz. i) covalent ii) Ionic iii) Electron deficient, cluster compounds bond compounds including sandwich derivatives. Structure and bonding in Meta carbonyls, cyclopentadienyl derivative, metal-ethylenic, metal-acetylenic complexes, Applications of organometallic compounds as homogeneous catalysts in hydrogenation, hydroformylation, polymerization, oligomerization and metathesis reactions of alkenes and alkynes (Ziegler - Natta polymerization of ethylene and propylene).

UNIT-5 ORGANOMETALLIC COMPOUNDS

VBT.π-acceptor behaviour of CO (MO diagram of CO to be discussed), synergic effect and use of IR data to explain extent of back bonding. Zeise's salt: Preparation and structure, evidencesof synergic effect and comparison of synergic effect with that in carbonyls.
Metal Alkyls: Important structural features of methyl lithium (tetramer) and trialkylaluminium(dimer), concept of multicentre bonding in these compounds. Role of triethylaluminium in polymerisation of ethene (Ziegler – Natta Catalyst). Species present in ether solution of Grignard reagent and their structures, Schlenk equilibrium. Wacker Process, Synthetic gasoline(Fischer Tropsch reaction) Synthesis gas by metal carbonyl complexes.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	2	-	-	1	1	-	2	1	-
CO2	2	1	-	-	1	1	1	3	-	2
CO3	1	3	1	--	-	1	-	1	-	1
CO4	2	1	-	-	1	1	1	3	-	2

B.SC. HONS. (CHEMISTRY)
FIFTH SEMESTER
BCH 325: ORGANIC CHEMISTRY-V

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

Course Objectives:

1. Understand the structure and properties of oil and detergents.
2. Demonstrate some knowledge of the sources of and uses for inorganic and organic compounds in the practical world.

Course Outcomes:

1. To know the complete detailed structure of the composition of fat, oil and detergents.
2. Able to explain the relationship between starting materials, reagents and products arising from polymers
3. To understand the way in which bonds are made and broken to bring about product formation in these alkaloid based reactions
4. The student can learn the synthesis of dyes and drugs with examples.

UNIT-1: FATS, OIL AND DETERGENTS:

Occurrence, chemical composition and importance, hydrogenated oils, Rancidity, acid value, saponification and iodine numbers, difference between toilet and washing soaps, comparison of soap and detergents, classification and principle of cleansing action of detergents.

UNIT-2: POLYMERS:

Polymers, Classification on the basis of source, repeating units, sequences, method of polymerization, intermolecular interactions, atoms present. Mechanism of polymersisation. Synthesis of polymers: Nylon-6,6.; Perlon, Dacron, PAN, PVC. Natural rubber, synthetic rubber, vulcanization; Plastics; resins

UNIT-3: ALKALOIDS

Natural occurrence, General structural features, Isolation and their physiological action Hoffmann's exhaustive methylation, Emde's modification, Structure, Medicinal importanceelucidation and synthesis of Nicotine, cocaine, atropine.

UNIT-4: DRUGS

Introduction, structure and use of methylene blue, Prontosil, use of pronyosil in synthesis of other sulpha drugs. Synthesis, structure and uses of sulphadiazine, mode of action of p- aminobenzenesulphonamide on bacteria.

UNIT-5: SYNTHETIC DYES

Color and constitution (electronic concept). Classification of dyes. Chemistry and synthesis of Methyl orange, Congo red, and Malachite green, Crystal violet, Phenolphthalein, Fluorescein,Alizarin and Indigo.

Reference Books:

- Berg, J.M., Tymoczko, J.L. and Stryer, L. (2006) Biochemistry. VIth Edition. W.H. Freeman and Co.
- Nelson, D.L., Cox, M.M. and Lehninger, A.L. (2009) Principles of Biochemistry. IV Edition. W.H. Freeman and Co.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	1	-	-	-	2	2	1	-
CO2	2	1	2	1	-	1	2	1	1	1
CO3	1	3	1	-	1	-	1	2	-	2
CO4	2	3	1	-	1	-	2	2	-	2

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B.SC. HONS. (CHEMISTRY)

FIFTH SEMESTER

BCH 321: PHYSICAL CHEMISTRY-V

L-4, T-0 P-0 **Credits –4** **Max Marks: 55**

Course Objectives

Understanding concept of quantization of energy, its application and principles learned in physical chemistry to area of photochemistry.

Course Outcomes:

1. Relate the concepts of quantum chemistry and its application
2. Interrelate the study of chemical bonding and nature of the atom
3. Correlate the atomic structure of an element to its physical properties by molecular spectroscopy.
4. Understand the concept of photochemistry and its application in day to day life.

UNIT-1: Quantum Chemistry

Postulates of quantum mechanics, quantum mechanical operators, Schrödinger equation and its application to free particle and "particle-in-a-box" (rigorous treatment), quantization of energy levels, zero-point energy and Heisenberg Uncertainty principle; wave functions, probability distribution functions, nodal properties, Extension to two and three dimensional boxes, separation of variables, degeneracy. Qualitative treatment of simple harmonic oscillator model of vibrational motion: Setting up of Schrödinger equation and discussion of solution and wave functions. Vibrational energy of diatomic molecules and zero-point energy. Angular momentum: Commutation rules, quantization of square of total angular momentum and z- component. Rigid rotator model of rotation of diatomic molecule. Schrödinger equation, transformation to spherical polar coordinates. Separation of variables. Spherical harmonics. Discussion of solution. Qualitative treatment of hydrogen atom and hydrogen-like ions: setting up of Schrödinger equation in spherical polar coordinates, radial part, quantization of energy (only final energy expression). Average and most probable distances of electron from nucleus.Setting up of Schrödinger equation for many-electron atoms (He, Li). Need for approximation methods. Statement of variation theorem and application to simple systems (particle-in-a-box, harmonic oscillator, hydrogen atom).

UNIT-2: Chemical bonding:

Covalent bonding, valence bond and molecular orbital approaches, LCAO-MO treatment of H_2^+. Bonding and antibonding orbitals. Qualitative extension to H_2. Comparison of LCAO- MO and VB treatments of H_2 (only wave functions, detailed solution not required) and their limitations. Refinements of the two approaches (Configuration Interaction for MO, ionic terms in VB). Qualitative description of LCAO-MO treatment of homonuclear and heteronuclear diatomic molecules (HF, LiH). Localised and non-localised molecular orbitals treatment of triatomic (BeH_2, H_2O) molecules. Qualitative MO theory and its application to AH_2 type molecules.

UNIT-3: Molecular Spectroscopy:

Interaction of electromagnetic radiation with molecules and various types of spectra; Born-Oppenheimer approximation. Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution. Vibrational spectroscopy: Classical equation of vibration, computation of force constant, amplitude of diatomic molecular vibrations, anharmonicity, Morse potential, dissociation energies, fundamental frequencies, overtones, hot bands, degrees of freedom for polyatomic molecules, modes of vibration, concept of group frequencies. Vibration-rotation spectroscopy: diatomic vibrating rotator, P, Q, R branches.

Raman spectroscopy: Qualitative treatment of Rotational Raman effect; Effect of nuclear spin, Vibrational Raman spectra, Stokes and anti-Stokes lines; their intensity difference, rule of mutual exclusion.

Electronic spectroscopy: Franck-Condon principle, electronic transitions, singlet and triplet states, fluorescence and phosphorescence, dissociation and predissociation, calculation of electronic transitions of polyenes using free electron model.

Nuclear Magnetic Resonance (NMR) spectroscopy: Principles of NMR spectroscopy, Larmorprecession, chemical shift and low resolution spectra, different scales, spin-spin coupling and high resolution spectra, interpretation of PMR spectra of organic molecules.

Electron Spin Resonance (ESR) spectroscopy: Its principle, hyperfine structure, ESR of simpleradicals.

Unit-4: Photochemistry

Characteristics of electromagnetic radiation, Lambert-Beer's law and its limitations, physicalsignificance of absorption coefficients. Laws, of photochemistry, quantum yield, actinometry,examples of low and high quantum yields, photochemical equilibrium and the differential rateof photochemical reactions, photosensitised reactions, quenching. Role of photochemical eactions in biochemical processes, photostationary states, chemiluminescence.

Reference Books:

- Banwell, C. N. & McCash, E. M. Fundamentals of Molecular Spectroscopy 4th Ed. Tata McGraw-Hill: New Delhi (2006).
- Chandra, A. K. Introductory Quantum Chemistry Tata McGraw-Hill (2001).
- House, J. E. Fundamentals of Quantum Chemistry 2nd Ed. Elsevier: USA (2004).
- Lowe, J. P. & Peterson, K. Quantum Chemistry, Academic Press (2005).
- Kakkar, R. Atomic & Molecular Spectroscopy, Cambridge University Press (2015).

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	3	-	-	1	-	2	2	1	1
CO2	2	3	1	-	1	-	1	2	1	-
CO3	1	3	-	-	-	-	1	2	-	-
CO4	1	3	-	-	-	-	2	2	-	-

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B.SC. HONS. (CHEMISTRY)
FIFTH SEMESTER

BCH 322: SPECTROSCOPY AND IMPORTANT ORGANIC COMPOUNDS (ELECTIVE)

Course Objectives

1. **Deduce the structural formula of an unknown organic compound from spectroscopic or chemical data.**
2. **Able to understand the concept of natural product.**
3. **To understand the concept and difference between natural and synthetic rubber.**

Course Outcomes:

1. **Understanding the various ways organic chemical structures are depicted.**
2. **Drawing organic chemical structures from names.**
3. **Knowledge of the basic mechanisms of reactions involved in synthesis of carbohydrate and fabrics.**
4. **Apply the concept of spectroscopy.**

UNIT-1:NMR SPECTROSCOPY: **Principle of nuclear magnetic resonance,the PMR spectrum,number of signals, peak areas, equivalent and nonequivalent protons positions of signals and chemical shift, shielding and deshielding of protons, proton counting,splitting of signals and coupling constants, magnetic equivalence of protons. Discussion of PMR spectra of the molecules: ethyl bromide, n-propyl bromide, isopropyl bromide, 1, 1-dibromoethane, 1, 1, 2-tribromoethane, ethanol, acetaldehyde, ethyl acetate, toluene, benzaldehyde, acetophenone, *p*-anisidine and *p*-nitrotoluene. Simple problems on PMR spectroscopy for structure determination of organic compounds.**

UNIT-2: MASS SPECTROSCOPY:

Introduction, instrumentation, mass spectrum, determination of molecular formula, parent peak and base peak, recognition of molecular ion peak, fragmentation pattern of alkanes, alkenes and benzene.

UNIT-3:CARBOHYDRATES: CLASSIFICATION AND NOMENCLATURE-

Monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides. Erythro and threo diastereomers. Conversion of glucose into mannose. Formation of glycosides, ethers and esters. Determination of ring size of glucose and fructose. Open chain and cyclic structure of D (+)-glucose & D (-) fructose. Mechanism of mutarotation.

UNIT-4: CARBOHYDRATES : STRUCTURES OF RIBOSE AND DEOXYRIBOSE.:

An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) involving structure determination.

UNIT-4 FABRICS:

Fabrics – natural and synthetic (acrylic, polyamido, polyester), Rubbers – Fabrics – natural and synthetic (acrylic, polyamido, polyester); Rubbers- natural and synthetic: Buna-S, Chloroprene and Neoprene; Vulcanization; Polymer additives; Introduction to liquid crystal polymers; Biodegradable and conducting polymers with examples.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	3	-	-	1	-	2	2	1	1
CO2	2	3	1	-	1	-	1	2	1	-
CO3	1	3	-	-	-	-	1	2	-	-
CO4	1	2	-	-	-	1	2	2	-	-

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B.SC. HONS. (CHEMISTRY)
FIFTH SEMESTER
BCH 374: INORGANIC CHEMISTRY-IV LAB

L-0, T-0 P-3 **Credits –2** **Max Marks: 60**

Course Objectives
The objective of this course is to get the knowledge of quantitative analysis of various inorganic techniques and experiments

Course Outcomes:

1. Student will understand common laboratory techniques including pH measurement, acid/base titrations, UV/Visible spectroscopy in both emission and absorption mode, calorimetry, and colorimetry.
2. Apply the use of the techniques mentioned above to solve chemical problems.
3. Study how to carry out self-directed experiment

List of Experiments

S. No	Experiment	Unit
1	Determination of acetic acid in commercial vinegar using NaOH	5
2	Determination of alkali content - antacid tablet using HCl	5
3	Estimation of calcium content in chalk as calcium oxalate by permanganometry	1
4	**Gravimetric Analysis** (i) Aluminium as oxinate (ii) Mg as $MgNH_4PO_4.6H_2O$ (i) Ba as $BaSO_4$	4
5	Synthesis of (a) Sodium hexa nitrito cobaltate (III) (b) Sodium ammonium hydrogen phosphate	1

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	2	-	-	1	-	2	2	1	1
CO2	3	2	1	-	1	-	1	2	1	-
CO3	1	3	-	-	-	2	1	2	2	2

B.SC. HONS. (CHEMISTRY)
FIFTH SEMESTER

BCH 375: ORGANIC CHEMISTRY-V

L-0, T-0 P-3 **Credits –1** **Max Marks: 60**

Course Objectives:
The objective of this course is to get the knowledge of analysis of an organic compound and separation of mixture

Course Outcomes:
Students will gain an understanding of:

1. Planning and implementation of advanced organic reactions
2. Purification of molecules from reactions in a
3. Analyze detailed organic structures

List of Experiments

S. No	Experiment	Unit
1	Estimation of glycine by Sorenson's formalinmethod.	2
2	Study of the titration curve ofglycine	2
3	Estimation of proteins byLowry's method	2
4	Effect of temperature onthe action of salivary amylase. Study of the action of salivary amylaseon starch at	3
5	Saponification value of an oilor a fat	4
6	Determination of Iodinenumber of an oil/ fat	4
7	Isolation andcharacterization of DNAfrom onion/ cauliflower/peas.	1

Reference Books:

- Manual of Biochemistry Workshop, 2012, Department of Chemistry, University of Delhi.
- Arthur, I. V. *Quantitative Organic Analysis,* Pearson.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	2	1	2	1	1	1	2	1	1
CO2	1	2	1	1	1	1	3	2	1	1
CO3	3	3	3	1	1	-	1	2	2	3

B.SC. HONS. (CHEMISTRY)
FIFTH SEMESTER

BCH 371: PHYSICAL CHEMISTRY-V LAB

L-0, T-0 P-3 **Credits –1** **Max Marks: 60**

Course Objectives:
The objective of this course is to get the knowledge of analysis of a compound for its physical properties
Course Outcomes:
Students will gain an understanding of:

1.Reporting of experimental results (including error analysis) in a publication-style (journal paper)
2.key spectroscopic techniques including FTIR, UV-vis absorption, luminescence, laser methods
3.the use of chemistry software programs to model energy potentials and vibrational levels of molecules.

S. No	Experiment	Unit
1	**UV/Visible spectroscopy** Study the 200-500 nm absorbance spectra of $KMnO_4$ and $K_2Cr_2O_7$ (in 0.1 M H_2SO_4) and determine the λ_{max} values. Calculate the energies of the two transitions in different units (J molecule^{-1}, kJ mol^{-1}, cm^{-1}, eV). Study the pH-dependence of the UV-Vis spectrum (200-500 nm) of $K_2Cr_2O_7$. Record the 200-350 nm UV spectra of the given compounds (acetone, acetaldehyde, 2-propanol, acetic acid) in water. Comment on the effect of structure on the UV spectra of organic compounds.	3
2	**Colourimetry**	3
	Verify Lambert-Beer's law and determine the concentration of $CuSO_4$/$KMnO_4$/$K_2Cr_2O_7$ in a solution of unknown concentration	
	Determine the concentrations of $KMnO_4$ and $K_2Cr_2O_7$ in a mixture.	
	Study the kinetics of iodination of propanone in acidic medium.	
	Determine the dissociation constant of an indicator (phenolphthalein).	
	Analysis of the given vibration-rotation spectrum of HCl(g)	
	Determine the amount of iron present in a sample using 1,10-phenathroline.	

Reference Books

- Khosla, B. D.; Garg, V. C. & Gulati, A., *Senior Practical Physical Chemistry,* R. Chand & Co.: New Delhi (2011).
- Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. *Experiments in Physical Chemistry 8th Ed.;* McGraw-Hill: New York (2003).
- Halpern, A. M. & McBane, G. C. *Experimental Physical Chemistry 3rd Ed.;* W.H. Freeman & Co.: New York (2003).

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	2	3	1	2	1	1	1	1	2	1
CO2	1	1	1	1	1	1	1	1	1	1
CO3	1	2	1	1	1	-	1	2	1	2

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B.SC (HONS)
CHEMISTRY SIXTH SEMESTER

BCH 326: POLYMER CHEMISTRY

L-4, T-0 P-0 **Credits –4** **Max Marks:**

75Course Objectives

The student can gain the knowledge of structure, physical and chemical properties and kinetics of polymeric materials in a broad aspect.

Course Outcomes:

1. Understand and perform the various polymerization techniques
2. Understand the various properties and kinetics of polymers.
3. Understand the nature structure of polymers and relationship between the lower and upper critical solution temperature.
4. Understand the properties, energy changes on mixing of polymer solution. Study the different natural and synthetic polymers present in this world.

UNIT 1: INTRODUCTION AND HISTORY OF POLYMERIC MATERIALS

Different schemes of classification of polymers, Polymer nomenclature, Molecular forces and chemical bonding in polymers, Texture of Polymers. Functionality and its importance: Criteria for synthetic polymer formation, classification of polymerization processes, Relationships between functionality, extent of reaction and degree of polymerization.
Bifunctional systems, Poly-functional systems.

UNIT 2: KINETICS OF POLYMERIZATION

Mechanism and kinetics of step growth, radical chain growth, ionic chain (both cationic and anionic) and coordination polymerizations, Mechanism and kinetics of copolymerization, polymerization techniques. Crystallization and crystallinity: Determination of crystalline melting point and degree of crystallinity, Morphology of crystalline polymers, Factors affecting crystalline melting point.

UNIT 3: NATURE AND STRUCTURE OF POLYMERS

Structure Property relationships. Determination of molecular weight of polymers (*Mn*, *Mw*, etc) by end group analysis, viscometer, light scattering and osmotic pressure methods. Molecular weight distribution and its significance. Polydispersity index. Glass transition temperature (Tg) and determination of Tg, Free volume theory, WLF equation, Factors affecting glass transition temperature (Tg).

UNIT 4: POLYMER SOLUTION

Criteria for polymer solubility, Solubility parameter, Thermodynamics of polymer solutions,entropy, enthalpy, and free energy change of mixing of polymers solutions, Flory- Huggins theory, Lower and Upper critical solution temperatures.

UNIT 5: PROPERTIES OF POLYMERS

Physical, thermal, Flow & Mechanical Properties. Brief introduction to preparation, structure, properties and application of the following polymers: polyolefins, polystyrene and styrene copolymers, poly(vinyl chloride), poly(vinyl acetate), acrylic polymers, fluoro polymers, polyamides. Phenol formaldehyde resins (Bakelite, Novalac), polyurethanes, silicone polymers, polydienes, Polycarbonates, Conducting Polymers, [polyacetylene, polyaniline].

List of Text Books:

- *Seymour's Polymer Chemistry,* Marcel Dekker, Inc.
- G. Odian: Principles of Polymerization, John Wiley.
- F.W. Billmeyer: Text Book of Polymer Science, John Wiley.

List of Reference Books

- P. Ghosh: Polymer Science & Technology, Tata Mcgraw-Hill.
- R.W. Lenz: Organic Chemistry of Synthetic High Polymers

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	-	-	1	1	2	2	1	1
CO2	2	3	1	-	1	-	1	2	1	-
CO3	1	3	-	-	-	-	1	2	1	1
CO4	2	3	1	-	1	-	1	2	1	2

B.SC (HONS) CHEMISTRY SIXTH SEMESTER

BCH 327: FUEL CHEMISTRY

L-4, T-0 P-0 **Credits –4** **Max Marks: 75**

FUEL CHEMISTRY (DEPARTMENTAL ELECTIVE)

SUBJECT CODE: BCH-327

Course Objectives:

1. Learn more about the energy-fuels-environment connection and prepare for making an intelligent contribution to the difficult energy policy choices inthe twenty-first century.
2. To know in detail about different kind of fuel and its efficiencies.

Course Outcomes:

Students should know following aspects after completion of course:

1. Energy use and the chemical processing aspects of energy production;
2. the chemical processes of fuel refining, conversion and utilization, including processesthat can control air pollution;
3. the selection of equipment for efficient utilization of fuels and upgrading of fuels to maximize energy conversion and minimize the environmental impact of fuel utilization;
4. Applications of materials for purification of air and water and use of lubricants in different machines in industries.

UNIT-1: LUBRICANTS & LUBRICANTS

Introduction, Mechanism of lubrication: fluid film, boundary lubrication and extreme pressurelubricants, Classification of lubricants: Solid, semi-solid, liquid and emulsion, synthetic lubricants and additives for lubricants.

UNIT-2 PROPERTIES OF LUBRICANTS

Properties of lubricants: Flash & Fire point, Saponification number, Iodine value, Acid value , Viscosity and Viscosity index, Aniline point, Cloud point and pour point, Corrosive Tendency, Specific gravity, Volatility, oiliness, Emulsification, decomposition stability and carbon residue of lubricants

UNIT-3: COAL AS ENERGY RESOURCES

Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value, Characteristics of good fuel, Comparison between solid, liquid and gaseous fuel, BOMB calorimeter, Coal, Classification of coal, Uses of coal in various industries, Selection of coal, analysis of coal, carbonization of coal. Pulverized coal and Metallurgical coal.

UNIT- 4 PETROLEUM

Petroleum, Cracking, Fractionation Distillation, Cracking: Thermal & Catalytic Cracking, Refining of gasoline, Synthetic petrol and methods of polymerization for synthetic petrol, Reforming: Thermal and Catalytic reforming, Knocking, Improvement in anti knockingproperties.

UNIT-5: FUELS

Diesel Engine fuel, Kerosene & LPG as fuel, Non petroleum fuels, Natural gas, Coal gas, Oilgas

Water gas/ Blue gas, Non- conventional source of energy, Biomass, Biogas, Combustion, Analysis of fuel gas.

Reference Books:

- Fuels and fuel-additives. S.P. Srivastava & Jeno Hancsok. Willey.
- The chemistry of Hydrocarbon fuels. *Harold H. Schobert. Science Direct.*
- The chemistry and technology of petroleum. J.G. Speight.
- The chemistry and technology of coal. James Speight.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3	2	-	1	2	2	2	2	1
CO2	1	3	1	-	1	2	1	2	1	2
CO3	1	3	1	-	-	-	1	2	2	-
CO4	2	3	1	-	1	-	2	3	1	-

BCH-377: Project/Dissertation
(Semester VI)

L+T+P	:	**0+0+22**
Credits:	:	**11**
Contact hours	:	**52**

Description
Students are required to work on the allotted topic and must make a presentation in front of advisory committee and B.Sc. Students. Students are expected to provide latest facts and updated information by consulting latest editions of textbooks, reference books, monographs, and peer-reviewed national & international research journals.

S.No.	**Course details**
1.	Research work
2.	Seminar
3.	Evaluation by Research committee
4.	Research work by taking 52 credit hours

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SCHEME FOR B.Sc. Hons. (Mathematics)

B.Sc. Hons. (Mathematics)			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BMA-114	Real Analysis	5	1	0	6
2	BMA-115	Calculus	5	1	0	6
3	BMA-117	Algebra	5	1	0	6
4	BEN-101	Communication Skills	2	0	0	2
5	BPH-121	Mechanics	3	1	0	4
6	BPH-171	Mechanics Lab	0	0	4	2
7	PDP-101	Induction & Nurturing Hobby	0	0	2	1
8		**Total---->**	**20**	**4**	**6**	**27**

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B.Sc. Hons. (Mathematics)			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BMA-113	Ordinary Differential Equations	5	1	0	6
2	BMA-119	Group Theory-I	5	1	0	6
3	BMA-120	Theory of Real Functions	5	1	0	6
4	BCH-115	Physical Chemistry	3	1	0	4
5	CEA-101A	Environmental Science & Ecology	2	0	0	2
6	BCH-165	Physical Chemistry Lab	0	0	4	2
7	PDP-102	People Connect	0	0	2	2
8		**Total---->**	**20**	**4**	**6**	**28**

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B.Sc. Hons. (Mathematics)			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BMA-222	PDE and systems of ODE	5	1	0	6
2	BMA-223	Logic and sets (SEC-1)	4	0	0	4
3	BMA-225	Riemann Integration and series of functions	5	1	0	6
4	BMA-226	Ring Theory and Linear Algebra-I	5	1	0	6
5	BCS-201	Web Designing	3	0	0	3
6	BCS-251	Web Designing Lab	0	0	4	2
7	PDP-201	Personality Development and Grooming	0	0	2	1
8	BA-2312	Entrepreneurship Development	3	0	0	3
		Total---->	**25**	**3**	**6**	**31**

B.Sc. Hons. (Mathematics)			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BMA-229	Numerical Methods	4	0	0	4
2	BMA-224	Ring Theory and Linear algebra II	4	1	0	5
3	BMA-227	Graph Theory	4	1	0	5
4	BMA-279	Numerical Methods Lab	0	0	2	1
5	BA-264A	Managerial Skills	3	0	0	3
6	PDP-202	Life Skills	0	0	2	1
7		Total---->	**15**	**2**	**4**	**19**

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B.Sc. Hons. (Mathematics)			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BMA-325	Multi Variate Calculus	4	1	0	5
2	BMA-326	Group Theory II	4	1	0	5
3	BMA-328	Probability and Statistics	4	1	0	5
4	BMA-329	Metric space and Complex analysis	4	1	0	5
5	PDP-301	Leadership and Entrepreneurship Development	0	0	2	1
6		Total---->	**16**	**4**	**2**	**21**

B.Sc. Hons. (Mathematics)			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BMA-331	Linear Programming	4	1	0	5
2	BMA-320	Discrete Mathematics	4	1	0	5
3	BMA-322	Analytical Geometry	4	1	0	5
4	BMA-360	MAT Lab	0	0	4	2
5	BMA-333	Major project/ seminar/Industrial Training	0	0	10	5
	PDP-302	Mechanics Lab	0	0	2	1
		Total---->	**12**	**3**	**16**	**23**

SYLLABUS FOR B. SC. (Hons.) MATHEMATICS

Semester I

MATHEMATICS

B.Sc (Hons) -1st SEMESTER

Course code	Course title	L	T	P	Credits
BMA-114	REAL ANALYSIS	5	1	-	6

Course Objectives:
1. To describe fundamental properties of the real numbers that lead to the formal development of real analysis. 2. To comprehend rigorous arguments developing the theory underpinning real analysis

UNIT-1: Algebraic and Order Properties of R, d-neighborhood of a point in R. Bounded above sets, Bounded below sets, Bounded Sets, Unbounded sets, Suprema and Infima, The Completeness Property of R, The Archimedean Property, Density of Rational (and Irrational) numbers in R, Intervals. [15]

UNIT-2: Limit points of a set, Isolated points,Derived sets, Examples of derived sets, Bolzano-Weierstrass theorem, Illustrations of Bolzano-Weierstrass theorem for sets. Idea of countable sets, uncountable sets and uncountability of R [14]

UNIT-3: Sequences, Bounded sequence, Convergent sequence, Limit of a sequence. Limit Theorems, Monotone Sequences, Monotone Convergence Theorem. Subsequences, Divergence Criteria. [15]

UNIT-4: Monotone Subsequence Theorem (statement only), Bolzano Weierstrass Theorem for Sequences. Cauchy sequence, Cauchy's Convergence Criterion. [15]

UNIT-5: Infinite series, convergence and divergence of infinite series, Cauchy Criterion,Tests for convergence: Comparison test, Limit Comparison test, Ratio Test, Cauchy's nth root test, Integral test, Alternating series, Leibniz test, Absolute and Conditional convergence. [18]

TEXT BOOKS/REFERENCE BOOKS:

1. *R.G. Bartle and D. R. Sherbert, Introduction to Real Analysis (3rd Edition), John Wiley and Sons*

(Asia) Pvt. Ltd., Singapore, 2002.

2. Gerald G. Bilodeau , Paul R. Thie, G.E. Keough, An Introduction to Analysis, Jones & Bartlett, Second Edition, 2010

Course outcomes:	
1.	Demonstrate an understanding of limits and how they are used in sequences, series, differentiation and integration.
2.	Demonstrate an understanding of limits and how they are used in sequences, series, differentiation and integration.

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Course code	Course title	L	T	P	Credits
BMA-115	CALCULUS	5	1	-	6

Course Objectives:
1. Understand the major problems of differential and integral calculus. 2. Appreciate how calculus allows us to solve important practical problems in an optimal way.

UNIT-1: Limit & Continuity : The real line and its geometrical representation; e-δ *treatment of limit and continuity; Properties of limit and classification of discontinuities; Properties of continuous functions.* *[12]*

UNIT-2: Differentiability: Successive differentiation; Leibnitz Theorem; Statement of Rolle's Theorem; Mean Value Theorem; Taylor and Maclaurin's Theorems; Indeterminate forms. [15]

UNIT-3: Applications of Differentiation *:* Asymptotes; Concavity, convexity and points of inflection; Curvature; Extrema; elementry curves, tangent and normal in parametric form; Polar Coordinates. [15]

UNIT-4: Partial Differentiation: Limits and continuity of functions of two variables; Partial derivatives; Taylor's theorem and Maclaurin's Theorem for function of two variable; Maxima and minima for function of two variable. [17]

UNIT-5: Double and triple integrals; Change of order in double integrals. Application of Integration : length of a curve; Arc length as a parameter; Evoute & Envelope; Volumes and surface areas of solids of revolution. [15]

TEXT BOOKS/REFERENCE BOOKS:

1. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd. Allahabad, 2000.
2. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd. Allahabad, 2000.
3. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar Inc. New York 1975.
4. Shanti Narayan, Elements of Real Analysis, S. Chand & Company, New Delhi.
5. Shanti Narayan, A Text Book of Vector Calculus, S. Chand & Company, New Delhi.
6. G.B. Thomas and R.L. Finney, *Calculus*, 9th Ed., Pearson Education, Delhi, 2005.
7. M.J. Strauss, G.L. Bradley and K. J. Smith, *Calculus*, 3rd Ed., Dorling Kindersley (India) Ltd. (Pearson Education), Delhi, 2007.
8. H. Anton, I. Bivens and S. Davis, Calculus, *7th Ed., John Wiley and Sons (Asia) P. Ltd., Singapore, 2002.*

Course outcomes:	
1.	Interpret a function from an algebraic, numerical, graphical and verbal perspective and extract information relevant to the phenomenon modeled by the function.
2.	Calculate the limit of a function at a point numerically and algebraically using appropriate techniques including L'Hospital's rule.

Course code	Course title	L	T	P	Credits
BMA-117	ALGEBRA	5	1	-	6

Course Objectives:
1) Students should be helped to make connections and build relationships between algebra and arithmetic, geometry, and probability and statistics. 2) The course will enhance research, inquiry and analytical thinking abilities of students.

UNIT- 1: Polar representation of complex numbers, nth roots of unity, De Moivre's theorem for rational indices and its applications. [12]

UNIT- 2:Equivalence relations, Functions, Composition of functions, Invertible functions, One to one correspondence and cardinality of a set, Well-ordering property of positive integers, Division algorithm, Divisibility and Euclidean algorithm, Congruence relation between integers, Principles of Mathematical Induction, statement of Fundamental Theorem of Arithmetic. [20]

UNIT- 3:Systems of linear equations, row reduction and echelon forms, vector equations, the matrix equation Ax=b, solution sets of linear systems, applications of linear systems, linear independence. [15]

UNIT -4:Introduction to linear transformations, matrix of a linear transformation, inverse of a matrix, characterizations of invertible matrices. [12]

UNIT - 5: Subspaces of R^n, dimension of subspaces of R^n and rank of a matrix, Eigen values, Eigen Vectors and Characteristic Equation of a matrix, special matrices.

[15]

TEXT BOOKS/REFERENCE BOOKS:

1. Titu Andreescu and Dorin Andrica, *Complex Numbers from A to Z*, Birkhauser, 2006.
2. Edgar G. Goodaire and Michael M. Parmenter, *Discrete Mathematics with Graph Theory,* *3rd Ed., Pearson Education (Singapore) P. Ltd., Indian Reprint, 2005.*
3. David C. Lay, *Linear Algebra and its Applications,* 3rd Ed., Pearson Education Asia, Indian Reprint, 2007.

Course outcomes:	
1.	Students will learn to transform between bases, including the creation, geometric connections, and the application of orthogonal and orthonormal bases.
2.	Students will learn Fundamental Theorem of Arithmetic

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SCHOOL OF BASIC & APPLIED SCIENCE

Course code	Course title	L	T	P	Credits
BEN-101	ENGLISH COMMUNICATION	2	0	0	2

Course Objectives:
1) Discuss and respond to content of a reading or listening passage 2) Use communication strategies to participate in group and class discussions

UNIT-1: Communication and its elements: An introduction to the need of communication competency; Role of vocabulary in effective communication; Word formation; A set of selected 50 synonyms, antonyms, homonyms & homophones; suffixes & prefixes
[5]

UNIT 2: Listening and Reading Skills: Listening comprehension & reading comprehension; Listening to recorded speeches, TV News and other audio materials to test listening comprehension with given exercises

[7]

UNIT 3: Writing Skills: Ad Creation; Slogan making; Picture composition; Expanding hints, proverbs; Movie review.

[6]

UNIT 4: Letter writing: Types of letter writing; Structure & Lay out; Leave application; Letter of enquiry & response with respect to educational & official matters; Informal letter expressing or discussing social or educational issues.
[6]

UNIT5: Spoken Skills: Introduction to oral communication; Importance of Pronunciation; Importance of phonetics; Usage of Phonetics; Types of Conversation; Strategies for effective conversation for social and official interaction; Developing conversation on topics of current importance. Soft Skills Non-verbal Importance of Body Language and its usage to communicate better.

[6].

	Course outcomes:
1.	Interact with academic content: reading, writing, listening, speaking;
2.	Demonstrate ability to think critically
3.	Utilize information and digital literacy skills

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SCHOOL OF BASIC & APPLIED SCIENCE

Course code	Course title	L	T	P	Credits
BPH-124	Mechanics	3	1	0	4

Course Objectives:

- To acquire skills allowing the student to identify and apply formulas of optics and wave physics using course literature.
- To be able to identify and illustrate physical concepts and terminology used in optics and to be able to explain them in appropriate detail.
- To be able to make approximate judgments about optical and other wave phenomena when necessary.
- To acquire skills allowing the student to organize and plan simpler laboratory course experiments and to prepare an associated oral and written report

Unit-1: Wave Optics-I : (10 Lectures)

Interference: Interference of light and its necessary conditions, path & Phase difference for reflected & transmitted rays, Interference in thin films (parallel and wedge shaped film), Newton's rings.

Diffraction: Single, double and N- Slit Diffraction, Diffraction grating, Grating spectra, dispersive power, Rayleigh's criterion and resolving power of grating.

Unit-II Fundamentals of Dynamics: (10 Lectures)

Reference frames. Inertial frames; Galileantransformations; Galilean invariance. Review of Newton's Laws of Motion. Dynamics of a system of particles. Centre of Mass. Principle of conservation of momentum. Impulse. Momentum of variable-mass system: motion of rocket.

Non-inertial frames and fictitious forces. Uniformly rotatingframe. Laws of Physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications. Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.

Unit-III Special Theory of Relativity: (10 Lectures)

Michelson-Morley Experiment and its outcome.Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. Variation of mass with velocity. Massless Particles. Mass-energy Equivalence. Relativistic Doppler effect. Relativistic Kinematics. Transformation of Energy and Momentum. Energy-Momentum Four Vector. (10 Lectures)

Unit-IV Work Energy and Collisions: (10 Lectures)

Work and Kinetic Energy Theorem. Conservative and non-conservative forces. Potential Energy. Energy diagram. Stable and unstable equilibrium. Elastic potential energy. Force as gradient of potential energy. Work & Potential energy. Work done by non-conservative forces. Law of conservation of Energy.

Unit-V Magnetic & Superconducting Properties: (10 Lectures)

Magnetization, Origin of magnetic moment, Dia, para and ferro magnetism, Langevin's theory for diamagnetic material, Applications of Magnetism.

Superconductors: Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, Type I and Type II superconductors. Applications of Superconductors.

TEXT BOOKS/REFERENCE BOOKS:

- *An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill.*
- *Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill*

Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.

- *Analytical Mechanics, G.R. Fowles and G.L. Cassiday. 2005, Cengage Learning.*
- *Feynman Lectures, Vol. I, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education*
- *Introduction to Special Relativity, R. Resnick, 2005, John Wiley and Sons.*
- *University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.*

Additional Books for Reference

- *Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000*
- *University Physics. F.W Sears, M.W Zemansky, H.D Young 13/e, 1986, Addison Wesley*
- *Physics for scientists and Engineers with Modern Phys., J.W. Jewett, R.A. Serway, 2010, Cengage Learning*
- *Theoretical Mechanics, M.R. Spiegel, 2006, Tata McGraw Hill.*

Course Objectives:
• To acquire skills allowing the student to identify and apply formulas of mechanics using course literature • To be able to make approximate judgement about waves and mechanics phenomenon when necessary • To acquire skill allowing the student to organize and plan simpler laboratory course and experiments to prepare and associated oral and written report.

Course code	Course title	L	T	P	Credits
BPH-174	Mechanics	0	0	4	2

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To study the random error in observations.
3. To determine the height of a building using a Sextant.
4. To study the Motion of Spring and calculate (a) Spring constant, (b) g and (c) Modulus of rigidity.
5. To determine the Moment of Inertia of a Flywheel.
6. To determine "g" and velocity for a freely falling body using Digital Timing Technique
7. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
8. To determine the Young's Modulus of a Wire by Optical Lever Method.
9. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
10. To determine the elastic Constants of a wire by Searle's method.
11. To determine the value of g using Bar Pendulum.
12. To determine the value of g using Kater's Pendulum.

Note: Each student is required to perform at least seven

experiments. TEXT BOOKS/REFERENCE BOOKS

- Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

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MATHEMATICS

B.Sc (2nd SEMESTER)

Course code	Course title	L	T	P	Credits
BMA-113	ORDINARY DIFFERENTIAL EQUATIONS	5	1	-	6

Course Objectives:
1) Identify essential characteristics of ordinary differential equations. 2) Develop essential methods of obtaining closed form solutions.

UNIT-1: Geometrical meaning of a differential equation. Exact differential equations, integrating factors. First order higher degree equations solvable for x,y,p Lagrange's equations, Clairaut's equations. Equation reducible to Clairaut's form. *[12]*

UNIT-2: Orthogonal trajectories: in Cartesian coordinates and polar coordinates. Self orthogonal family of curves.. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations. Equations reducible to homogeneous .

[15]

UNIT-3: Method of variations of parameters. Method of undetermined coefficients. Reduction of order of a differential equation. Linear differential equations of second order: Reduction to normal form. [14]

UNIT-4: Transformation of the equation by changing the dependent variable/ the independent variable. Solution by operators of non-homogeneous linear differential equations. [15]

UNIT-5: Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators x (d/dx) or t (d/dt) etc. Simultaneous equation of the form dx/P = dy/Q = dz/R. Total differential equations. Condition for Pdx + Qdy +Rdz = 0 to be exact. General method of solving Pdx + Qdy + Rdz = 0 by taking one variable constant. Method of auxiliary equations.

[18]

TEXT BOOKS/REFERENCE BOOKS:

1. B.Rai & D.P. Chaudhary : Ordinary Differential Equations; Narosa, Publishing House Pvt. Ltd.

2. D.A. Murray : Introductory Course in Differential Equations. Orient Longaman (India)

Course outcomes:	
1.	Distinguish between initial value problems and boundary value problems.
2.	Solve standard constant coefficient nonhomogeneous ordinary differential equations by the methods of undetermined coefficients.

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SCHOOL OF BASIC & APPLIED SCIENCE

Code	Name	L-T-P	Credits
BMA-119	Group Theory I	5-1-0	6

Course Objectives:
1) Students will be able to understand the concept of group theory. 2) Understand the properties of homomorphism and isomorphism.

Unit-1: Symmetries of a square, Dihedral groups, definition and examples of groups including permutation groups and quaternion groups (illustration through matrices), elementary properties of groups. *[15]*

Unit-2: Subgroups and examples of subgroups, centralizer, normalizer, center of a group, product of two subgroups. Properties of cyclic groups, classification of subgroups of cyclic groups. [15]

Unit-3: Cycle notation for permutations, properties of permutations, even and odd permutations, alternating group, properties of cosets, Lagrange's theorem and consequences including Fermat's Little theorem. [15]

Unit-4: External direct product of a finite number of groups, normal subgroups, factor groups, Cauchy's theorem for finite abelian groups. [15]

Unit-5: Group homomorphisms, properties of homomorphisms, Cayley's theorem, properties of isomorphisms, First, Second and Third isomorphism theorems. [15]

Books Recommended

1. John B. Fraleigh, *A First Course in Abstract Algebra*, 7th Ed., Pearson, 2002.
2. M. Artin, *Abstract Algebra*, 2nd Ed., Pearson, 2011.
3. Joseph A. Gallian, *Contemporary Abstract Algebra*, 4th Ed., Narosa Publishing House, New *Delhi, 1999.*
4. Joseph J. Rotman, *An Introduction to the Theory of Groups*, 4th Ed., Springer Verlag, 1995.
5. I.N. Herstein, *Topics in Algebra*, Wiley Eastern Limited, India, 1975.

Course outcomes:	
1.	Explain the concept of group homomorphism and the application of these concepts
2.	Be able to produce examples and counter examples examples illustrating the mathematical concepts presented in the course.

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SCHOOL OF BASIC & APPLIED SCIENCE

Course code	Course title	L	T	P	Credits
BMA-120	Theory of Real Functions	5	1	-	6

Course Objectives:
1) Students will be able to describe fundamental properties of continuous functions that lead to the formal development of real analysis. 2) Appreciate how abstract ideas and regions methods in mathematical analysis can be applied to important practical problems.

Unit-1: Limits of functions ($\epsilon - \delta$ approach), sequential criterion for limits, divergence criteria. Limit theorems, one sided limits. Infinite limits and limits at infinity. Continuous functions, sequential criterion for continuity and discontinuity. Algebra of continuous
functions. [16]

Unit-2: Continuous functions on an interval, intermediate value theorem, location of roots theorem, preservation of intervals theorem. Uniform continuity, non-uniform continuity criteria, uniform continuity theorem. [15]

Unit-3: Differentiability of a function at a point and in an interval, Caratheodory's theorem, algebra of differentiable functions. Relative extrema, interior extremum theorem. [11]

Unit-4: Rolle's theorem, Mean value theorem, intermediate value property of derivatives, Darboux's theorem. Applications of mean value theorem to inequalities and approximation of polynomials, Taylor's theorem to inequalities.Cauchy's mean value theorem. [18]

Unit-5: Taylor's theorem with Lagrange's form of remainder, Taylor's theorem with Cauchy's form of remainder, application of Taylor's theorem to convex functions, relative extrema. Taylor's series and Maclaurin's series expansions of exponential and trigonometric functions, ln(1 + x), 1/ax+b and $(1 +x)^n$ [17]

Books Recommended

1. R. Bartle and D.R. Sherbert, *Introduction to Real Analysis*, John Wiley and Sons, 2003.
2. K.A. Ross, *Elementary Analysis: The Theory of Calculus*, Springer, 2004.
3. A. Mattuck, *Introduction to Analysis*, Prentice Hall, 1999.
4. S.R. Ghorpade and B.V. Limaye, *A Course in Calculus and Real Analysis,* Springer, 2006.

Course outcomes:	
1.	Demonstrate an understanding of limits ad how that are used in sequences, series and differentiation.
2.	Construct rigorous mathematical proofs of basic results in real analysis.

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SCHOOL OF BASIC & APPLIED SCIENCE

Course code	Course title	L	T	P	Credits
BCH-115	PHYSICAL CHEMISTRY II	3	1	-	4

Course Objectives:
1) Here in this syllabus we start learning with aspects of thermochemistry and thermodynamics, it become easy to understand the aspect of thermodynamic behavior of chemical reaction and their direct indirect influence on chemical activity after the study. 2) We also learn the theory of Chemical equilibrium and their different aspect of forward and backward reactions. Student may also able to understand the colligative properties of any chemical systems.

UNIT-1: THERMOCHEMISTRY-I:

Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics.

First law: Concept of heat, *q*, work, *w*, internal energy, *U*, and statement of first law; enthalpy, *H*, relation between heat capacities, calculations of *q*, *w*, *U* and *H* for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions. [8]

Unit-II THERMOCHEMISTRY-II

Heats of reactions: standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions. Adiabatic flame temperature, explosion temperature.

Second Law: Concept of entropy; thermodynamic scale of temperature, statement of the second law of thermodynamics; molecular and statistical interpretation of entropy. Calculation of entropy change for reversible and irreversible processes.

Third Law: Statement of third law, concept of residual entropy, calculation of absolute entropy of molecules.

Free Energy Functions: Gibbs and Helmholtz energy; variation of S, G, A with T, V, P; Free energy change and spontaneity. Relation between Joule-Thomson coefficient and other thermodynamic parameters; inversion temperature; Gibbs-Helmholtz equation; Maxwell relations; thermodynamic equation of state.

Unit-III SYSTEMS OF VARIABLE COMPOSITION:

Partial molar quantities, dependence of thermodynamic parameters on composition; Gibbs- Duhem equation, chemical potential of ideal mixtures, change in thermodynamic functions in mixing of ideal gases.
[8]

Unit-IV CHEMICAL EQUILIBRIUM:

Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases, Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration. Free energy of mixing and spontaneity; thermodynamic derivation of relations between the various equilibrium constants K_p , K_c and K_x. Le Chatelier principle (quantitative treatment); equilibrium between ideal gases and a pure condensed phase. [10]

Unit-V SOLUTIONS AND COLLIGATIVE PROPERTIES:

Dilute solutions; lowering of vapour pressure, Raoult's and Henry's Laws and their applications. Thermodynamic derivation using chemical potential to derive relations between the four colligative properties [(i) relative lowering of vapour pressure, (ii) elevation of boiling point, (iii) Depression of freezing point, (iv) osmotic pressure] and amount of solute. Applications in calculating molar masses of normal, dissociated and associated solutes in solution. [10]

TEXT BOOKS/REFERENCE BOOKS:

- Peter, A. & Paula, J. de. *Physical Chemistry 9th Ed.,* Oxford University Press (2011).
- Castellan, G. W. *Physical Chemistry 4th Ed.*, Narosa (2004).
- Engel, T. & Reid, P. *Physical Chemistry 3rd Ed.*, Prentice-Hall (2012).
- McQuarrie, D. A. & Simon, J. D. *Molecular Thermodynamics* Viva Books Pvt. Ltd.: New Delhi (2004).
- *Assael, M. J.; Goodwin, A. R. H.; Stamatoudis, M.; Wakeham, W. A. & Will, S. Commonly Asked Questions in Thermodynamics.* CRC Press: NY (2011).
- Levine, I .N. *Physical Chemistry* 6th Ed., Tata Mc Graw Hill (2010).
- Metz, C.R. *2000 solved problems in chemistry,* Schaum Series (2006)

Course outcomes:	
1.	On finishing these modules of chemistry we are able to differentiate colligative properties of solution like elevation of boiling point, depression of freezing point with relatively lowering the vapor pressure.
2.	Its also easy to understand thermodynamic derivation of relations between the various equilibrium constants K_p , K_C and K_X. Le Chatelier principle (quantitative treatment); equilibrium between ideal gases and a pure condensed phase.

Course code	Course title	L	T	P	Credits
BCH-165	PHYSICAL CHEMISTRY LAB-II	-	-	4	2

(a) Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization).

(b) Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.

(c) Calculation of the enthalpy of ionization of ethanoic acid.

(d) Determination of heat capacity of the calorimeter and integral enthalpy (endothermic and exothermic) solution of salts.

(e) Determination of basicity/proticity of a polyprotic acid by the thermochemical method in terms of the changes of temperatures observed in the graph of temperature versus time for different additions of a base. Also calculate the enthalpy of neutralization of the first step.

(f) Determination of enthalpy of hydration of copper sulphate.

(g) Study of the solubilityΔ of benzoic acid in water and determination of H.

Any other experiment carried out in the class.

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Course code	Course title	L	T	P	Credits
CEA-101A	ENVIRONMETAL SCIENCE AND ECOLOGY	2	0	0	2

Course Objectives:

1) The aim of the course is to make everyone aware of environmental issues like continuing problems of pollution, loss of forest, solid waste disposal, and degradation of environment.
2) Issues like economic productivity and national security, global warming, the depletion of ozone layer and loss of biodiversity are other serious concerns before the mankind.

UNIT-1:. THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: Renewable and non-renewable resources; forest Basic definitions related to environment; Scope, vis-à-vis environmental science and environmental engineering; a uses of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principals involved in environmental education, environmental awareness, Environmental ethics, environmental organization and their involvement.

UNIT-2:. NATURAL RESOURCES: Renewable and non-renewable resources; forest resources, over-exploitation, and deforestation / afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; Food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non- renewable energy sources, solar energy, wind energy, hydro energy, biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT-3: ECOSYSTEMS: Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids; characteristic features, structure and function of the following ecosystem -forest ecosystem, grassland ecosystem desert ecosystem and aquatic ecosystems.

UNIT-4: BIODIVERSITY AND ITS CONSERVATION: Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in- situ and ex-situ conservation of biodiversity.

UNIT-5: ENVIRONMENTAL POLLUTION: Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution; solid waste management, e-waste management; disaster management –floods, earthquake, cyclone and landslides.

TEXT BOOK/REFERENCE BOOKS

1. *Kaushik, Anubha, and Kaushik, C.P., "Perspectives in Environmental Studies", 4th Edition New Age International Publishers, 2004*
2. Agarwal, K.C., "Environmental Biology", 2nd Edition, Nidhi Publ. Ltd., Bikaner, 2001.
3. Bharucha Erach, "The Biodiversity of India", 2nd Edition, Mapin Publishing Pvt. Ltd., 2006.
4. Brunner R. C., "Hazardous Waste Incineration", 1st Edition McGraw Hill Inc., 1989.
5. Clark R.S., "Marine Pollution", 1st Edition Clanderson Press Oxford,1989
6. .Cunningham, W.P., Cooper, T.H. Gorhani, E. & Hepworth, M.T., Environmental Encyclopedia", 2nd Edition, Jaico Publ. House, 2001.
7. De, A. K., "Environmental Chemistry", 2nd Edition, Wiley Eastern, 1989
8. Jadhav, H. and Bhosale, V.M ., "Environmental Protection and Laws", 1st Edition, Himalaya Pub. House, Delhi, 1995.
9. Mckinney, M.L. and Schocl. R.M., "Environmental Science Systems & Solutions", 2nd Edition, Web enhanced edition, 1996.
10. Rao M.N. and Datta, A.K.,"Waste Water Treatment", 2nd Edition, Oxford & IBH Publ.Co., 1987.
11. Sharma B.K., "Environmental Chemistry", 2nd Edition, Goel Publ. House, Meerut, 2001
12. Trivedi R.K. and Goel, P.K., "Introduction to Air Pollution", 2nd Edition, Techno- science Publications, 1996

Course outcomes:	
1.	understand fundamental terms related to environment and aware of environmental problems
2.	analyze the complexities of environmental problems and should know remedies available to them and implement them at their own level

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SCHOOL OF BASIC & APPLIED SCIENCE

MATHEMATICS

B.Sc (3rd SEMESTER)

Course code	Course title	L	T	P	Credits
BMA-222	PDE and Systems of ODE	5	1	-	6

Course Objectives:
1. Introduce students to partial differential equations 2. Introduce students to how to solve linear Partial Differential with different methods

Unit-1: Partial Differential Equations – Basic concepts and Definitions, Mathematical Problems. First-Order Equations: Classification, Construction and Geometrical Interpretation. Method of Characteristics for obtaining General Solution of Quasi Linear Equations. *[15]*

Unit 2:Canonical Forms of First-order Linear Equations. Method of Separation of Variables for solving first order partial differential equations. Derivation of Heat equation, Wave equation and Laplace equation. [14]

Unit 3:Classification of second order linear equations as hyperbolic, parabolic or elliptic. Reduction of second order Linear Equations to canonical forms. [15]

Unit-4: Systems of linear differential equations, types of linear systems, differential operators, an operator method for linear systems with constant coefficients, Basic Theory of linear systems in normal form [15]

Unit-5: Homogeneous linear systems with constant coefficients: Two Equations in two unknown functions, The method of successive approximations, the Euler method, the modified Euler method, The Runge-Kutta method. [15]

Books Recommended

Tyn Myint-U and Lokenath Debnath, *Linear Partial Differential Equations for Scientists and Engineers,* 4th edition, Springer, Indian reprint, 2006.

1. S.L. Ross, *Differential equations,* 3rd Ed., John Wiley and Sons, India, 2004.
2. Martha L Abell, James P Braselton, *Differential equations with MATHEMATICA*, 3rd Ed.,Elsevier Academic Press, 2004.
3. M. Merkow and J. Breithaupt, *Information Security: Principles and Practices,* Pearson Education, 2006.

Course outcomes:	
1.	Classify partial differential equations and transform into canonical form.
2.	Solve linear partial differential equations of both first and second order.

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Course code	Course title	L	T	P	Credits
BMA-223	Logic and Sets	4	0	-	4

Course Objectives:
1.)Students will be able to explain the concepts of sets, relations and functions with a counter example. 2.)To understand the difference between tautology and contradiction.

Unit 1: Introduction, propositions, truth table, negation, conjunction and disjunction. Implications, biconditional propositions, converse, contra positive and inverse propositions and precedence of logical operators. *[15]*

Unit 2: Propositional equivalence: Logical equivalences. Predicates and quantifiers: Introduction, Quantifiers, Binding variables and Negations. [14]

Unit 3:Sets, subsets, Set operations and the laws of set theory and Venn diagrams. Examples of finiteand infinite sets. Finite sets and counting principle. Empty set, properties of empty set. Standardset operations. Classes of sets. Power set of a set. [15]

Unit 4:Difference and Symmetric difference of two sets. Set identities, Generalized union and intersections. [15]

Unit 5:Relation: Product set, Composition of relations, Types of relations, Partitions, Equivalence Relations with example of congruence modulo relation, Partial ordering relations, binary relations. [15]

Books Recommended

1. R.P. Grimaldi, *Discrete Mathematics and Combinatorial Mathematics*, Pearson Education, 1998.
2. P.R. Halmos, *Naive Set Theory*, Springer, 1974.
3. E. Kamke, *Theory of Sets*, Dover Publishers, 1950.

Course outcomes:	
1.	Students can formalise first-order properties with formulas of predicate logic.
2.	Students can prove simple first-order properties about sets, relations and functions using calculation style reasoning

Course code	Course title	L	T	P	Credits
BMA-225	Riemann Integration and Series of Functions	5	1	-	6

Course Objectives:
1) To describe a regular partition of an interval, a Riemann sum for a function on a given interval (including the specific cases of left, right, and mid-point Riemann sums), and how they can be used to approximate area. 2) Compute specific Riemann sums for a function on a given interval.

Unit 1:Riemann integration; inequalities of upper and lower sums; Riemann conditions of integrability. Riemann sum and definition of Riemann integral through Riemann sums; equivalence of two definitions; [15]

Unit 2:Riemann integrability of monotone and continuous functions, Properties of theRiemann integral; definition and integrability of piecewise continuous and monotone functions. [14]

Unit 3:Intermediate Value theorem for Integrals; Fundamental theorems of Calculus. Improper integrals; Convergence of Beta and Gamma functions.Pointwise and uniform convergence of sequence of functions. [15]

Unit 4:Theorems on continuity, derivability and integrability of the limit function of a sequence of functions. Series of functions;Theorems on the continuity and derivability of the sum function of a series of functions; Cauchy criterion for uniform convergence and Weierstrass M-Test. [15]

Unit 5:Limit superior and Limit inferior. Power series, radius of convergence, Cauchy Hadamard Theorem, Differentiation and integration of power series; Abel's Theorem; Weierstrass Approximation Theorem. [15]

Books Recommended

1. K.A. Ross, *Elementary Analysis, The Theory of Calculus*, Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.
2. R.G. Bartle D.R. Sherbert, *Introduction to Real Analysis,* 3rd Ed., John Wiley and Sons (Asia)

Pvt. Ltd., Singapore, 2002.
3. Charles G. Denlinger, *Elements of Real Analysis*, Jones & Bartlett (Student Edition), 2011.

Course outcomes:	
1.	Read and interpret an expression in sigma notation as the sum of a series of numbers.
2.	Express Riemann sums for a function f(x) on a given interval using sigma notation, and identify a function and an interval which give rise to a given Riemann sum in sigma notation.

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Course code	Course title	L	T	P	Credits
BMA-226	Ring Theory and Linear Algebra I	5	1	-	6

Course Objectives:
1. Students will have the capacity to work with the classes of rings and fields appearing in the course, particularly specific calculations around finite fields and polynomials. 2. Be able to produce examples and counter examples illustrating the mathematical concepts presented in the course.

Unit 1:Definition and examples of rings, properties of rings, subrings, integral domains and fields, characteristic of a ring. *[14]*

Unit 2:Ideal, ideal generated by a subset of a ring, factor rings, operations on ideals, prime and maximal ideals. [15]

Unit 3: Ring homomorphisms, properties of ring homomorphisms, Isomorphism theorems I, II and III, field of quotients. [15]

Unit 4: Vector spaces , subspaces, algebra of subspaces, quotient spaces , linear combination of vectors, linear span, linear independence, basis and dimension, dimension of subspaces. [15]

Unit 5: Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, algebra of linear transformations.

Isomorphisms, Isomorphism theorems, invertibility and isomorphisms, change of coordinate matrix. [15]

Books Recommended:

1. John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.
2. M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.
3. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra, 4th Ed., PrenticeHall of India Pvt. Ltd., New Delhi, 2004.
4. Joseph A. Gallian, ContemporaryAbstract Algebra, 4th Ed., Narosa Publishing House, New Delhi, 1999.
5. S. Lang, Introduction to Linear Algebra, 2nd Ed., Springer, 2005.
6. Gilbert Strang, Linear Algebra and its Applications, Thomson, 2007.
7. S. Kumaresan, Linear Algebra- A Geometric Approach, Prentice Hall of India,1999.
8. Kenneth Hoffman, Ray Alden Kunze, Linear Algebra, 2nd Ed., Prentice-Hall of India Pvt. Ltd., 1971.
9. D.A.R. Wallace, Groups, Rings and Fields, Springer Verlag London Ltd., 1998.

Course outcomes:	
1.	Will be able to write the statements and proofs of important theorems and be able to explain the key steps in proofs, sometimes with variation
2.	Facility with the ring homomorphisms and presentations, and the application of these in order to describe aspects of the intrinsic structure of rings ,both abstractly and in specific examples

Course code	Course title	L	T	P	Credits
BCS-201	WEB DESIGNING	3	0	0	3

Course Objectives:
1) Understand the principles of creating an effective web page, including an in- depth consideration of information architecture. 2) Become familiar with graphic design principles that relate to web design and learn how to implement these theories into practice.

UNIT – 1 : INTRODUCTION TO INTERNET:

World Wide Web and concepts of website, web pages etc. Client – Server Architecture, The idea of hypertext and hyper media: how the web works: HTTP, HTML and URLs; how the browser works: MIME types, plug-ins and helper applications, standards, Introduction to HTML, XML, XHTML and the W3C. *[10]*

UNIT – 2 : HYPERTEXT MARKUP LANGUAGE:

HTMLS: The anatomy of an HTML document; marking up for structure and style: basic page markup, ordered and unordered list, Structuring content with HTML using natural divisions, Marquee text with or without background with attributes, Working with Links Internal Links: Anchor Link, Email Link; embedding images, table creation: Table attributes Colspan, Rowspan, Table Border, Align, Valign, Table background image, Nesting tables, Frames and Nesting, iframes, forms, Semantic elements of HTMLS, Media tags in HTMLS.

[8]

UNIT – 3 : CASCADING STYLE SHEET:

Introduction to Cascading Style Sheet: Selector, Declaration and declaration block. Types of CSS – Inline and Internal style specifications within HTML; external linked style specification using CSS, page and site design considerations. Types of Selector:

Universal, Class and ID Selector, Building & Applying Class Selectors, ID Selector using Div Tags and span tag. [8]

UNIT – 4 : CLIENT SIDE PROGRAMMING:

Introduction to JavaScript syntax: output, Comments, variables, functions, operators, conditions, switch, loop. Java1Script object model: Window, Location and History object

model; HTML DOM: Introduction to DOM: methods, event handling, navigation, Forms validation. *[10]*

UNIT – 5 : TESTING WEB APPLICATION :

Introduction, Fundamentals, Terminology, Quality characteristics, test objectives, test levels, Test Methods and Techniques, Link Testing, Browser Testing, Usability Testing Load, stress and continuous testing; Testing Security; Test automation; Benefits and drawbacks of automation testing.

[12]

TEXT BOOKS/REFERENCE BOOKS:

Course outcomes:	
1.	Employ fundamental computer theory to basic programming techniques.
2.	Use fundamental skills to maintain web server services required to host a website.

Course code	Course title	L	T	P	Credits
BA-272A	ENTREPRENEURSHIP DEVELOPMENT	3	0	-	3

Course Objectives:
1. To educate people on the upsides and downsides of entrepreneurship 2. Entrepreneurship development programs are intended to shine a light on enterprise responsibility

UNIT-1: Introduction: The Entrepreneur: Definition, Emergence of Entrepreneurial Class; Theories of Entrepreneurship.

[5]

UNIT-2: Promotion of a Venture: Opportunity Analysis; External Environmental Analysis Economic, Social and Technological; Competitive factors; Legal requirements of establishment of a new unit and Raising of Funds; Venture Capital Sources and Documentation Required.

[9]

UNIT-3: Entrepreneurial Behaviour: Innovation and Entrepreneur; Entrepreneurial Behaviour and Psycho-theories, Social responsibility.Entrepreneurial Development Programmes (EDP): EDP, Their Role, Relevance and Achievements; Role of Government in Organizing EDP's Critical Evaluation.

[12]

UNIT-4: Role of Entrepreneur: Role of an Entrepreneur in Economic Growth as an Innovator, Generation of Employment Opportunities, Complimenting and Supplementing Economic Growth, Bringing about Social Stability and Balanced Regional Development of Industries: Role in Export Promotion and Import Substitution, Forex Earnings.

[14]

TEXT BOOKS/REFERENCE BOOKS:,

1. Charantimani, (2006), Entrepreneurship Development and Small Business Enterprise, 1stedition, Pearson Education.
2. Chandra, Ravi, (2003), Entrepreneurial Success: A Psychological Study,
3. Hisrich, Robert and Peters, Michael, (2002), Entrepreneurship, 5thEdition, McGrawHill Education Sterling Publication Pvt. Ltd., New Delhi.
4. Balaraju, Theduri, (2004), Entrepreneurship Development: An Analytical Study, Akansha Publishing House, New Delhi.
5. David, Otes, (2004), A Guide to Entrepreneurship, Jaico Books Publishing House, Delhi.
6. Kaulgud, Aruna, (2003), Entrepreneurship Management, Vikas Publishing House, Delhi.

Course outcomes:	
1.	Students will be able to understand the basic development of entrepreneurship as a profession.
2.	Students will be able to have a basic knowledge of human resource management for small business

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MATHEMATICS

B.Sc (4th SEMESTER)

Course code	Course title	L	T	P	Credits
BMA-229	Numerical Methods	4	0	-	4

Course Objectives:
1) Derive appropriate numerical methods to solve algebraic and transcendental equations 2) Develop appropriate numerical methods to approximate a function

UNIT-1. ERRORS AND APPROXIMATIONS, SOLUTION OF NONLINEAR EQUATIONS

:Introduction to numbers and their accuracy; absolute, relative and percentage errors. Bisection method; Regular falsi method; secant method; fixed point iteration method; Newton- Raphson method; convergence criteria of methods. [15]

UNIT-2. SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS : Gauss elimination method; Gauss-Jordan method; UV factorization method; Jacobi's iteration method; Gauss-Seidal iteration method .
[14]

UNIT-3. INTERPOLATION AND CURVE FITTING: Introduction to interpolation ; Newton's forward and backward interpolation formulae; Gauss's forward and backward interpolation formulae; Stirling formula; Lagrange interpolation; Newton's divided difference formula; Principle of least squares; curve fitting. [15]

UNIT-4. NUMERICAL DIFFERENTIATION AND INTEGRATION: Numerical differentiation formulae: differentiation by using forward interpolation formula; backward interpolation formula; Stirling formula; Newton-Cotes formula for numerical integration: Trapezoidal rule; Simpson's rules; Boole's rule and Weddle's rule; Romberg' method. [15]

UNIT-5. NUMERICAL SOLUTION OF ORDINARY AND PARTIAL DIFFERENTIAL

EQUATION : ,Taylor series method; Euler method; Euler modified method; Runge kutta method; Milne's predictor -corrector method; Adams-Bashforth method for finding solution of differential equation. [15]

BOOKs Recommended:

1) Grewal, B. S., "Numerical methods in Engineering and Science".

2) M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, 6th Ed., New age International Publisher, India, 2007

3) Sastry, S.S.," " Introductory Methods of Numerical Analysis".

4) Curtis F "Applied Numerical Analysis".Books Recommended

5) Brian Bradie, A Friendly Introduction to Numerical Analysis, Pearson Education, India, 2007.

Course outcomes:	
1.	Solve an algebraic or transcendental equation using an appropriate numerical method
2.	Approximate a function using an appropriate numerical method

Course code	Course title	L	T	P	Credits
BMA-224	Ring Theory and Linear Algebra II	4	1	-	5

Course Objectives:
Demonstrate understanding of the idea of a group, a ring and an integral domain, and be aware of examples of these structures in mathematics. Appreciate the significance of unique factorization in rings and integral domains. To learn the basic terminology and results concerning abstract algebra

Unit 1:Polynomial rings over commutative rings, division algorithm and consequences, principal ideal domains, factorization of polynomials, reducibility tests, irreducibility tests.

[15]

Unit 2:Eisenstein criterion,unique factorization in Z[x]. Divisibility in integral domains, irreducibles, primes, uniquefactorization domains, Euclidean domains. [12]

Unit 3:Dual spaces, dual basis, double dual, transpose of a linear transformation and its matrix in the dual basis, annihilators, Eigen spaces of a linear operator, diagonalizability, invariant subspaces and Cayley-Hamilton theorem, the minimal polynomial for a linear operator. [18]

Unit 4:Inner product spaces and norms, Gram-Schmidt orthogonalisation process, orthogonal Complements. [14]

Unit 5:Bessel's inequality, the adjoint of a linear operator, Least Squares Approximation, minimal solutions to systems of linear equations, Normal and self-adjoint operators, Orthogonal projections and Spectral theorem. [16]

TEXT BOOKS/REFERENCE BOOKS:

1. John B. Fraleigh, *A First Course in Abstract Algebra*, 7th Ed., Pearson, 2002.
2. M. Artin, *Abstract Algebra*, 2nd Ed., Pearson, 2011.
3. Joseph A. Gallian, *Contemporary Abstract Algebra*, 4th Ed., Narosa Publishing House, 1999.
4. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra, *4th Ed., Prentice- Hall of India Pvt. Ltd., New Delhi, 2004.*
5. S. Lang, *Introduction to Linear Algebra,* 2nd Ed., Springer, 2005.
6. Gilbert Strang, *Linear Algebra and its Applications*, Thomson, 2007.

Course outcomes:	
1.	Students completing this course will be able to find the null space of a matrix and represent it
2.	Apply the theory in the course to solve a variety of problems at an appropriate level of difficulty.

Course code	Course title	L	T	P	Credits
BMA-227	Graph Theory	4	1	-	5

Course Objectives:
1) It has a aim to know about different types of graph. 2) To understand Shortest Path.

Unit1: Definition, examples and basic properties of graphs, pseudo graphs, complete graphs. *[10]*

Unit 2:Bi-partite graphs, isomorphism of graphs, paths and circuits,

Eulerian circuits. [9]

Unit-3:Hamiltonian cycles, the adjacency matrix, weighted graph,. [11]

Unit4:travelling salesman's problem ,shortest path, Kruskal Algorithm,

[9]

Unit-5: Dijkstra's algorithm ,Floyd-Warshall algorithm, Prim's Algorithm

[9]

Books Recommended :

1. B.A. Davey and H.A. Priestley, Introduction to Lattices and Order, Cambridge University Press, Cambridge, 1990.
2. Edgar G. Goodaire and Michael M. Parmenter, Discrete Mathematics with Graph Theory, 2nd Edition, Pearson Education (Singapore) P. Ltd., Indian Reprint 2003.
3. Rudolf Lidl and Gunter Pilz, Applied Abstract Algebra, 2nd Ed., Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004

Course outcomes:	
1.	Students will able to learn applications of matrix in graph.
2.	It will help to understand Networking.

Code	Name	Credits(2)
BMA-279	Numerical Methods Lab	0-0-2

List of Practicals (Using any software)

(1) Bisection Method.

(2) Newton Raphson Method.

(3) Secant Method.

(4) Regulai Falsi Method.

(5) LU decomposition Method.

(6) Gauss-Jacobi Method.

(7) Gauss-Siedel Method.

(8) Lagrange Interpolation or Newton Interpolation.

(9) Simpson's rule.

(10) Trapezoidal Rule

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Course code	Course title	L	T	P	Credits
BA-264A	MANAGERIAL SKILLS	3	0	0	3

Course Objectives:
1. To facilitate students' understanding of their own managerial skills. 2. To improve communication skills. 3. To learn from the management experience of others. 4. To develop and learn about goals specific to the students of this class

UNIT-1

Skill Development - Writing Business Letter, Official letters, 7C's & 4'S in Communication

, Report writing , Skills, Presentation Skills , Communication : Concept, Types , process, barriers, making Communication effective.

Managerial creativity- Business Process Re-engineering - Concept , Process, Redesign, BPR, experiences in Indian Industry , Total Quality Management(TQM) - Concept , Systems model of Quality, Deming's approach, TQM as a business Strategy . [10]

UNIT-2

Technology led development- Knowledge Management (KM)- What , why, how, of Knowledge Management , KM process , approach, strategies, tools. E-commerce- Ideology, methodology, classification by application /nature of transactions , Driving Forces of EC, Impact of EC, Scope [8]

UNIT-3

Leadership for managers - Concept , Traits, Styles, Types of leadership, Leadership for managers- varied case studies for identifying and imbibing leadership attributes.

Selling & Negotiation Skills-Types of Negotiation , Negotiation Strategies ,Selling skills –

Selling to customers , Selling skills – Body language, Conceptual selling, Strategic selling

[10]

UNIT-4

Conflict Management- Conflict Management - Types of conflicts and Conflict Management, Coping strategies and Conflict Management, Conflict Management Styles

[10]

UNIT-5

Positive thinking

Attitudes , Beliefs, Positive thinking – Martin Seligman's theory of Learned Helplessness , Learned Optimism, Case Studies and Presentations *[10]*

References

1.Stoner, Freeman , Gilbert Jr. : Management (Pearson education) 2.Kootz,O'Donnell ,

Weighrich : Essentials of Management

3. Michael , J. Stahl : Management -Total Quality in a global environment (Blackwell Business)

4. Newman , Warren and Summer : The Process of Management , Concept, Behaviour & Practice.

Course outcomes:	
1.	Manage the selection and initiation of individual projects and of portfolios of projects in the enterprise.
2.	Conduct project planning activities that accurately forecast project costs, timelines, and quality.
3.	Implement processes for successful resource, communication, and risk and change management.

B.Sc(H) Mathematics (V- SEMESTER)

Course code	Course title	L	T	P	Credits
BMA-325	Multivariate Calculus	4	1	-	5

Course Objectives:
The goal of this chapter is to see that many quantities in various scientific fields depend on more than one variable: the strength of the gravitational force between two bodies depend on their masses and their distance apart. The understand how the value of a multivariable function changes as one of its independent variables is allowed to vary with all other variables fixed at constants.

UNIT-1: Functions of several variables, limit and continuity of functions of two variables Partial differentiation, total differentiability and differentiability, sufficient condition for differentiability. *[12]*

UNIT-2: Chain rule for one and two independent parameters, directional derivatives, the gradient, maximal and normal property of the gradient, tangent planes, Extrema of functions of two variables, method of Lagrange multipliers, constrained optimization problems, Definition of vector field, divergence and curl. [14]

UNIT-3:Double integration over rectangular region, double integration over non- rectangular region,Double integrals in polar co-ordinates, Triple integrals, Triple integral over a parallelepiped andsolid regions. Volume by triple integrals, cylindrical and spherical co-ordinates. [18]

UNIT-4:Change of variables in double integrals and triple integrals. Line integrals, Applications of lineintegrals: Mass and Work. Fundamental theorem for line integrals, conservative vector fields,independence of path. [12]

UNIT-5: Green's theorem, surface integrals, integrals over parametrically defined surfaces. Stoke's theorem, The Divergence theorem. [16]

TEXT BOOKS/REFERENCE BOOKS:

1. *G.B. Thomas and R.L. Finney,* Calculus, *9th Ed., Pearson Education, Delhi, 2005.*
2. M.J. Strauss, G.L. Bradley and K. J. Smith, *Calculus,* 3rd Ed., Dorling Kindersley (India) Pvt .Ltd. (Pearson Education), Delhi, 2007.
3. E. Marsden, A.J. Tromba and A. Weinstein, *Basic Multivariable Calculus*, Springer (SIE), Indian reprint, 2005.
4. James Stewart, *Multivariable Calculus, Concepts and Contexts*, 2nd Ed., Brooks /Cole, Thomson Learning, USA, 2001.

Course outcomes:	
1.	Handle vectors fluently in solving problems involving the geometry of lines, curves, planes, and surfaces in space.
2.	Visualize and draw graphs of surfaces in space.

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SCHOOL OF BASIC & APPLIED SCIENCE

B.Sc(H) Mathematics (V- SEMESTER)

Course code	Course title	L	T	P	Credits
BMA-326	Group Theory II	4	1	-	5

Course Objectives:
This lecture course unit aims to introduce students to some more sophisticated concepts and results of group theory as an essential part of general mathematical culture and as a basis for further study of more advanced mathematics. Provide knowledge of some fundamental results and techniques from the theory of finite groups

UNIT-1: Automorphism, inner automorphism, automorphism groups, automorphism groups of finite and infinite cyclic groups, applications of factor groups to automorphism groups. [14]

UNIT-2: Characteristic subgroups, Commutator subgroup and its properties.

Properties of external direct products, the group of units modulo n as an external direct product,internal direct products, Fundamental Theorem of finite abelian groups. [16]

UNIT-3: Group actions, stabilizers and kernels, permutation representation associated with a given group action, Applications of group actions: Generalized Cayley's theorem, Index theorem.. [17]

UNIT-4: Groups acting on themselves by conjugation, class equation and consequences, conjugacy in Sn. [12]

UNIT-5: *p*-groups, Sylow's theorems and consequences, Cauchy's theorem, Simplicity of An for $n \geq 5$,non-simplicity tests.. [14]

TEXT BOOKS/REFERENCE BOOKS:

1. *G.B. Thomas and R.L. Finney,* Calculus, *9th Ed., Pearson Education, Delhi, 2005.*
2. M.J. Strauss, G.L. Bradley and K. J. Smith, *Calculus,* 3rd Ed., Dorling Kindersley (India) Pvt .Ltd. (Pearson Education), Delhi, 2007.
3. E. Marsden, A.J. Tromba and A. Weinstein, *Basic Multivariable Calculus*, Springer (SIE), Indian reprint, 2005.
4. James Stewart, *Multivariable Calculus, Concepts and Contexts,* 2nd Ed., Brooks /Cole, Thomson Learning, USA, 2001.

Course outcomes:	
1.	Verify group properties in particular examples
2.	Understand and use the concept of conjugacy

Course code	Course title	L	T	P	Credits
BMA-329	Metric Spaces and Complex Analysis	4	1	-	5

Course Objectives:
Students will have been introduced to point-set topology and will know the central importance of complex variables in analysis. Students will have grasped a deeper understanding of differentiation and integration in this setting and will know the tools and results of complex analysis including Cauchy's Theorem, Cauchy's integral formula, Liouville's Theorem, Laurent's expansion and the theory of residues

Unit 1:Metric spaces: definition and examples. Sequences in metric spaces, Cauchy sequences. Complete Metric Spaces. Open and closed balls, neighbourhood, open set, interior of a set. Limit point of a set, closed set, diameter of a set, Cantor's theorem. Subspaces, dense sets, separablespaces. [17]

Unit 2:Continuous mappings, sequential criterion and other characterizations of continuity. Uniform continuity. Homeomorphism, Contraction mappings, Banach Fixed point Theorem.Connectedness, connected subsets of R.

[14]

Unit 3:Limits, Limits involving the point at infinity, continuity. Properties of complex numbers, regions in the complex plane, functions of complex variable, mappings.

Derivatives, differentiation formulas, Cauchy-Riemann equations, sufficient conditions for differentiability. Analytic functions, examples of analytic functions, exponential function, Logarithmic function, trigonometric function, derivatives of functions.

[15]

Unit 4:Definite integrals of functions. Contours ,Contour integrals and its examples, upper bounds for moduli of contour integrals. Cauchy-Goursat theorem, Cauchy integral formula.Liouville's theorem and the fundamental theorem of algebra. [15]

Unit 5: Convergence of sequences andseries, Taylor series and its examples.Laurent series and its examples, absolute and uniform convergence of power series. [12]

TEXT BOOKS/REFERENCE BOOKS:

1. Satish Shirali and Harikishan L. Vasudeva, *Metric Spaces*, Springer Verlag, London, 2006.
2. S. Kumaresan, *Topology of Metric Spaces*, 2nd Ed., Narosa Publishing House, 2011.
3. G.F. Simmons, *Introduction to Topology and Modern Analysis*, McGraw-Hill, 2004.
4. James Ward Brown and Ruel V. Churchill, *Complex Variables and Applications*, 8th Ed., McGraw – Hill International Edition, 2009.
5. *Joseph Bak and Donald J. Newman*, Complex Analysis, *2nd Ed., Undergraduate Texts in Mathematics, Springer-Verlag New York, Inc., NewYork, 1997.*

Course outcomes:	
1.	Explain the fundamental concepts of real analysis and their role in modern mathematics and applied contexts
2.	Demonstrate accurate and efficient use of complex analysis techniques.

Course code	Course title	L	T	P	Credits
BMA-328	Probability and Statistics	4	1	-	5

Course Objectives:
We will study about the Basic probability axioms and rules and the moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables. Provide the knowledge about discrete time Markov chain .

Unit 1:Sample space, probability axioms, real random variables (discrete and continuous), cumulative distribution function, probability mass/density functions, mathematical expectation, moments. *[8]*

Unit 2:Moment generating function, characteristic function, discrete distributions: uniform, binomial,Poisson, geometric, negative binomial. [10]

Unit 3:Continuous distributions: uniform, normal, exponential. Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions. [11]

Unit 4: Expectation of function of two random variables, conditional expectations, independent random variables, bivariate normal distribution, correlation coefficient, joint moment generating function (jmgf) and calculation of covariance(from jmgf), linear regression for two variables. [08]

Unit 5:Chebyshev's inequality, statement and interpretation of (weak) law of large numbers and strong law of large numbers, Central Limit theorem for independent and identically distributed random variables with finite variance, Markov Chains, Chapman-Kolmogorov equations, classificationof states [12]

TEXT BOOKS/REFERENCE BOOKS:

1. Robert V. Hogg, Joseph W. McKean and Allen T. Craig, *Introduction to Mathematical Statistics*, Pearson Education, Asia, 2007.

2. Irwin Miller and Marylees Miller, John E. Freund, *Mathematical Statistics with Applications*,

7th Ed., Pearson Education, Asia, 2006.

3. Sheldon Ross, *Introduction to Probability Models*, 9th Ed., Academic Press, Indian Reprint,

2007.

4. Alexander M. Mood, Franklin A. Graybill and Duane C. Boes, *Introduction to the Theory of Statistics*, 3rd Ed., Tata McGraw- Hill, Reprint 2007.

Course outcomes:	
1.	How to derive the probability density function of transformations of random variables and use these techniques to generate data from various distributions
2.	Discrete time Markov chains and methods of finding the equilibrium probability distributions
3.	How to translate real-world problems into probability models

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B.Sc(H) Mathematics (VI- SEMESTER)

Course code	Course title	L	T	P	Credits
BMA-331	Linear Programming	4	1	-	5

Course Objectives:
1. Evaluate the computational performance of search, satisfaction, optimization and learning algorithms. 2. Apply search, satisfaction, optimization and learning algorithms to real world problems

Unit 1: Introduction to linear programming problem, Theory of simplex method, optimality and unboundedness, the simplex algorithm, simplex method in tableau format. *[16]*

Unit 2: Introduction to artificial variables, two-phase method, Big-M method and their comparison. Duality, formulation of the dual problem, primal-dual relationships, economic interpretation of the dual. [16]

Unit 3: Transportation problem and its mathematical formulation, northwest-corner method least cost method and Vogel approximation method for determination of starting basic solution, algorithm for solving transportation problem. [14]

Unit 4: Assignment problem and its mathematical formulation, Hungarian method for solving assignment problem. [15]

Unit 5: Game theory: formulation of two person zero sum games, solving two person zero sum games,games with mixed strategies, graphical solution procedure, linear programming solution of games. [12]

TEXT BOOKS/REFERENCE BOOKS:

1. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, *LinearProgramming and Network*

Flows, *2nd Ed., John Wiley and Sons, India, 2004.*

2. F.S. Hillier and G.J. Lieberman, *Introduction to Operations Research,* 9th Ed.,

Tata McGraw

Hill, Singapore, 2009.

3. Hamdy A. Taha, *Operations Research, An Introduction,* 8th Ed., Prentice-Hall India, 2006.

4. G. Hadley, *Linear Programming*, Narosa Publishing House, New Delhi, 2002.

Course outcomes:	
1.	Describe at an intuitive level the process of artificial intelligence and operations research: a real-time cycle of problem understanding, formulation, solution and implementation
2.	Formulate simple reasoning, learning and optimization problems, in terms of the representations and methods presented. .

Course code	Course title	L	T	P	Credits
BMA-320	Discrete Mathematics	4	1	-	5

UNIT-I Set Theory: Definition of Sets, Venn Diagrams, complements, cartesian products, power sets, counting principle, cardinality and countability (Countable and Uncountable sets), proofs of some general identitites on sets, pigeonhole principle. Relation:Definition, types of relation, composition of relations, domain and range of a relation, pictorial representation of relation, properties of relation, partial ordering relation. Function: Definition and types of function, composition of functions, recursively defined functions.

UNIT-II Propositional logic: Proposition logic, basic logic, logical connectives, truth tables, tautologies, contradiction , normal forms(conjunctive and disjunctive), modus ponens and modus tollens, validity, predicate logic, universal and existential quantification. Notion of proof: proof by implication, converse, inverse, contrapositive, negation, and contradiction, direct proof, proof by using truth table, proof by counter example.

UNIT-III Combinatories:Mathematical induction, recursive mathematical definitions, basics of counting, permutations, combinations, inclusion-exclusion, recurrence relations (nth order recurrence relation with constant coefficients, Homogeneous recurrence relations, Inhomogeneous recurrence relation), generating function (closed form expression, properties of G.F., solution of recurrence relation using G.F, solution of combinatorial problem using G.F.)

Unit-IV Algebraic Structure:Binary composition and its properties definition of algebraic structure; Groyas Semi group, Monoid Groups, Abelian Group, properties of groups, Permutation Groups, Sub Group, Cyclic Group, Rings and Fields (definition and standard results).

UNIT-V Graphs: Graph terminology, types of graph connected graphs, components of graph, Euler graph, Hamiltonian path and circuits, Graph coloring, Chromatic number. Tree: Definition, types of tree(rooted, binary), properties of trees, binary search tree, tree traversing (preorder, inorder, postorder). Finite Automata: Basic concepts of Automation theory, Deterministic finite Automation(DFA), transition function, transition table, Non Deterministic Finite Automata (NDFA), Mealy and Moore Machine, Minimization of finite Automation.

Text/Reference Books:

1. Kenneth H. Rosen, “Discrete Mathematics and its Applications”, Mc.Graw Hill, 2002.

2. J.P.Tremblay & R. Manohar, “Discrete Mathematical Structure with Applications to PDF created with pdfFactory Pro trial version www.pdffactory.com Computer Science” Mc.Graw Hill

3. V. Krishnamurthy, “Combinatories:Theory and Applications”, East-West Press.

4. Seymour Lipschutz, M.Lipson, “Discrete Mathemataics” Tata Mc Graw Hill

Course code	Course title	L	T	P	Credits
BMA-360	MATLAB	-	-	4	2

NAME OF EXPERIMENT:

1. Draw a 3X3 Matrix and Find its Eigen values and Eigen vectors.

2. Solve the differential Equation $\frac{dy}{dx} = 1 + xy$ by using R.K method of 1st and 2nd order.

3. Solve the differential Equation $\frac{dy}{dx} = \frac{y-x}{y+x}$ by using Euler's Method.

4. Evaluate the function by Newton's forward and backward Interpolation.

X	1	2	3	4	5
Y	1	4	9	16	25

5. If a matrix A=$\begin{matrix} 2 & 2 & 3 \\ 1 & -1 & 0 \\ 3 & 2 & 4 \end{matrix}$ and B= $\begin{matrix} 2 & 1 & 4 \\ -1 & 4 & 0 \\ 3 & 6 & 4 \end{matrix}$ and matrix C is a unit matrix, check by MATLAB (Scilab) Coding i) Distributive law (ii) Associative law

(iii) Commutative law (iv) Addition of 3 matrices (v) AB and BC

6. Solve the system of linear equation

$$2x + y - 2z = -2\ ,3x - 2y + z = 2, -2x - 2y + 3z = 3$$

And find the reduced row echelon form.

7. Solve the differential Equation $f(x) = x^2$ by using Trapezoidal Rule.

8. Solve the differential Equation $f(x) = x^2$ by using Simpson's 1/3rd Rule.

9. Solve the differential Equation $f(x) = x^2 - 2x - 1$ by using Regula Falsi method and Newton Raphson method.

10. Declare the two matrices and find its Addition, Multiplication, and Subtraction and find the determinant of each matrix.

SCHEME FOR B.Sc. (HONORS) PHYSICS

B.Sc. (HONORS) PHYSICS			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPH-120	Mathematical Physics-I	3	1	0	4
2	BPH-122	Electricity and Magnetism	3	1	0	4
3	BPH-121	Mechanics	3	1	0	4
4	BMA-115	Calculus	5	1	0	6
5	BEN-101	Communication Skill (English)	2	0	0	2
6	BPH-170	Mathematical Physics-I Lab	0	0	4	2
7	BPH-172	Electricity and Magnetism Lab	0	0	4	2
8	BPH-171	Mechanics Lab	0	0	4	2
9	PDP-101	Hobby club	2	0	0	2
		Total---->	**18**	**4**	**12**	**28**

SCHEME FOR B.Sc. (HONORS) PHYSICS

B.Sc. (HONORS) PHYSICS			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPH-123	Waves and Optics	3	1	0	4
2	BPH-125	Thermal Physics	3	1	0	4
3	BPH-126	Mathematical Physics-II	3	1	0	4
4	BCH-115	Physical Chemistry-II	3	1	0	4
5	CEA-101A	Environmental Science/Ecology	2	0	0	2
6	BPH-173	Waves & Optics Lab	0	0	4	2
7	BPH-175	Thermal Physics Lab	0	0	4	2
8	BPH-176	Mathematical Physics-II Lab	0	0	4	2
9	BCH-165	Physical Chemistry Lab	0	0	4	2
10	PDP-102	People Connect	0	0	2	1
		Total---->	**14**	**4**	**18**	**27**

SCHEME FOR B.Sc. (HONORS) PHYSICS

B.Sc. (HONORS) PHYSICS			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPH-221	Digital Systems and Applications	3	1	0	4
2	BPH-223	Applied Optics	3	1	0	4
3	BPH-224	Elements of Modern Physics	3	1	0	4
4	BPH-225	Analog Systems and Applications	3	1	0	4
5	BCS-201	Web Designing	3	0	0	3
6	BPH-271	Digital Systems and Applications Lab	0	0	4	2
7	BPH-274	Elements of Modern Physics Lab	0	0	4	2
8	BPH-275	Analog Systems and Applications Lab	0	0	4	2
9	BA-272A	Entrepreneurship Development	3	0	0	3
10	BCS-251	Web Designing Lab	0	0	4	2
		Total---->	**18**	**4**	**16**	**30**

SCHEME FOR B.Sc. (HONORS) PHYSICS

B.Sc. (HONORS) PHYSICS			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPH-226	Mathematical Physics-III	3	1	0	4
2	BPH-227	Quantum Mechanics & Applications	3	1	0	4
3	BPH-228	Solid State Physics	3	1	0	4
4	BCH-220	Physical Chemistry	3	1	0	4
5	BA-264A	Managerial Skill	3	0	0	3
6	PD-293A	PDP/Inter Personal Skill	2	0	0	2
7	BPH-276	Mathematical Physics-III Lab	0	0	4	2
8	BPH-277	Quantum Mechanics & Applications Lab	0	0	4	2
9	BPH-278	Solid State Physics Lab	0	0	4	2
10	BPH-270	Physical Chemistry Lab	0	0	4	2
		Total---->	**17**	**4**	**16**	**29**

SCHEME FOR B.Sc. (HONORS) PHYSICS

B.Sc. (HONORS) PHYSICS			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPH-322	Physics of Devices and Communication	3	1	0	4
2	BPH-323	Nuclear & Particle Physics	3	1	0	4
3	BPH-324	Electro-Magnetic Theory	3	1	0	4
4	BPH-325	Statistical Mechanics	3	1	0	4
5	BPH-372	Physics of Devices and Communication Lab	0	0	4	2
6	BPH-374	Electro-Magnetic Theory Lab	0	0	4	2
7	BPH-375	Statistical Mechanics Lab	0	0	4	2
8	PD-301	Leadership and Entrepreneurship Development	2	0	0	2
9		Total---->	**14**	**4**	**12**	**24**

SCHEME FOR B.Sc. (HONORS) PHYSICS

B.Sc. (HONORS) PHYSICS			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPH-326	Nano-Materials and Applications	3	1	0	4
2	BPH-327	Biophysics	4	0	0	4
3	BPH-376	Nano-Materials and Applications Lab	0	0	4	2
4	BPH-377	Industrial Training/Dissertation &Seminar	0	2	16	10
		Total---->	**7**	**3**	**20**	**20**

SEMESTER-I

BPH-120: MATHEMATICAL PHYSICS

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objective- The emphasis of course is on applications in solving problems of interest to physicists. The students are to be examined entirely based on problems, seen and unseen.

Course Outcome

CO1: In this course the students should learn to master the tools from vector and calculus analysis that are important prerequisites for other physics courses like electrodynamics.

CO2: This module will teach how to solve differential equations and apply them in physical world.

CO3: The students will learn to formulate specific physics problems through mathematical models of this kind, to master various important analytical and numerical methods to solve such models.

CO4: Students will learn to give physical interpretations of the solutions of various mathematical models.

Unit-I: Calculus: (12 Lectures)

Recapitulation: Limits, continuity, average and instantaneous quantities, differentiation. Plotting functions. Intuitive ideas of continuous, differentiable, etc. functions and plotting of curves. Approximation: Taylor and binomial series (statements only). First Order Differential Equations and Integrating Factor.

Second Order Differential equations: Homogeneous Equations with constant coefficients. Wronskian and general solution. Statement of existence and Uniqueness Theorem for Initial Value Problems. Particular Integral.

Calculus of functions of more than one variable: Partial derivatives, exact and inexact differentials. Integrating factor, with simple illustration. Constrained Maximization using Lagrange Multipliers.

Unit-II: Vector Calculus: (10 Lectures)

Recapitulation of vectors: Properties of vectors under rotations. Scalar product and its invariance under rotations. Vector product, Scalar triple product and their interpretation in terms of area and volume respectively. Scalar and Vector fields.

Vector Differentiation: Directional derivatives and normal derivative. Gradient of a scalar field and its geometrical interpretation. Divergence and curl of a vector field. Del and Laplacian operators. Vector identities, Gradient, divergence, curl and Laplacian in spherical and cylindrical coordinates.

Unit-III: Vector integration (10 Lectures)

Vector Integration: Ordinary Integrals of Vectors. Multiple integrals, Jacobian. Notion of infinitesimal line, surface and volume elements. Line, surface and volume integrals of Vector fields. Flux of a vector field. Gauss' divergence theorem, Green's and Stokes Theorems and their applications (no rigorous proofs).

Unit-IV: Orthogonal Curvilinear Coordinates: (8 Lectures)

Orthogonal Curvilinear Coordinates. Derivation of Gradient, Divergence, Curl and Laplacian in Cartesian, Spherical and Cylindrical Coordinate Systems.

Unit-V: Probability & Dirac Delta function and its properties: (10 Lectures)

Independent random variables: Probability distributions functions, binomial, Gaussian, and Possion, with examples, Mean and Variance.

Definition of Dirac delta function. Representation as limit of Gaussian function and rectangular function. Properties of Dirac delta function.

Reference Books:

- Mathematical Methods for Physicists, G.B. Arfken, H.J. Weber, F.E. Harris, 2013, 7thEdn., Elsevier.
- An introduction to ordinary differential equations, E.A. Coddington, 2009, PHI learning.
- Differential Equations, George F. Simmons, 2007, McGraw Hill.
- Mathematical Tools for Physics, James Nearing, 2010, Dover Publications.

- Mathematical methods for Scientists and Engineers, D.A. McQuarrie, 2003, Viva Book.
- Advanced Engineering Mathematics, D.G. Zill and W.S. Wright, 5 Ed., 2012, Jones and Bartlett Learning

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	-	3	2	3	1
CO2	2	3	1	-	1	2	1	-
CO3	3	3	-	-	1	2	-	-
CO4	2	3	-	-	2	1	-	-

BPH-122:ELECTRICITY AND MAGNETISM

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: This module discusses the basic phenomena of electricity and magnetism as they relate to effects animation.

Course outcomes:

CO1: The use of Coulomb's law and Gauss' law for the electrostatic force
CO2: The relationship between electrostatic field and electrostatic potential
CO3: The use of the Lorentz force law for the magnetic force
CO4: The use of Ampere's law to calculate magnetic fields.

Unit-I Electric Field and Electric Potential (12 Lectures)

Electric field: Electric field lines. Electric flux. Gauss' Law with applications to charge distributions with spherical, cylindrical and planar symmetry.

Conservative nature of Electrostatic Field. Electrostatic Potential. Laplace's and Poisson equations. The Uniqueness Theorem. Potential and Electric Field of a dipole. Force and Torque on a dipole.

Electrostatic energy of system of charges. Electrostatic energy of a charged sphere. Conductors in an electrostatic Field. Surface charge and force on a conductor. Capacitance of a system of charged conductors. Parallel-plate capacitor. Capacitance of an isolated conductor. Method of Images and its application to: (1) Plane Infinite Sheet and (2) Sphere.

Unit-II Dielectric Properties of Matter: (10 Lectures)

Electric Field in matter. Polarization, Polarization Charges. Electrical Susceptibility and Dielectric Constant. Capacitor (parallel plate, spherical, cylindrical) filled with dielectric. Displacement vector D. Relations between E, P and D. Gauss' Law in dielectrics.

Unit-III Magnetic Field: (10 Lectures)

Magnetic force between current elements and definition of Magnetic FieldB. Biot-Savart's Law and its simple applications: straight wire and circular loop. Current Loop as a Magnetic Dipole and its Dipole Moment (Analogy with Electric Dipole). Ampere's Circuital Law and its application to (1) Solenoid and (2) Toroid. Properties of B: curl and divergence. Vector

Potential. Magnetic Force on (1) point charge (2) current carrying wire (3) between current elements. Torque on a current loop in a uniform Magnetic Field.

Unit-IV Electromagnetic Induction & Ballistic Galvanometer: (10 Lectures)

Faraday's Law. Lenz's Law. Self-Inductance and Mutual Inductance. Reciprocity Theorem. Energy stored in a Magnetic Field. Introduction to Maxwell's Equations. Charge Conservation and Displacement current.

Torque on a current Loop. Ballistic Galvanometer: Current and Charge Sensitivity. Electromagnetic damping. Logarithmic damping.

Unit-V Electrical Circuits & Network theorems: (10 Lectures)

AC Circuits: Kirchhoff's laws for AC circuits. Complex Reactance and Impedance. Series LCR Circuit: (1) Resonance, (2) Power Dissipation and (3) Quality Factor, and (4) Band Width. Parallel LCR Circuit. Ideal Constant-voltage and Constant-current Sources. Network Theorems: Thevenin theorem, Norton theorem, Superposition theorem, Maximum Power Transfer theorem.

Reference Books:

- Electricity, Magnetism & Electromagnetic Theory, S. Mahajan and Choudhury, 2012, Tata McGraw
- Electricity and Magnetism, Edward M. Purcell, 1986 McGraw-Hill Education
- Introduction to Electrodynamics, D.J. Griffiths, 3rd Edn., 1998, Benjamin Cummings.
- Feynman Lectures Vol.2, R.P. Feynman, R.B. Leighton, M. Sands, 2008, Pearson Education
- Elements of Electromagnetics, M.N.O. Sadiku, 2010, Oxford University Press.
- Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ. Press.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	1	2	2	1	1
CO2	2	3	1	-	1	2	1	-
CO3	1	3	-	-	1	2	-	1
CO4	2	3	-	2	2	1	2	-

BPH-124: MECHANICS

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: To acquire skills allowing the student to identify and apply formulas of optics and wave physics using course literature.

Course outcomes:

CO1: Students will learn about relative motion & Inertial and non-inertial reference frames.
CO2: Parameters defining the motion of mechanical systems and their degrees of freedom will also be learned by the students.
CO3: understand the study of the interaction of forces between solids in mechanical systems.
CO4: Learn about centre of mass and inertia tensor of mechanical systems.

UNIT-1: Wave optics-I (10 Lectures)

Interference: Interference of light and its necessary conditions, path & Phase difference for reflected & transmitted rays, Interference in thin films (parallel and wedge-shaped film), Newton's rings.

Diffraction: Single, double and N- Slit Diffraction, Diffraction grating, grating spectra, dispersive power, Rayleigh's criterion and resolving power of grating

Unit-II Fundamentals of Dynamics (10 Lectures)

Reference frames. Inertial frames; Galilean transformations; Galilean invariance. Review of Newton's Laws of Motion. Dynamics of a system of particles. Centre of Mass. Principle of conservation of momentum. Impulse.

Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of Physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications. Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.

Unit-III Special Theory of Relativity (10 Lectures)

Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. Variation of mass with velocity. Massless Particles. Mass-energy Equivalence. Relativistic Kinematics. Transformation of Energy and Momentum. Energy-Momentum Four Vector.

Unit-IV Work Energy and Collisions (10 Lectures)

Work and Kinetic Energy Theorem. Conservative and non-conservative forces. Potential Energy. Energy diagram. Stable and unstable equilibrium. Elastic potential energy. Force as gradient of potential energy. Work & Potential energy. Work done by non-conservative forces. Law of conservation of Energy.

Elastic and inelastic collisions between particles. Centre of Mass and Laboratory frames.

UNIT-V Magnetic & superconducting properties: (10 Lectures)

Magnetization, Origin of magnetic moment, Dia, para and ferro magnetism, Langevin's theory for diamagnetic material, Applications of Magnetism.

Superconductors: Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, Type I and Type II superconductors. Applications of Superconductors.

Reference Books:

- An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill.
- Mechanics, Berkeley Physics, vol.1, C. Kittel, W. Knight, et.al. 2007, Tata McGraw-Hill.
- Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.
- Analytical Mechanics, G.R. Fowles and G.L. Cassiday. 2005, Cengage Learning.
- Feynman Lectures, Vol. I, R.P. Feynman, R.B. Leighton, M. Sands, 2008, Pearson Education
- Introduction to Special Relativity, R. Resnick, 2005, John Wiley and Sons.
- University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	-	2	2	1	1
CO2	2	3	1	-	1	2	1	-
CO3	2	1	3	3	1	2	-	-
CO4	2	3	-	-	2	1	-	2

BPH-170-MATHEMATICAL PHYSICS LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

Objective: The aim of this Lab is not just to teach computer programming and numerical analysis but to emphasize its role in solving problems in Physics.

Course outcomes:

CO1: Students will demonstrate proficiency in mathematics and the mathematical concepts needed for a proper understanding of physics.

CO2: Students will demonstrate knowledge of classical mechanics, electromagnetism, quantum mechanics, and thermal physics, and be able to apply this knowledge to analyze a variety of physical phenomena.

CO3: Students will show that they have learned laboratory skills, enabling them to take measurements in a physics laboratory and analyze the measurements to draw valid conclusions.

CO4: Students will be capable of oral and written scientific communication and will prove that they can think critically and work independently.

Topics	Description with Applications
Introduction and Overview	Computer architecture and organization, memory and Input/output devices
Basics of scientific computing	Binary and decimal arithmetic, Floating point numbers, algorithms, Sequence, Selection and Repetition, single, and double precision arithmetic, underflow & overflow, emphasize the importance of making equations in terms, of dimensionless variables, Iterative methods
Errors and error Analysis	Truncation and round off errors, Absolute and relative, errors, Floating point computations
EXP-1 Mat Lab Programs:	Sum & average of a list of numbers, largest of a given list of numbers and its location in the list, sorting of numbers in ascending descending order, Binary search
EXP-2 Random number generation	Area of circle, area of square, volume of sphere, value of Pi
Exp-3 Solution of Algebraic and Transcendental equations by Bisection, Newton Raphson and Secant methods	Solution of linear and quadratic equation, solving α tanα *IIo* $[(\text{Sin}\alpha)/\alpha]^2$ in optics
Exp-4 Interpolation Method	Evaluation of trigonometric function sin , cos , tan .

	First order differential equation
Exp-5 Solution of ordinary differential equation	Radioactive decay Current in RC,LC Circuits and DC circuits
Exp-6 First order differential equation	Differntial equation describing the motion of a pendulum. Differntial equation describing the motion of a pendulum
Exp-7 Programs:	Sum and average of a list of numbers, largest of a given list of number, sorting of numbers in ascending and descending order.
Exp-8 Ploting	Basic curve and their fitting
Exp-9 Roots	Roots of a polynomial, Roots of a Quadratic equation Conversion of Temp

Referred Books:

- Introduction to Numerical Analysis, S.S. Sastry, 5thEdn. , 2012, PHI Learning Pvt. Ltd.
- Numerical Recipes in C: The Art of Scientific Computing, W.H. Pressetal, 3rdEdn. , 2007, Cambridge University Press.
- A first course in Numerical Methods, U.M. Ascher & C. Greif, 2012, PHI Learning.
- Elementary Numerical Analysis, K.E. Atkinson, 3rd Edn. , 2007 , Wiley India Edition.
- Numerical Methods for Scientists & Engineers, R.W. Hamming, 1973, Courier Dover Pub.
- An Introduction to computational Physics, T. Pang, 2nd Edn.2006,Cambridge Univ. Press

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	-	2	2	1	1
CO2	1	3	1	1	1	2	1	3
CO3	1	3	-	-	1	2	-	1
CO4	2	3	1	1	2	1	-	-

BPH-172:ELECTRICITY AND MAGNETISM LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

Objective: The aim of this Lab is skill the students with various experiments involved in mechanics.

Course outcomes:

CO1: Students will learn about electrical measurements.
CO2: understand the concept of parallel and series connection.
CO3: determine the magnetic field strength of a solenoid.
CO4: master the various theorems of simplifying a circuit.

1. Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, (d) Capacitances, and (e) Checking electrical fuses.
2. To study the characteristics of a series RC Circuit.
3. To determine an unknown Low Resistance using Potentiometer.
4. To determine an unknown Low Resistance using Carey Foster's Bridge.
5. To compare capacitances using De'Sauty's bridge.
6. Measurement of field strength B and its variation in a solenoid (determine dB/dx)
7. To verify the Thevenin and Norton theorems.
8. To verify the Superposition, and Maximum power transfer theorems.
9. To determine self-inductance of a coil by Anderson's bridge.
10. To study response curve of a Series LCR circuit and determine its (a) Resonant frequency, (b) Impedance at resonance, (c) Quality factor Q, and (d) Band width.
11. To study the response curve of a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q.
12. Measurement of charge and current sensitivity and CDR of Ballistic Galvanometer
13. Determine a high resistance by leakage method using Ballistic Galvanometer.
14. To determine self-inductance of a coil by Rayleigh's method.
15. To determine the mutual inductance of two coils by Absolute method.

Reference Books

- Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House.

- Advanced level Physics Practical's, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	1	2	2	1	1
CO2	1	3	1	-	1	2	1	1
CO3	1	3	-	3	1	2	2	-
CO4	2	3	-	1	2	1	-	-

BPH-174:MECHANICS LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

Objective: The aim of this Lab is skill the students with various experiments involved in mechanics.

Course outcomes:

CO1: Students will learn about measuring techniques.
CO2: understand the elasticity concept.
CO3: determine the value of acceleration due to gravity.
CO4: master the techniques to calculate various mechanical parameters.

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To study the random error in observations.
3. To determine the height of a building using a Sextant.
4. To study the Motion of Spring and calculate (a) Spring constant, (b) g and (c) Modulus of rigidity.
5. To determine the Moment of Inertia of a Flywheel.
6. To determine "g" and velocity for a freely falling body using Digital Timing Technique.
7. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
8. To determine the Young's Modulus of a Wire by Optical Lever Method.
9. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
10. To determine the elastic Constants of a wire by Searle's method.
11. To determine the value of g using Bar Pendulum.
12. To determine the value of g using Kater's Pendulum.

Reference Books

- Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	1	2	2	1	1
CO2	2	3	1	-	1	1	2	-
CO3	1	3	3	-	1	2	-	-
CO4	2	3	-	3	2	1	-	1

SEMESTR-II

BPH-123:WAVE AND OPTICS

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: The course aims to introduce the basic concepts required for a mathematical description of oscillations and waves, and to provide expertise for solving the differential equations which arise in simple mathematical models for oscillations and waves.

Course outcomes:

CO1: Solve for the solutions and describe the behavior of a damped and driven harmonic oscillator in both time and frequency domains.

CO2: Describe the behavior of waves at interfaces (reflection, transmission, impedance) and their behavior in dissipative media (damping).

CO3: Construct travelling and standing solutions to the wave equation.

CO4: Understand and implement Fourier series.

UNIT-I: Motion and oscillations (10 Lectures)

Oscillations: SHM: Simple Harmonic Oscillations. Differential equation of SHM and its solution. Kinetic energy, potential energy, total energy and their time-average values. Damped oscillation. Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation and Quality Factor.

UNIT-II Superposition of collinear harmonic oscillations (12 Lectures)

Linearity and Superposition Principle. Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies (Beats). Superposition of N collinear Harmonic Oscillations with (1) equal phase differences and (2) equal frequency differences. Graphical and Analytical Methods. Lissajous Figures (1:1 and 1:2) and their uses.

Unit-III: Wave Motion & Velocity of Waves (13 Lectures)

Plane and Spherical Waves. Longitudinal and Transverse Waves. Plane Progressive (Travelling) Waves. Wave Equation. Particle and Wave Velocities. Differential Equation. Pressure of a Longitudinal Wave. Energy Transport, Intensity of wave, Water Waves.

Velocity of Transverse Vibrations of Stretched Strings. Velocity of Longitudinal Waves in a Fluid in a Pipe. Newton's Formula for Velocity of Sound waves and Laplace's Correction.

Unit-IV: Superposition of Two Harmonic Waves (12 Lectures)

Standing (Stationary) Waves in a String: Fixed and Free Ends. Analytical Treatment. Phase and Group Velocities. Changes with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings. Plucked and Struck Strings. Melde's Experiment. Longitudinal Standing Waves and Normal Modes. Open and Closed Pipes.

Unit-V: Wave Optics (12 Lectures)

Interference: Division of amplitude and wavefront. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes' treatment, Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes).

Diffraction: Kirchhoff's Integral Theorem, Fresnel-Kirchhoff's Integral formula and its application to rectangular slit. Fresnel's Assumptions. Fresnel's Half-Period Zones for Plane Wave. Explanation of Rectilinear Propagation of Light.

Reference Books

- Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill.
- Fundamentals of Optics, F.A. Jenkins and H.E. White, 1981, McGraw-Hill
- Principles of Optics, Max Born and Emil Wolf, 7thEdn., 1999, Pergamon Press.
- Optics, Ajoy Ghatak, 2008, Tata McGraw Hill
- The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons.
- The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	1	2	2	1	1
CO2	2	3	1	1	1	3	1	-
CO3	1	3	1	2	1	2	-	-
CO4	2	3	-	3	2	1	-	-

BPH-125:THERMAL PHYSICS

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: The objective of this course is to develop a working knowledge of the laws and methods of thermodynamics and elementary statistical mechanics and to use this knowledge to explore various applications.

Course outcomes:

CO1: Identify and describe the statistical nature of concepts and laws in thermodynamics, in particular: entropy, temperature, chemical potential, Free energies, partition functions.
CO2: Use the statistical physics methods, such as Boltzmann distribution, Gibbs distribution, Fermi-Dirac and Bose-Einstein distributions to solve problems in some physical systems.
CO3: Apply the concepts and principles of black-body radiation to analyze radiation phenomena in thermodynamic systems.
CO4: Apply the concepts and laws of thermodynamics to solve problems in thermodynamic systems such as gases, heat engines and refrigerators etc.

Unit I: Introduction to Thermodynamics (14 Lectures)

Zeroth and First Law of Thermodynamics: Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Zeroth Law of Thermodynamics & Concept of Temperature, Concept of Work & Heat, State Functions, First Law of Thermodynamics and its differential form, Internal Energy, First Law & various processes, Applications of First Law: General Relation between CP and CV, Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Co-efficient.

Unit II: Second Law of Thermodynamics: (8 Lectures)

Reversible and Irreversible process with examples. Conversion of Work into Heat and Heat into Work. Heat Engines. Carnot's Cycle, Carnot engine & efficiency. Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence. Carnot's Theorem. Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.

Unit III: Entropy (10 Lectures)

Thermodynamics in terms of Entropy. Entropy of a perfect gas. Principle of Increase of Entropy. Entropy Changes in Reversible and Irreversible processes with examples. Entropy of the Universe. Entropy Changes in Reversible and Irreversible Processes. Principle of Increase of Entropy. Temperature–Entropy diagrams for Carnot's Cycle. Third Law of Thermodynamics. Unattainability of Absolute Zero.

Thermodynamic Potentials: Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy. Their Definitions, Properties and Applications. Surface Films and Variation of Surface Tension with Temperature. Magnetic Work, Cooling due to adiabatic demagnetization, First and second order Phase Transitions with examples, Clausius Clapeyron Equation and Ehrenfest equations.

Unit IV: Maxwell's Thermodynamic Relations (10 Lectures)

Derivations and applications of Maxwell's Relations, Maxwell's Relations:(1) Clausius Clapeyron equation, (2) Values of Cp-Cv, (3) TdS Equations, (4) Joule-Kelvin coefficient for Ideal and Van der Waal Gases, (5) Energy equations, (6) Change of Temperature during Adiabatic Process.

Kinetic Theory of Gases: Distribution of Velocities: Maxwell-Boltzmann Law of Distribution of Velocities in an Ideal Gas and its Experimental Verification. Doppler Broadening of Spectral Lines and Stern's Experiment. Mean, RMS and Most Probable Speeds. Degrees of Freedom. Law of Equipartition of Energy (No proof required). Specific heats of Gases.

UNIT V: Molecular collisions: (11 Lectures)

Mean Free Path. Collision Probability. Estimates of Mean Free Path. Transport Phenomenon in Ideal Gases: (1) Viscosity, (2) Thermal Conductivity and (3) Diffusion. Brownian Motion and its Significance.

Real Gases: Behavior of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO2 Gas. Critical Constants. Continuity of Liquid and Gaseous State. Vapour and Gas. Boyle Temperature. Van der Waal's Equation of State for Real Gases. Values of Critical Constants. Law of Corresponding States. Comparison with Experimental Curves. P-V Diagrams. Joule's Experiment. Free Adiabatic Expansion of a Perfect Gas. Joule-Thomson Porous Plug Experiment. Joule- Thomson Effect for Real and Van der Waal Gases. Temperature of Inversion. Joule- Thomson Cooling.

Reference books:

- Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.
- A Treatise on Heat, Meghnad Saha, and B.N. Srivastava, 1958, Indian Press
- Thermal Physics, S. Garg, R. Bansal and Ghosh, 2nd Edition, 1993, Tata McGraw-Hill
- Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer.
- Thermodynamics, Kinetic Theory & Statistical Thermodynamics, Sears & Salinger. 1988, Narosa.
- Concepts in Thermal Physics, S.J. Blundell and K.M. Blundell, 2nd Ed., 2012, Oxford University Press
- Thermal Physics, A. Kumar and S.P. Taneja, 2014, R. Chand Publications.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	2	2	2	1	1
CO2	1	3	1	-	1	2	1	-
CO3	1	3	3	2	1	2	2	-
CO4	2	3	-	-	2	1	-	2

BPH-126:MATHEMATICAL PHYSICS-II

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: The emphasis of the course is on applications in solving problems of interest to physicists. Students are to be examined based on problems, seen and unseen.

Course outcomes:

CO1: Use complex analysis in solving physical problems.

CO2: Solve ordinary and partial differential equations of second order that are common in the physical sciences.

CO3: Use of Green functions.

CO4:Use the orthogonal polynomials and other special functions.

Unit I:Fourier Series (11 Lectures)

Periodic functions. Orthogonality of sine and cosine functions, Dirichlet Conditions (Statement only). Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. Complex representation of Fourier series. Expansion of functions with arbitrary period. Expansion of non-periodic functions over an interval. Even and odd functions and their Fourier expansions. Application. Summing of Infinite Series. Term-by-Term differentiation and integration of Fourier Series.

UNIT II: Special functions (10 Lectures)

Legendre, Bessel, Hermite and Laguerre Differential Equations. Properties of Legendre Polynomials: Rodrigues Formula, Generating Function, Orthogonality. Simple recurrence relations. Expansion of function in a series of Legendre Polynomials. Bessel Functions of the First Kind: Generating Function, simple recurrence relations. Zeros of Bessel Functions (Jo(x) and J1(x))and Orthogonality.

Unit III: Some Special Integrals (09 Lectures)

Beta and Gamma Functions and Relation between them. Expression of Integrals in terms of Gamma Functions. Error Function (Probability Integral).

UNIT IV: Theory of Errors (09 Lectures)

Systematic and Random Errors. Propagation of Errors. Normal Law of Errors. Standard and Probable Error. Least-squares fit. variables:

UNIT V: Partial differential equations (10 Lectures)

Solutions to partial differential equations, using separation of variables: Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry. Wave equation and its solution for vibrational modes of a stretched string, rectangular and circular membranes. Diffusion Equation.

Reference Books:

- Mathematical Methods for Physicists: Arfken, Weber, 2005, Harris, Elsevier.
- Fourier Analysis by M.R. Spiegel, 2004, Tata McGraw-Hill.
- Mathematics for Physicists, Susan M. Lea, 2004, Thomson Brooks/Cole.
- Differential Equations, George F. Simmons, 2006, Tata McGraw-Hill.
- Partial Differential Equations for Scientists & Engineers, S.J. Farlow, 1993, Dover Pub.
- Engineering Mathematics, S.Pal and S.C. Bhunia, 2015, Oxford University Press

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	1	2	2	1	1
CO2	2	3	1	-	1	2	1	1
CO3	1	3	2	-	1	2	-	3
CO4	2	3	-	3	2	1	3	-

BPH-173:WAVE AND OPTICS LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

Objective: The aim of this Lab is skill the students with various experiments involved in optical physics.

Course outcomes:

CO1: Students will learn about optical measurements.
CO2: understand the concept diffraction through prism.
CO3: determine the wavelength of sodium light.
CO4: understand the concept of diffraction of light practically.

1. To determine the frequency of an electric tuning fork by Melde's experiment and verify λ^2 –T law.
2. To investigate the motion of coupled oscillators.
3. To study Lissajous Figures.
4. Familiarization with: Schuster`s focusing; determination of angle of prism.
5. To determine refractive index of the Material of a prism using sodium source.
6. To determine the dispersive power and Cauchy constants of the material of a prism using mercury source.
7. To determine the wavelength of sodium source using Michelson's interferometer.
8. To determine wavelength of sodium light using Fresnel Biprism.
9. To determine wavelength of sodium light using Newton's Rings.
10. To determine the thickness of a thin paper by measuring the width of the interference fringes produced by a wedge-shaped Film.
11. To determine wavelength of (1) Na source and (2) spectral lines of Hg source using plane diffraction grating.
12. To determine dispersive power and resolving power of a plane diffraction grating.
13. To determine the time period of bar endulum.
14. To determine the time period of Keters pendulum.

Note: Each student is required to perform at least seven experiments.

Reference Books

- Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	1	2	2	1	1
CO2	2	3	1	-	1	1	2	-
CO3	1	3	3	-	1	2	-	-
CO4	2	3	-	3	2	1	-	1

BPH-175:THERMAL PHYSICS LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

Objective: The aim of this Lab is skill the students with various experiments involved in thermal physics.

Course outcomes:

CO1: Students will learn about thermal measurements.
CO2: understand the concept thermometer and variable resistance.
CO3: determination of thermal conductivity of the materials.
CO4: understand the thermodynamics of materials.

1. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.
2. To determine the Coefficient of Thermal Conductivity of Cu by Searle's Apparatus.
3. To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method.
4. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.
5. To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).
6. To study the variation of Thermo-Emf of a Thermocouple with Difference of Temperature of its Two Junctions.
7. To calibrate a thermocouple to measure temperature in a specified Range using (1) Null Method, (2) Direct measurement using Op-Amp difference amplifier and to determine Neutral Temperature.

Note: Each student is required to perform at least seven experiments.

Reference Books

- Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House

- A Text Book of Practical Physics, I.Prakash& Ramakrishna, 11th Ed., 2011, Kitab Mahal
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
- A Laboratory Manual of Physics for undergraduate classes, D.P. Khandelwal,1985, Vani Pub.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	1	2	2	1	1
CO2	3	3	1	-	1	2	1	-
CO3	1	3	-	1	1	2	2	2
CO4	2	3	-	1	2	1	-	-

BPH-176:MATHEMATICAL PHYSICS – II LAB

L-0, T-0 P-4 Credits–2 Max Marks:100

Objectives: The aim of this Lab is to use the computational methods to solve physical problems. Course will consist of lectures (both theory and practical) in the Lab. Evaluation done not on the programming but based on formulating the problem.

Course outcomes:-

CO1: Students will demonstrate proficiency in mathematics and the mathematical concepts needed for a proper understanding of physics.
CO2: Students will demonstrate knowledge of classical mechanics, electromagnetism, quantum mechanics, and thermal physics, and be able to apply this knowledge to analyze a variety of physical phenomena.
CO3: Students will show that they have learned laboratory skills, enabling them to take measurements in a physics laboratory and analyze the measurements to draw valid conclusions.
CO4: Students will be capable of oral and written scientific communication and will prove that they can think critically and work independently.

Topics	Description with Applications
Introduction to Numerical computation software Scilab, Mat lab	Introduction to Scilab, Advantages and disadvantages, Scilab environment, Command window, Figure, window, edit window, Variables and arrays, Initializing variables in Scilab, Multidimensional arrays, Subarray, Special values, Displaying. output data, data file, Scalar and array operations, Hierarchy of operations, Built in Scilab functions, Introduction to plotting, 2Dand 3D plotting (2), Branching Statements and program design, Relational & logical operators, the while loop, for loop, details of loop operations, break & continue statements, nested loops, logical arrays and vectorization (2) User defined functions, Introduction to Scilab functions, Variable passing in Scilab, optional arguments, preserving data between calls to a function, Complex and Character data, string function, Multidimensional arrays (2) an introduction to Scilab

	file processing, file opening and closing, Binary I/o functions, comparing binary and formatted functions, Numerical methods and developing the skills of writing a program (2).
Curve fitting, Least square fit, Goodness of fit, standard deviation	Ohms law to calculate R, Hooke's law to calculate spring constant
Solution of Linear system of equations by Gauss elimination method and Gauss Seidal method. Diagonalization of matrices, Inverse of a matrix, Eigen vectors, eigen values problems.	Solution of mesh equations of electric circuits (3 meshes) Solution of coupled spring mass systems (3 masses)
Generation of Special functions using User defined functions in Scilab	Generating and plotting Legendre Polynomials Generating and plotting Bessel function
Solution of ODE First order Differential equation Euler, modified Euler and Runge-Kutta second order methods p Second order differential difference method equation Fixed difference method	First order differential equation • Radioactive decay • Current in RC, LC circuits with DC source • Newton's law of cooling • Classical equations of motion Second order Differential Equation • Harmonic oscillator (no friction) • Damped Harmonic oscillator • Over damped • Critical damped

Partial differential equations	• Oscillatory • Forced Harmonic oscillator • Transient and • Steady state solution • Solve With the boundary condition at $$x^2\frac{d^2y}{dx^2} - 4x(1-x)\frac{dy}{dx} + 2(1+x)y = x^3$$ $$x^2\frac{d^2y}{dx^2} - y\frac{1}{2}e^2\frac{dy}{dx} = -\frac{3}{2}e^2 - 0.5$$ In the range 1≤ x ≤ 3. Plot y and dy/dx against x in the given range on the same graph. Partial Differential Equation • Wave equation • Heat equation • Poisson equation • Laplace equation
Using Scicos / xcos	• Generating square wave, sine wave, saw tooth wave • Solution to harmonic oscillator • Study of beat phenomenon • Phase space plots

Note; Each students is required to perform at least seven experiments.

Reference Books:

- Mathematical Methods for Physics and Engineers, K.F Riley, M.P. Hobson and S. J. Bence, 3rd ed., 2006, Cambridge University Press
- Complex Variables, A.S. Fokas& M.J. Ablowitz, 8th Ed., 2011, Cambridge Univ. Press
- First course in complex analysis with applications, D.G. Zill and P.D. Shanahan, 1940, Jones & Bartlett.
- Computational Physics, D.Walker, 1st Edn., 2015, Scientific International Pvt. Ltd.
- A Guide to MATLAB, B.R. Hunt, R.L. Lipsman, J.M. Rosenberg, 2014, 3rd Edn., Cambridge University Press

- Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific and Engineering
- Applications: A.V. Wouwer, P. Saucez, C.V. Fernández. 2014 Springer
- Scilab by example: M. Affouf 2012, ISBN: 978-1479203444

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	-	2	2	1	1
CO2	2	3	1	-	1	2	1	-
CO3	1	3	-	-	1	2	-	-
CO4	2	3	-	-	2	1	-	-

SEMESTER-III

BPH-221:DIGITAL SYSTEM AND APPLICATION

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: In particular, students will be able to explain the elements of digital system abstractions such as digital representations of information, digital logic, Boolean algebra.

Course outcomes:-

CO1: Create the appropriate truth table from a description of a combinational logic function.

CO2: Describe the operation and timing constraints for latches and registers.

CO3: Create a state transition diagram from a description of a sequential logic function and then convert the diagram into an implementation of a finite-state machine with the appropriate combinational and sequential components.

CO4: Describe the operation and timing constraints for latches and registers.

Unit I: Introduction to CRO (06 Lectures)

Block Diagram of CRO. Electron Gun, Deflection System and Time Base. Deflection Sensitivity. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference.

Integrated Circuits (Qualitative treatment only): Active & Passive components. Discrete components. Wafer. Chip. Advantages and drawbacks of ICs. Scale of integration: SSI, MSI, LSI and VLSI (basic idea and definitions only). Classification of ICs. Examples of Linear and Digital lCs.

Unit II: Digital Circuits (12 Lectures)

Difference between Analog and Digital Circuits. Binary Numbers. Decimal to Binary and Binary to Decimal Conversion. BCD, Octal and Hexadecimal numbers. AND, OR and

NOT Gates (realization using Diodes and Transistor). NAND and NOR Gates as Universal Gates. XOR and XNOR Gates and application as Parity Checkers.

Boolean algebra: De Morgan's Theorems. Boolean Laws. Simplification of Logic Circuit using Boolean Algebra. Fundamental Products. Idea of Minterms and Maxterms. Conversion of a Truth table into Equivalent Logic Circuit by (1) Sum of Products Method and (2) Karnaugh Map.

Unit III: Data processing circuits (12 Lectures)

Basic idea of Multiplexers, De-multiplexers, Decoders, Encoders. Arithmetic Circuits: Binary Addition. Binary Subtraction using 2's Complement. Half and Full Adders. Half & Full Subtractors, 4-bit binary Adder/Subtractor.

Sequential Circuits: SR, D, and JK Flip-Flops. Clocked (Level and Edge Triggered) Flip-Flops.Preset and Clear operations. Race-around conditions in JK Flip-Flop. M/S JK Flip-Flop.Timers: IC 555: block diagram and applications: Astable multivibrator and Monostable multivibrator.

Unit IV: Shift registers (12 Lectures)

Serial-in-Serial-out, Serial-in-Parallel-out, Parallel-in-Serial-out and Parallel-in-Parallel-out Shift Registers (only up to 4 bits).

Counters(4 bits): Ring Counter. Asynchronous counters, Decade Counter. Synchronous Counter. Computer Organization: Input/Output Devices. Data storage (idea of RAM and ROM). Computer memory. Memory organization & addressing. Memory Interfacing. Memory Map.

Unit V: Intel 8085 Microprocessor Architecture (12 Lectures)

Main features of 8085. Block diagram. Components. Pin-out diagram. Buses. Registers. ALU. Memory. Stack memory. Timing & Control circuitry. Timing states. Instruction cycle, Timing diagram of MOV and MVI.

Introduction to Assembly Language: 1 byte, 2 byte & 3 byte instructions.

Reference Books:

- Digital Principles and Applications, A.P. Malvino, D.P. Leach and Saha, 7th Ed., 2011, Tata McGraw

- Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
- Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
- Digital Electronics G K Kharate ,2010, Oxford University Press
- Digital Systems: Principles & Applications, R.J. Tocci, N.S. Widmer, 2001, PHI Learning
- Logic circuit design, Shimon P. Vingron, 2012, Springer.
- Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning.
- Digital Electronics, S.K. Mandal, 2010, 1st edition, McGraw Hill
- Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	-	2	2	1	1
CO2	2	3	2	2	1	-	1	2
CO3	2	1	1	-	1	2	-	-
CO4	2	3	-	1	2	3	2	1

BPH 223: APPLIED OPTICS

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: To make the student understand the principles of Lasers and to enable the student to explore the field of Holography and Nonlinear optics.

Course outcomes:

CO1: The student should have had knowledge on the different types of lasers.

CO2: The student should have understood the basics of nonlinear optics.

CO3: students will understand interference.

CO4: Students will learn about working of lasers.

Unit-I: Fiber Optics (11 lectures)

Optical fiber modes and configuration, fiber types, Ray optics, representation, Wave equation for Step index fiber, Model equation, modes in step index fiber, Fiber Material fabrication attenuation, Absorption, Scattering losses. Radiative losses, Core & Cladding Losses, Material Dispersion, Wave Guide Dispersion.

Unit II: Basic Laser Theory & Laser Systems (10 lectures)

Historical background of laser, Einstein coefficients and stimulated light amplification: population inversion, creation of population inversion in three level & four level lasers. Gas Laser: CO2 laser, Solid State Laser: Host material and its characteristics, doped ions, Nd: YAG laser. Liquid laser: Dye laser, Semiconductor laser.

Unit III: Laser Beam Propagation (10 lectures)

Laser beam propagation, properties of Gaussian beam, resonator, stability, various types of resonators, resonator for high gain and high energy lasers, Gaussian beam focusing. Concept of

spatial frequency filtering. Fourier transforming property of a thin lens.

Unit IV: Nonlinear Optics & Fourier Optics (10 lectures)

Origin of nonlinearity, susceptibility tensor, phase matching, second harmonic generation, methods of enhancement, frequency mixing processes. nonlinear optical materials.

Unit V: Holography (8 lectures)

Importance of coherence, resolution, types of hologram, white light reflection, hologram, Principle of holography and characteristics, Recording and reconstruction, classification of hologram and application, non-destructive testing.

Reference Book:

- Principles of lasers- O Svelto
- Solid State Laser Engineering- W Koechner
- Laser- B A Labgyel
- Gas laser- A J Boom
- Methods of Experimental Physics Vol. 15B ed. By C L Tang
- Industrial Application of Lasers – J F Ready
- Handbook of Nonlinear Optics- R L Sautherland

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	2	2	2	1	1
CO2	1	-	1	-	1	-	1	-
CO3	1	3	-	3	1	2	-	-
CO4	2	-	-	-	2	1	2	-

BPH-224: ELEMENTS OF MODERN PHYSICS

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: Students will apply understanding and skill related to the principles and concepts of modern physics essential for graduate school and/or professional employment in the field.

Course outcomes:

CO1:Demonstrated ability to solve relativity of space and time problems.

CO2:Demonstrated ability to solve relativistic mass, energy, and momentum problems.

CO3:Demonstrated ability to solve problems involving the quantization of mass, charge, light, and energy including Avogadro's number, black-body radiation, photoelectric effect, and Compton scattering.

CO4: Described various models of the atom and explained why each was proposed and rejected except for the quantum model.

Unit I: Basics of quantum physics (10 Lectures)

Planck's quantum, Planck's constant and light as a collection of photons; Blackbody Radiation: Quantum theory of Light; Photo-electric effect and Compton scattering. De Broglie wavelength and matter waves., Davisson-Germer experiment. Wave description of particles by wave packets. Group and Phase velocities and relation between them. Two-Slit experiment with electrons. Probability. Wave amplitude and wave functions.

Unit II : Quantum physics (10 Lectures)

Position measurement- gamma ray microscope thought experiment; Wave-particle duality, Heisenberg uncertainty principle (Uncertainty relations involving Canonical pair of variables): Derivation from Wave Packets impossibility of a particle following a trajectory; Estimating minimum energy of a confined particle using uncertainty principle; Energy-time uncertainty principle- application to virtual particles and range of an interaction Two slit interference experiment with photons, atoms and particles; linear superposition principle as a consequence; Matter waves and wave amplitude.

Unit III: Quantum physics (10 Lectures)

Schrodinger equation for non-relativistic particles; Momentum and Energy operators; stationary states; physical interpretation of a wave function, probabilities and normalization; Probability and probability current densities in one dimension.

One dimensional infinitely rigid box- energy eigenvalues and eigenfunctions, normalization; Quantum dot as example. Quantum mechanical scattering and tunnelling in one dimension- across a step potential & rectangular potential barrier.

Unit IV: (15 Lectures)

Size and structure of atomic nucleus and its relationship with atomic weight; Impossibility of an electron being in the nucleus as a consequence of the uncertainty principle. Nature of nuclear force, NZ graph, Liquid Drop model: semi -empirical mass formula and binding energy, Nuclear Shell Model, and magic numbers

Radioactivity: stability of the nucleus; Law of radioactive decay; Mean life and half-life; Alpha decay; Beta decay- energy released, spectrum, Gamma ray emission, energy-momentum conservation: electron-positron pair creation by gamma photons in the vicinity of a nucleus.

Unit V: Fission and fusion (9 Lectures)

Mass deficit, relativity and generation of energy; Fission - nature of fragments and emission of neutrons. Nuclear reactor: slow neutrons interacting with Uranium 235; Fusion and thermonuclear reactions driving stellar energy (brief qualitative discussions).

Lasers: Einstein's A and B coefficients. Metastable states. Spontaneous and Stimulated emissions. Optical Pumping and Population Inversion. Three-Level and Four-Level Lasers. Ruby Laser and He-Ne Laser. Basic lasing.

Reference Books:

- Concepts of Modern Physics, Arthur Beiser, 2002, McGraw-Hill.
- Introduction to Modern Physics, Rich Meyer, Kennard, Coop, 2002, Tata McGraw Hill
- Introduction to Quantum Mechanics, David J. Griffith, 2005, Pearson Education.
- Physics for scientists and Engineers with Modern Physics, Jewett and Serway, 2010, Cengage Learning.
- Modern Physics, G. and G.R. Pickrell, 2014, McGraw Hill.
- Quantum Mechanics: Theory & Applications, A. K. Ghatak & S. Lokanathan, 2004, Macmillan

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	2	2	2	1	1
CO2	2	-	1	-	3	2	1	-
CO3	1	2	-	1	1	2	-	-
CO4	1	3	-	-	2	1	-	-

BPH-225: ANALOG SYSTEM AND APPLICATIONS

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: Ability to apply knowledge of mathematics, science and engineering to the solution of complex engineering problems Strong b Ability to design and conduct experiments, analyze, interpret data and synthesize valid conclusions.

Course outcomes:

CO1:students will understand semiconductor physics

CO2:students will know about p-n junction diode

CO3:students will understand the drift velocity concept

CO4:students will understand about transistors

Unit I: Semiconductor Diodes (10lectures)

P and N type semiconductors. Energy Level Diagram. Conductivity and Mobility, Concept of Drift velocity. PN Junction Fabrication (Simple Idea). Barrier Formation in PN Junction Diode. Static and Dynamic Resistance. Current Flow Mechanism in Forward and Reverse Biased Diode. Drift Velocity. Derivation for Barrier Potential, Barrier Width and Current for Step Junction. Current Flow Mechanism in Forward and Reverse Biased Diode.

Unit II: Two-terminal Devices and their Applications (12lectures)

(1) Rectifier Diode: Half-wave Rectifiers. Centre-tapped and Bridge Full-wave Rectifiers, Calculation of Ripple Factor and Rectification Efficiency, C-filter (2) Zener Diode and Voltage Regulation . Principle and structure of (1) LEDs, (2) Photodiode and (3) Solar Cell. Bipolar Junction transistors: n-p-n and p-n-p Transistors. Characteristics of CB,CE and CC Configurations. Current gains α and β Relations between α and β. Load Line analysis of Transistors. DC Load line and Q-point. Physical Mechanism of Current Flow. Active, Cutoff and Saturation Regions.

Unit III: Amplifiers-I (10 lecturers)

Transistor Biasing and Stabilization Circuits. Fixed Bias and Voltage Divider Bias. Transistor as 2-port Network. h-parameter Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance. Current, Voltage and Power Gains. Classification of Class A, B & C Amplifiers.

Unit IV: Amplifiers-II (10 Lectures)

Sinusoidal Oscillators: Barkhausen's Criterion for self-sustained oscillations. RC Phase shift oscillator, determination of Frequency. Hartley & Colpitts oscillators. Operational Amplifiers (Black Box approach): Characteristics of an Ideal and Practical Op-Amp. (IC 741) Open-loop and Closed-loop Gain. Frequency Response. CMRR. Slew Rate and concept of Virtual ground.

Unit V: Applications of Op-Amps (12 Lectures) (1) Inverting and non-inverting amplifiers, (2) Adder, (3) Subtractor, (4) Differentiator, (5) Integrator, (6) Log amplifier, (7) Zero crossing detector (8) Wein bridge oscillator.

Conversion: Resistive network (Weighted and R-2R Ladder). Accuracy and Resolution. A/D Conversion (successive approximation)

Reference Books:

- Integrated Electronics, J. Millman and C.C. Halkias, 1991, Tata Mc-Graw Hill.
- Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.
- Solid State Electronic Devices, B.G. Streetman & S.K. Banerjee, 6th Edn.,2009, PHI Learning
- Electronic Devices & circuits, S. Salivahanan & N.S. Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill
- OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall 2 9
- Microelectronic circuits, A.S. Sedra, K.C. Smith, A.N. Chandorkar, 2014, 6thEdn., Oxford University Press.
- Electronic circuits: Handbook of design & applications, U.Tietze, C.Schenk,2008, Springer
- Semiconductor Devices: Physics and Technology, S.M. Sze, 2nd Ed., 2002, Wiley India
- Microelectronic Circuits, M.H. Rashid, 2nd Edition, Cengage Learning
- Electronic Devices, 7/e Thomas L. Floyd, 2008, Pearson India

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	2	-	1	2	3	1	1
CO2	2	2	1	-	1	2	1	-
CO3	1	1	-	1	1	2	-	-
CO4	2	1	-	-	2	3	-	-

BPH-271:DIGITAL SYSTEM AND APPLICATION LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

Objectives: Students will be able to explain the elements of digital system abstractions such as digital representations of information, digital logic, Boolean algebra.

Course outcomes:-

CO1: Create the appropriate truth table from a description of a combinational logic function.

CO2: Describe the operation and timing constraints for latches and registers.

CO3: Create a state transition diagram from a description of a sequential logic function and then convert the diagram into an implementation of a finite-state machine with the appropriate combinational and sequential components.

CO4: Describe the operation and timing constraints for latches and registers.

1. To measure (a) Voltage, and (b) Time period of a periodic waveform using CRO.
2. To test a Diode and Transistor using a Multimeter.
3. To design a switch (NOT gate) using a transistor.
4. To verify and design AND, OR, NOT and XOR gates using NAND gates.
5. To design a combinational logic system for a specified Truth Table.
6. To convert a Boolean expression into logic circuit and design it using logic gate ICs.
7. To minimize a given logic circuit.
8. Half Adder, Full Adder and 4-bit binary Adder.
9. Half Subtractor, Full Subtractor, Adder-Subtractor using Full Adder I.C.
10. To build Flip-Flop (RS, Clocked RS, D-type and JK) circuits using NAND gates.
11. To build JK Master-slave flip-flop using Flip-Flop ICs

12. To build a 4-bit Counter using D-type/JK Flip-Flop ICs and study timing diagram.
13. To make a 4-bit Shift Register (serial and parallel) using D-type/JK Flip-Flop ICs.
14. To design an astable multivibrator of given specifications using 555 Timer.
15. To design a monostable multivibrator of given specifications using 555 Timer.
16. Write the following programs using 8085 Microprocessor

    a) Addition and subtraction of numbers using direct addressing mode

    b) Addition and subtraction of numbers using indirect addressing mode

    c) Multiplication by repeated addition.

    d) Division by repeated subtraction.

    e) Handling of 16-bit Numbers.

    f) Use of CALL and RETURN Instruction.

    g) Block data handling.

    h) Other programs (e.g. Parity Check, using interrupts, etc.).

Note: Each students is required to perform at least seven experiments

REFERENCE BOOKS

- Modern Digital Electronics, R.P. Jain, 4th Edition, 2010, Tata McGraw Hill.
- Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc-Graw Hill.
- Microprocessor Architecture Programming and applications with 8085, R.S. Goankar, 2002, Prentice Hall.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	2	-	1	2	3	1	1
CO2	2	2	1	-	1	2	1	-
CO3	1	1	-	1	1	2	-	-
CO4	2	1	-	-	2	3	-	-

BPH-274:ELEMENTS OF MODERN PHYSICS LAB

L-0, T-0 P-4 Credits–2 Max Marks:100

Objective: the aim of this lab is to familiarize students with various experiments involved in modern physics

Course outcomes:

CO1: student will learn about photoelectric effect

CO2: understand the work function of materials

CO3: calculate planck's constant

CO4: calculate e/m ratio

1. Measurement of Planck's constant using black body radiation and photo-detector.
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light.
3. To determine work function of material of filament of directly heated vacuum diode.
4. To determine the Planck's constant using LEDs of at least 4 different colours.
5. To determine the wavelength of H-alpha emission line of Hydrogen atom.
6. To determine the ionization potential of mercury.
7. To determine the absorption lines in the rotational spectrum of Iodine vapour.
8. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
9. To setup the Millikan oil drop apparatus and determine the charge of an electron.
10. To show the tunneling effect in tunnel diode using I-V characteristics.
11. To determine the wavelength of laser source using diffraction of single slit.
12. To determine the wavelength of laser source using diffraction of double slits.
13. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating

Note: Each student is required to perform at least seven experiments

Reference Books

- Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
- A Text Book of Practical Physics, I.Prakash& Ramakrishna, 11thEdn, 2011,Kitab Mahal

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	-	2	2	1	1
CO2	1	3	1	1	1	2	1	-
CO3	1	1	-	-	2	2	-	-
CO4	2	3	-	2	2	1	-	3

BPH-275:ANALOG SYSTEM AND APPLICATION LAB

L-0, T-0 P-4 Credits–4 Max Marks: 100

Objective: aim of this lab is to study electrical parameters

Course outcomes:

CO1: study of p-n junction diode and light emitting diode

CO2: understand the zener diode mechanism

CO3: learn about transistors

CO4: study about operational amplifiers

1. To study V-I characteristics of PN junction diode, and Light emitting diode.
2. To study the V-I characteristics of a Zener diode and its use as voltage regulator.
3. Study of V-I & power curves of solar cells, and find maximum power point & efficiency.
4. To study the characteristics of a Bipolar Junction Transistor in CE configuration.
5. To study the various biasing configurations of BJT for normal class A operation.
6. To design a CE transistor amplifier of a given gain (mid-gain) using voltage divider bias.
7. To study the frequency response of voltage gain of a RC-coupled transistor amplifier.
8. To design a Wien bridge oscillator for given frequency using an op-amp.
9. To design a phase shift oscillator of given specifications using BJT.
10. To study the Colpitt`s oscillator.
11. To design a digital to analog converter (DAC) of given specifications.
12. To study the analog to digital convertor (ADC) IC.
13. To design an inverting amplifier using Op-amp (741,351) for dc voltage of given gain
14. To design inverting amplifier using Op-amp (741,351) and study its frequency response
15. To design non-inverting amplifier using Op-amp (741,351) & study its frequency response
16. To study the zero-crossing detector and comparator.
17. To add two dc voltages using Op-amp in inverting and non-inverting mode
18. To design a precision Differential amplifier of given I/O specification using Op-amp.
19. To investigate the use of an op-amp as an Integrator.

20. To investigate the use of an op-amp as a Differentiator.

Note: Each students is required to perform at least seven experiments

Reference Books:

- Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc-Graw Hill.
- OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall.
- Electronic Principle, Albert Malvino, 2008, Tata Mc-Graw Hill.
- Electronic Devices & circuit Theory, R.L. Boylestad & L.D. Nashelsky, 2009, Pearson

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	-	2	2	3	3
CO2	1	3	1	-	1	2	1	-
CO3	1	3	3	-	2	2	-	-
CO4	2	3	-	-	2	1	1	-

Semester IV

BPH-223:MATHEMATICAL PHYSICS – III

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: The course aims to demonstrate the utility and limitations of a variety of powerful calculation techniques and to provide a deeper understanding of the mathematics underpinning theoretical physics.

Course outcomes:

CO1:define and derive convergent and asymptotic series.

CO2:apply techniques of complex analysis, such as contour integrals and analytic continuation, to the study of special functions of mathematical physics.

CO3:calculate approximations to integrals by appropriate saddle point methods.

CO4:define and manipulate the Dirac Delta and other distributions and be able to derive their various properties.

Unit-I: Complex Analysis I (15 Lectures)

Brief Revision of Complex Numbers and their Graphical Representation. Euler's formula, De Moivre's theorem, Roots of Complex Numbers. Functions of Complex Variables. Analyticity and Cauchy-Riemann Conditions. Examples of analytic functions. Singular functions: poles and branch points, order of singularity, branch cuts.

Unit II: Complex Analysis II (10 lectures)

Integration of a function of a complex variable. Cauchy's Inequality. Cauchy’s Integral formula. Simply and multiply connected region. Laurent and Taylor’s expansion. Residues and Residue Theorem. Application in solving Definite Integrals.

Unit III: Integral Transforms I (12 lectures)

Fourier Transforms: Fourier Integral theorem. Fourier Transform. Examples. Fourier transform of trigonometric, Gaussian, finite wave train & other functions. Representation of Dirac delta function as a Fourier Integral. Fourier transform of derivatives. Inverse

Fourier transform, Convolution theorem.

Unit IV Integral transforms II (10 lectures)

Properties of Fourier transforms (translation, change of scale, complex conjugation, etc.).Three dimensional Fourier transforms with examples. Application of Fourier Transforms to differential equations: One dimensional Wave and Diffusion/Heat Flow Equations. Laplace Transforms: Laplace Transform (LT) of Elementary functions. Properties of LTs: Change of Scale Theorem, Shifting Theorem. .

Unit V Laplace Transform (10 lectures)

LTs of 1^{st} and 2^{nd} order Derivatives and Integrals of Functions, Derivatives and Integrals of LTs. LT of Unit Step function, Dirac Delta function, Periodic Functions. Convolution Theorem. Inverse LT. Application of Laplace Transforms to 2^{nd} order Differential Equations: Damped Harmonic Oscillator, Simple Electrical Circuits, Coupled differential equations of 1^{st} order. Solution of heat flow along infinite bar using Laplace transform.

Reference Books:

- Mathematical Methods for Physics and Engineers, K.F Riley, M.P. Hobson and S. J. Bence, 3^{rd} ed., 2006, Cambridge University Press
- Mathematics for Physicists, P. Dennery and A. Krzywicki, 1967, Dover Publications
- Complex Variables, A.S. Fokas& M.J. Ablowitz, 8^{th} Ed., 2011, Cambridge Univ. Press
- Complex Variables, A.K. Kapoor, 2014, Cambridge Univ. Press
- Complex Variables and Applications, J.W. Brown & R.V. Churchill, 7^{th} Ed. 2003, Tata McGraw-Hill
- First course in complex analysis with applications, D.G. Zill and P.D. Shanahan, 1940, Jones & Bartlett

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	-	2	2	1	1
CO2	2	1	1	2	1	2	1	-
CO3	2	3	3	-	1	3	-	-
CO4	2	3	-	-	2	1	-	-

BPH-227: QUANTUM MECHANICS AND APPLICATIONS

L-3, T-1, P-0 Credits–4 Max Marks: 100

Objective:- This course develops concepts in quantum mechanics such that the behavior of the physical universe can be understood from a fundamental point of view. It provides a basis for further study of quantum mechanics. Content will include: Review of the Schrodinger equation, operators, eigenfunctions, compatible observables, infinite well in one and three dimensions, degeneracy; Fourier methods and momentum space; Hermiticity; scalar products of wave functions, completeness relations, matrix mechanics; harmonic oscillator in one and three dimensions; sudden approximation; central potentials, quantization of angular momentum, separation of radial and angular variables, spherical harmonics, hydrogen atom, spin.

Course Outcome

CO1: Pinpoint the historical aspects of development of quantum mechanics.

CO2: Understand and explain the differences between classical and quantum mechanics.
CO3**:** Understand the idea of wave function and the uncertainty relations.
CO4: Solve Schrodinger equation for simple potentials. Identify and relate the eigenvalue problems for energy, momentum, angular momentum, and central potentials explain the idea of spin.

Unit-I: Time dependent Schrodinger equation (10 lectures)

Time dependent Schrodinger equation and dynamical evolution of a quantum state; Properties of Wave Function. Interpretation of Wave Function Probability and probability current densities in three dimensions; Conditions for Physical Acceptability of Wave Functions. Normalization. Linearity and Superposition Principles. Eigenvalues and Eigenfunctions. Position, momentum, and Energy operators; commutator of position and momentum operators; Expectation values of position and momentum. Wave Function of a Free Particle.

Unit-II: Time independent Schrodinger equation (10 Lectures)

Hamiltonian, stationary states and energy eigenvalues; expansion of an arbitrary wavefunction as a linear combination of energy eigenfunctions; General solution of the time dependent Schrodinger equation in terms of linear combinations of stationary states; Application to spread of Gaussian wave-packet for a free particle in one dimension; wave packets, Fourier transforms and momentum space wavefunction; Position-momentum uncertainty principle.

Unit-III: General discussion of bound states in an arbitrary potential (10 Lectures)

Continuity of wave function, boundary condition and emergence of discrete energy levels; application to one-dimensional problem-square well potential; Quantum mechanics of simple harmonic oscillator-energy levels and energy eigenfunctions using Frobenius method; Hermite polynomials; ground state, zero-point energy & uncertainty principle.

Unit-IV: Quantum theory of Hydrogen-like atoms (12 Lectures)

Time independent Schrodinger equation in spherical polar coordinates; separation of variables for second order partial differential equation; angular momentum operator & quantum numbers; Radial wavefunctions from Frobenius method; shapes of the probability densities for ground & first excited states; Orbital angular momentum quantum numbers l and m, s, p, d, shells.

Many electron atoms: Pauli's Exclusion Principle. Symmetric &Antisymmetric Wave Functions. Periodic table. Fine structure. Spin orbit coupling. Spectral Notations for Atomic States. Total angular momentum. Vector Model. Spin-orbit coupling in atoms L-S and J-J couplings. Hund's Rule. Term symbols. Spectra of Hydrogen and Alkali Atoms (Na etc.).

Unit-V: Atoms in Electric & Magnetic Fields (9 Lectures)

Electron angular momentum. Space quantization. Electron Spin and Spin Angular Momentum. Larmor's Theorem. Spin Magnetic Moment. Stern-Gerlach Experiment. Zeeman Effect: Electron Magnetic Moment and Magnetic Energy, Gyromagnetic Ratio and Bohr Magneton.

Atoms in External Magnetic Fields: Normal and Anomalous Zeeman Effect. Paschen Back and Stark Effect (Qualitative Discussion only).

Reference Books:

- A Textbook of Quantum Mechanics, P.M. Mathews and K. Venkatesan, 2nd Ed., 2010, McGraw Hill.
- Quantum Mechanics, Robert Eisberg and Robert Resnick, 2nd Edn., 2002, Wiley.
- Quantum Mechanics, Leonard I. Schiff, 3rd Edn. 2010, Tata McGraw Hill.
- Quantum Mechanics, G. Aruldhas, 2nd Edn. 2002, PHI Learning of India.
- Quantum Mechanics, Bruce Cameron Reed, 2008, Jones and Bartlett Learning.
- Quantum Mechanics: Foundations & Applications, Arno Bohm, 3rd Edn., 1993, Springer
- Quantum Mechanics for Scientists & Engineers, D.A.B. Miller, 2008, Cambridge University Press

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	2	-	2	2	2	1	1
CO2	2	3	1	-	1	2	1	-
CO3	1	2	-	-	1	2	-	-
CO4	3	3	2	-	2	1	-	-

BPH-228: SOLID STATE PHYSICS

L-3, T-1, P-0 Credits–4 Max Marks: 100

Objectives:-The aim of this course is to give you an extended knowledge of the principles and techniques of solid-state physics. The course covers the physical understanding of matter from an atomic viewpoint. Topics covered include the structure, thermal and electrical properties of matter. Fundamental theories in solid state physics are introduced and then extended to show the irrelevance to important applications in current -day technology, industry, and research. The course has a theoretical lecture component and makes extensive use of examples and exercises to illustrate the material.

Course outcomes:

CO1: Students will be able to account for interatomic forces and bonds and have a basic knowledge of crystal systems and spatial symmetries**.**

CO2: Students will be able to account for how crystalline materials are studied using diffraction and be able to perform structure determination of simple structures.

CO3: Understand the concept of reciprocal space and significance of Brillouin zones**.**

CO4: Students will be understanding the fundamental principles of semiconductors, including pn-junctions, and be able to estimate the charge carrier mobility and density.

Unit-I: Crystal Structure (12 Lectures)

Solids: Amorphous and Crystalline Materials. Lattice Translation Vectors. Lattice with a Basis – Central and Non-Central Elements. Unit Cell. Miller Indices. Reciprocal Lattice. Types of Lattices. Brillouin Zones. Diffraction of X-rays by Crystals. Bragg's Law. Atomic and Geometrical Factor.

Unit-II: Elementary Lattice Dynamics (10 Lectures)

Lattice Vibrations and Phonons: Linear, Monoatomic and Diatomic Chains. Acoustical and Optical Phonons. Qualitative Description of the 34 Phonon Spectrum in Solids. Dulong and Petit's Law, Einstein, and Debye theories of specific heat of solids.

Unit-III: Properties of Matter (12 lectures)

Magnetic Properties: Dia-, Para-, Ferri- and Ferromagnetic Materials. Classical Langevin Theory of dia– and Paramagnetic Domains. Quantum Mechanical Treatment of Paramagnetism. Curie's law, Weiss's Theory of Ferromagnetism and Ferromagnetic Domains. Discussion of B-H Curve. Hysteresis and Energy Loss.; Dielectric Properties: Polarization. Local Electric Field

at an Atom. Depolarization Field. Electric Susceptibility. Polarizability. Clausius Mosotti Equation. Classical Theory of Electric Polarizability. Normal and Anomalous Dispersion. Cauchy and Sellmeir relations. Langevin-Debye equation. Complex Dielectric Constant. Optical Phenomena. Application: Plasma Oscillations, Plasma Frequency, Plasmons, TO modes. Ferroelectric Properties: Structural phase transition, Classification of crystals, Piezoelectric effect, Pyroelectric effect, Ferroelectric effect, Electrostrictive effect, Curie-Weiss Law, Ferroelectric domains, PE hysteresis loop.

U nit-IV: Elementary band theory (8 Lectures)

Kronig Penny model. Band Gap. Conductor, Semiconductor (P and N type) and insulator. Conductivity of Semiconductor, mobility, Hall Effect. Measurement of conductivity (04 probe method) & Hall coefficient.

Unit-V: Superconductivity (8 Lectures)

Experimental Results. Critical Temperature. Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth. Isotope effect. Idea of BCS theory (No derivation)

Reference Books:

- Introduction to Solid State Physics, Charles Kittel, 8th Edition, 2004, Wiley India Pvt. Ltd.
- Elements of Solid-State Physics, J.P. Srivastava, 4th Edition, 2015, Prentice-Hall of India.
- Introduction to Solids, Leonid V. Azaroff, 2004, Tata Mc-Graw Hill.
- Solid State Physics, N.W. Ashcroft and N.D. Mermin, 1976, Cengage Learning.
- Solid-state Physics, H. Ibach and H. Luth, 2009, Springer. Solid State Physics, Rita John, 2014, McGraw Hill.
- Elementary Solid-State Physics, 1/e M. Ali Omar, 1999, Pearson India.
- Solid State Physics, M.A. Wahab, 2011, Narosa Publications.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3	-	2	2	1	1
CO2	1	3	1	1	1	2	1	-
CO3	1	3	2	-	1	3	-	2
CO4	2	2	2	-	2	1	-	-

BPH-276:MATHEMATICAL PHYSICS-III LAB

L-0, T-0 P-4 Credits–2 Max Marks:100

Objectives: The aim of this lab is to familiarize students with mathematical physics tools along with programming skills.

Course outcomes:

CO1: students will learn to solve differential equations.

CO2:students will understand dirac delta functions.

CO3:students will learn to write equations in programs.

CO4:students will understand programming.

Experiments:

Scilab/C++ based simulations experiments based on Mathematical Physics problems like

Solve differential equations:

$dy/dx = e^{-x}$ with $y = 0$ for $x = 0$
$dy/dx + e^{-x}y = x^2$
$d^2y/dt^2 + 2\,dy/dt = -y$
$d^2y/dt^2 + e^{-t}dy/dt = -y$

Dirac Delta Function, Evaluate

$$\frac{1}{\sqrt{2\pi\sigma^2}}\int e^{\frac{-(x-2)^2}{2\sigma^2}}(x+3)dx, \quad \text{for } \sigma = 1,\ 0.1,\ 0.01$$

and show it tends to 5.

3. Fourier Series:

Program to sum $\sum_{n=1}^{\infty}(0.2)^n$

Evaluate the Fourier coefficients of a given periodic function (square wave)

4. Frobenius method and Special functions:

$$\int_{-1}^{+1} P_n(\mu) P_m(\mu) d\mu = \delta_{n,m}$$

Plot $P_n(x)$, $j_v(x)$

Show recursion relation.

5. Calculation of error for each data point of observations recorded in experiments done in previous semesters (choose any two).

6. Calculation of least square fitting manually without giving weightage to error. Confirmation of least square fitting of data through computer program.

7. Evaluation of trigonometric functions e.g. *sinθ,* Given Bessel's function at N

points find its value at an intermediate point. Complex analysis: Integrate $1/(x^2+2)$ numerically and check with computer integration.

8. Compute the n^{th} roots of unity for n = 2, 3, and 4.

9. Find the two square roots of $-5+12j$.

10. Integral transform: FFT of

11. Solve Kirchoff's Current law for any node of an arbitrary circuit using Laplace's transform.

12. Solve Kirchoff's Voltage law for any loop of an arbitrary circuit using Laplace's transform.

13. Perform circuit analysis of a general LCR circuit using Laplace's transform.

Note: Each student is required to perform at least seven experiments

Reference Books:

- Mathematical Methods for Physics and Engineers, K.F Riley, M.P. Hobson and S. J. Bence, 3rd ed., 2006, Cambridge University Press

- Mathematics for Physicists, P. Dennery and A. Krzywicki, 1967, Dover Publications
- Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific and Engineering Applications: A. Vande Wouwer, P. Saucez, C. V. Fernández. 2014 Springer ISBN: 978-3319067896
- A Guide to MATLAB, B.R. Hunt, R.L. Lipsman, J.M. Rosenberg, 2014, 3rdEdn., Cambridge University Press
- Scilab by example: M. Affouf, 2012. ISBN: 978-1479203444
- Scilab (A free software to Matlab): H. Ramchandran, A.S. Nair. 2011 S.Chand & Company
- Scilab Image Processing: Lambert M. Surhone. 2010 Betascript Publishing
- https://web.stanford.edu/~boyd/ee102/laplace_ckts.pdf
- ocw.nthu.edu.tw/ocw/upload/12/244/12handout.pdf

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	1	2	2	1	1
CO2	1	2	1	1	1	3	1	-
CO3	1	3	1	-	1	2	-	-
CO4	2	3	-	2	2	1	-	-

BPH-277-QUANTUM MECHANICS AND APPLICATION LAB

L-0, T-0, P-4 Credits–2 Max Marks: 100

Objective:-Use C/C++/Scilab for solving the following problems based on Quantum Mechanics like

Course outcomes:
CO1:Students will demonstrate proficiency in Quantum Mechanics and related application needed for a proper understanding of physics.
CO2:Students will be able to demonstrate knowledge of Quantum mechanics be able to apply this knowledge to analyze a variety of physical phenomena.
CO3: Students will show that they have learned laboratory skills, enabling them to take measurements in a physics laboratory and analyze the measurements to draw valid conclusions.
CO4:Students will be able to Use C/C++/Scilab for solving the following problems based on Quantum Mechanics like.

1. Solve the s-wave Schrodinger equation for the ground state and the first excited state of the hydrogen atom:

$$\frac{d^2y}{dr^2} = A(r)u(r), \quad A(r) = \frac{2m}{h^2}V(r) - E \text{ where } V(r) = \frac{e^2}{r}$$

Here, m is the reduced mass of the electron. Obtain the energy eigenvalues and plot the corresponding wavefunctions. Remember that the ground state energy of the hydrogen atom is -13.6 eV. Take e = 3.795 $(eVÅ)^{1/2}$, ħc = 1973 (eVÅ) and m = 0.511x106 eV/c^2 .

2. Solve the s-wave radial Schrodinger equation for an atom:

$$\frac{d^2y}{dr^2} = A(r)u(r), \quad A(r) = \frac{2m}{h^2}V(r) - E$$

where m is the reduced mass of the system (which can be chosen to be the mass of an electron), for the screened coulomb potential.

$$V(r) = \frac{e^2}{r} e^{-r/a}$$

Find the energy (in eV) of the ground state of the atom to an accuracy of three significant digits. Also, plot the corresponding wavefunction. Take e = 3.795 $(eVÅ)^{1/2}$, m = 0.511x106 eV/c^2 , and a = 3 Å, 5 Å, 7 Å. In these units ħc = 1973 (eVÅ). The ground state energy is expected to be above -12 eV in all three cases.

3. Solve the s-wave radial Schrodinger equation for a particle of mass

$$m\frac{d^2y}{dx^2} = A(r)u(r), A(r) = \frac{2m}{h^2}V(r) - E$$

For the anharmonic oscillator potential

$$V(r) = \frac{1}{2}kr^2 + \frac{1}{3}br^3$$

for the ground state energy (in MeV) of particle to an accuracy of three significant digits. Also, plot the corresponding wave function. Choose m = 940 MeV/c^2 , k = 100 33 MeV fm^{-2}, b = 0, 10, 30 MeV fm^{-3} .In these units, cħ = 197.3 MeV fm. The ground state energy I expected to lie between 90 and 110 MeV for all three cases.

4. Solve the s-wave radial Schrodinger equation for the vibrations of hydrogen

$$\frac{d^2y}{dx^2} = A(r)u(r), \qquad A(r) = \frac{2m}{h^2}V(r) - E$$

Where m is the reduced mass of the two-atom system for the Morse potential.

$$V(r) = D(e^{-2r} - e^{-r}), r = \frac{r - r_0}{r}$$

Find the lowest vibrational energy (in MeV) of the molecule to an accuracy of three significant digits. Also plot the corresponding wave function. Take: m = 940x106 eV/C^2 , D = 0.755501 eV, α = 1.44, r_o = 0.131349 Å

Laboratory based experiments:

5. Study of Electron spin resonance- determine magnetic field as a function of the resonance frequency.
6. Study of Zeeman effect: with external magnetic field; Hyperfine splitting
7. To show the tunneling effect in tunnel diode using I-V characteristics.
8. Quantum efficiency of CCDs.

NOTE: Each student is required to perform at least five experiments.

Reference Books:

- Schaum's outline of Programming with C++.J. Hubbard, 2000,McGraw-Hill Publication
- Numerical Recipes in C: The Art of Scientific Computing, W.H. Pressetal., 3rd Edn., 2007, Cambridge University Press.
- An introduction to computational Physics, T.Pang, 2nd Edn.,2006, Cambridge Univ. Press
- Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific & Engineering Applications: A. VandeWouwer, P. Saucez, C. V. Fernández.2014 Springer.
- Scilab (A Free Software to Matlab): H. Ramchandran, A.S. Nair. 2011 S. Chand & Co.
- A Guide to MATLAB, B.R. Hunt, R.L. Lipsman, J.M. Rosenberg, 2014, 3rd Edn., Cambridge University Press.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	2	2	3	1	1
CO2	1	2	1	-	1	2	1	-
CO3	1	3	-	2	1	-	-	-
CO4	2	2	3	-	2	1	-	3

BPH-278: SOLID STATE PHYSICS LAB

L-0, T-0, P-4 Credits–2 Max Marks: 100

Objectives:- The aim of this course is to give you an extended practical knowledge of the principles and techniques of solid-state physics. The course covers the physical understanding of matter from an atomic viewpoint.

Course outcomes:

CO1: Students will be understanding the practical knowledge of various aspects of magnetism.

CO2: Students will be to calculate the magnetic susceptibility of different magnetic materials.

CO3: Understand the concept of PE loop and Hysteresis loop and difference between these two.

CO4: Students will be able to calculate the resistivity and hall coefficient value.

1. Measurement of susceptibility of paramagnetic solution (Quinck`s Tube Method).

2. To measure the Magnetic susceptibility of Solids.

3. To determine the Coupling Coefficient of a Piezoelectric crystal.

4. To measure the Dielectric Constant of a dielectric Materials with frequency

5. To determine the complex dielectric constant and plasma frequency of metal using Surface Plasmon resonance (SPR)

6. To determine the refractive index of a dielectric layer using SPR

7. To study the PE Hysteresis loop of a Ferroelectric Crystal.

8. To draw the BH curve of Fe using Solenoid & determine energy loss from Hysteresis.

9. To measure the resistivity of a semiconductor (Ge) with temperature by four-probe method (room temperature to 150 ^{0}C) and to determine its band gap.

10. To determine the Hall coefficient of a semiconductor sample.

Note: Each student is required to perform at least five experiments.

Reference Books :

- Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
- A Textbook of Practical Physics, I. Prakash& Ramakrishna, 11th Ed., 2011, Kitab Mahal
- Elements of Solid-State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice-Hall of India.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	2	-	2	2	2	1	1
CO2	2	-	1	-	1	2	1	-
CO3	1	3	2	1	1	2	-	-
CO4	2	-	3	-	2	1	-	-

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SEMESTER-V

BPH-322: PHYSICS OF DEVICE AND COMMUNICATION

L-4, T-0, P-0 Credits–4 Max Marks: 100

Objectives: To understand the basic working of Electronic devices and Linear Integrated Circuits. To give an emphasis to the student to know the various semiconductor devices and its working. To give clear understanding of various fabrication techniques of electronic devices. To introduce the basic building blocks of linear integrated circuits.

Course outcomes:

CO1:Students will be able to understand the fundamentals of Electronics Device Physics.

CO2:Students will understand the physical principles crucial to the functionality and operation of basic semiconductor devices.

CO3: Students will enrich their knowledge in understanding the linear and non-linear applications of operational amplifiers.

CO4:Students will gain the knowledge of industrial instruments and fundaments of Electronics.

Unit I: Measurement Science (10 Lectures)

Static characteristics of measuring instruments - accuracy, precision sensitivity, non-linerarity, hysteresis - dynamic characteristics - I order and II order instruments - Standards and calibration-errors and error analysis

Unit II: Transducers (10 Lectures)

Variable resistance transducers - potentiometer, strain gauge RTD, thermistor, hygrometer-Variable inductance transducers - LVDT - variable relectance accelerometer – variable capacitance transducers for differential pressure, sound, and thickness measurement-piezoelectric transducer – smart transducers.

Unit III: Industrial Instruments (10 Lectures)

Temperature measurement - thermocouples, cold-junction compensation for thermocouple, radiation and optical pyrometers - pressure measurements - bourdon gauge, bellows, diaphragme, differential pressure transmitter, vacum gauges, melead gauge, pirani gauge-flow measurement-office meter, venturimeter, electro-magnetic flow meter, ultrasonic flow meter, rotameter positive displacement meters, mass flowmeters.

Unit IV: Fundamentals of Networks (10 Lectures)

Dc And Ac Series And Parallel Circuits - Kirchhoffs Law - Network Graph – Matrix Representation- Solution Of Steady State, equations - transients in AC networks-frequency response of RL, RC, RIC series and parallel circuits.

Unit V: Fundamentals Electronics and Bio-Medical Measurements (10 Lectures)

Electronics Instruments: BJT, FET and MOSFET voltmerters - solid state multimeter - DMM - audio and Radio frequency signal generators - AM signal generator. Bio-Medical Instruments: Measurement of biological signals - ECG,EEG, EMG - blood pressure and blood flow measurements-defibrillators-pace maker.

Reference Books:

- Electrical Measurements and Measuring Instruments By S. Kamakshaiah, J. Amarnath, Krishna Murthy, Published by I K International Publishing House Pvt. Ltd, 2011.
- Helfrick and Cooper, "Modern Electronic Instrumentation and
- Jones, B.E., "Instrumentation Measurement and Feedback", Tata McGraw-Hill, 1986.
- Golding, E.W., "Electrical Measurement and Measuring Instruments", 3rd Edition, Sir
- Issac Pitman and Sons, 1960.
- Buckingham, H. and Price, E.N., "Principles of Electrical Measurements", 1961.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	2	2	2	1	1
CO2	-	2	1	-	1	2	1	-
CO3	1	3	-	3	1	2	-	2
CO4	2	2	-	-	2	1	-	3

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BPH-323: NUCLEAR AND PARTICLE PHYSICS

L-3, T-1, P-0 Credits–4 Max Marks: 100

Objectives: Introduce students to the fundamental principles and concepts governing nuclear and particle physics and have a working knowledge of their application to real-life problems. Provide students with opportunities to develop basic knowledge and understanding of scientific phenomena, facts, laws, definitions, concepts, theories, scientific vocabulary, terminology, conventions, scientific quantities and their determination.

Course outcomes:

CO1:Understand the fundamental principles and concepts governing classical nuclear and particle physics and have a working knowledge of their application to real-life problems.

CO2:Demonstrate knowledge and understanding of scientific phenomena, facts, laws, definitions, concepts, theories, scientific vocabulary, terminology, conventions.

CO3: Students will understand scientific quantities and their determination, order-of-magnitude estimates, scientific and technological applications as well as their social, economic, and environmental implications.

CO4:Demonstrate comprehension of physical reality through estimation, approximation, and mathematical modeling, and understand how a small number of fundamental physical principles underlie a huge variety of interconnected natural phenomena.

Unit I: Structure of Nuclei and Radioactivity (12 Lectures)

Basic Properties of Nuclei: (1) Mass, (2) Radii, (3) Charge, (4) Angular Momentum, (5) Spin, (5) Magnetic Moment (μ), (6) Stability and (7) Binding Energy.

Radioactivity: Law of Radioactive Decay. Half-life, Theory of Successive Radioactive

Transformations. Radioactive Series, Binding Energy, Mass Formula. α-decay :- Range of α-particles, Geiger-Nuttal law and α-particle Spectra. Gamow Theory of Alpha Decay, β-decay. Energy Spectra and Neutrino Hypothesis, γ-decay :- Origin of γ-rays, Nuclear Isomerism, and Internal Conversion.

Unit II: Nuclear Reactions(10 Lectures)

Types of Reactions and Conservation Laws. Concept of Compound and Direct Reaction. Compound Nucleus. Scattering Problem in One Dimension : Reflection and Transmission by a Finite Potential Step. Stationary Solutions, Attractive and Repulsive Potential Barriers, Scattering Cross-section. Reaction Rate. Q-value of Reaction. Fission and Fusion.

Unit III: Nuclear Models and Accelerators(8 Lectures)

Liquid Drop Model. Mass formula. Shell Model. Meson Theory of Nuclear Forces and Discovery of Pion. Van de Graaff Generator, Linear Accelerator, Cyclotron, Betatron.

Unit IV: Detectors of Nuclear Radiations(8 Lectures)

Interaction of Energetic particles with matter. Ionization chamber. GM Counter. Cloud Chambers. Wilson Cloud Chamber. Bubble Chamber. Scintillation Detectors. Semiconductor Detectors (Qualitative Discussion Only).

Unit V: Elementary Particles(12 Lectures)

Cosmic Rays :- Nature and Properties, Fundamental Interactions, Classification of Elementary Particles. Particles and Antiparticles. Baryons, Hyperons, Leptons, and Mesons. Elementary Particle Quantum Numbers : Baryon Number,

Lepton Number, Strangeness, Electric Charge, Hypercharge and Isospin0. Conservation Laws and Symmetry. Different Types of Quarks and Quark Contents of Spin ½ Baryons. Photons.

Reference Books:

- Concepts of Modern Physics by Arthur Beiser (McGraw-Hill Book Company, 1987)
- Concepts of nuclear physics by Bernard L.Cohen.(New Delhi: Tata Mcgraw Hill, 1998).
- Introduction to the physics of nuclei and particles by R.A. Dunlap.(Singapore: Thomson Asia, 2004).
- Nuclear physics by Irving Kaplan. (Oxford & IBH, 1962).
- Introductory nuclear physics by Kenneth S. Krane.(John Wiley & Sons, 1988)

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	2	3	-	2	2	3	1
CO2	2	1	1	2	1	3	1	-
CO3	2	2	-	1	1	2	-	3
CO4	3	1	2	-	2	1	-	-

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BPH-324:ELECTROMAGNETIC THEORY

L-3, T-1P-0 Credits–4 Max Marks: 100

OBJECTIVE: Main objective to study this course is to have a clean understanding of electromagnetic theory.

Course outcomes:

CO1: study of maxwell's equations

CO2: understanding the EM waves

CO3: learn about wave propagation

CO4: study about polarization of waves

Unit-I: Maxwell Equations (12 Lectures)

Review of Maxwell's equations. Displacement Current. Vector and Scalar Potentials. Gauge Transformations: Lorentz and Coulomb Gauge. Boundary Conditions at interface between Different Media. Wave Equations. Plane Waves in Dielectric Media. Poynting Theorem and Poynting Vector. Electromagnetic (EM) Energy Density. Physical Concept of Electromagnetic Field Energy Density, Momentum Density and Angular Momentum Density.

Unit-II: EM Wave Propagation in Unbounded Media (10 Lectures)

Plane EM waves through vacuum and isotropic dielectric medium, transverse nature of plane EM waves, refractive index and dielectric constant, wave impedance. Propagation through conducting media, relaxation time, skin depth. Wave propagation through dilute plasma, electrical conductivity of ionized gases, plasma frequency, refractive index, skin depth, application to propagation through ionosphere.

Unit-III: EM Wave in Bounded Media (10 Lectures)

Boundary conditions at a plane interface between two media. Reflection & Refraction of plane waves at plane interface between two dielectric media-Laws of Reflection & Refraction. Fresnel's Formulae for perpendicular & parallel polarization cases, Brewster's law. Reflection & Transmission coefficients. Total internal reflection, evanescent waves.

Metallic reflection (normal Incidence).

Unit-IV: Polarization of Electromagnetic Waves (10 Lectures)

Description of Linear, Circular and Elliptical Polarization. Propagation of E.M. Waves in Anisotropic Media. Symmetric Nature of Dielectric Tensor. Fresnel's Formula. Uniaxial and Biaxial Crystals. Light Propagation in Uniaxial Crystal. Double Refraction. Polarization by Double Refraction. Nicol Prism. Ordinary & extraordinary refractive indices. Production & detection of Plane, Circularly and Elliptically Polarized Light. Phase Retardation Plates: Quarter-Wave and Half-Wave Plates. Babinet Compensator and its Uses. Analysis of Polarized Light.

Rotatory Polarization: Optical Rotation. Biot's Laws for Rotatory Polarization. Fresnel's Theory of optical rotation. Calculation of angle of rotation. Experimental verification of Fresnel's theory. Specific rotation. Laurent's half-shade polarimeter.

Unit-V: Wave Guides & Optical Fibres (10 Lectures)

Planar optical wave guides. Planar dielectric wave guide. Condition of continuity at interface. Phase shift on total reflection. Eigenvalue equations. Phase and group velocity of guided waves. Field energy and Power transmission.

Numerical Aperture. Step and Graded Indices (Definitions Only). Single and Multiple Mode Fibres (Concept and Definition Only).

Reference Books:

- Introduction to Electrodynamics, D.J. Griffiths, 3rd Ed., 1998, Benjamin Cummings.
- Elements of Electromagnetics, M.N.O. Sadiku, 2001, Oxford University Press.
- Introduction to Electromagnetic Theory, T.L. Chow, 2006, Jones & Bartlett Learning.
- Fundamentals of Electromagnetics, M.A.W. Miah, 1982, Tata McGraw Hill.
- Electromagnetic field Theory, R.S. Kshetrimayun, 2012, Cengage Learning.
- Engineering Electromagnetic, Willian H. Hayt, 8th Edition, 2012, McGraw Hill.
- Electromagnetic Field Theory for Engineers & Physicists, G. Lehner, 2010, Springer.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	2	3	2	2	3	3
CO2	1	2	1	1	1	2	1	-
CO3	-	3	1	-	3	2	3	3
CO4	2	1	3	1	2	1	-	1

BPH-325:STATISTICAL MECHANICS

L-3, T-1 P-0 Credits–4 Max Marks: 100

OBJECTIVE: Main objective to study this course is to have a clean understanding of electromagnetic theory.

Course outcomes:

CO1: study of statistical systems

CO2: understanding the ensembles

CO3: learn about partition function

CO4: study about Gibb's paradox

Unit-I: Classical Statistics (18 Lectures)

Macrostate & Microstate, Elementary Concept of Ensemble, Phase Space, Entropy and Thermodynamic Probability, Maxwell-Boltzmann Distribution Law, Partition Function, Thermodynamic Functions of an Ideal Gas, Classical Entropy Expression, Gibbs Paradox, Sackur Tetrode equation, Law of Equipartition of Energy (with proof) – Applications to Specific Heat and its Limitations, Thermodynamic Functions of a Two-Energy Levels System, Negative Temperature.

Unit-II: Classical Theory of Radiation(10 Lectures)

Properties of Thermal Radiation. Blackbody Radiation. Pure temperature dependence. Kirchhoff's law. Stefan-Boltzmann law: Thermodynamic proof. Radiation Pressure. Wien's Displacement law. Wien's Distribution Law. Saha's Ionization Formula. Rayleigh-Jean's Law. Ultraviolet Catastrophe.

Unit-III: Quantum Theory of Radiation(8 Lectures)

Spectral Distribution of Black Body Radiation. Planck's Quantum Postulates. Planck's Law of Blackbody Radiation: Experimental Verification. Deduction of (1) Wien's Distribution Law, (2) Rayleigh-Jeans Law, (3) Stefan-Boltzmann Law, (4) Wien's Displacement law from Planck's law.

Unit-IV: Bose-Einstein Statistics(10 Lectures)

B-E distribution law, Thermodynamic functions of a strongly Degenerate Bose Gas, Bose Einstein condensation, properties of liquid He (qualitative description), Radiation as a photon gas and Thermodynamic functions of photon gas. Bose derivation of Planck's law.

Unit-V: Fermi-Dirac Statistics(10 Lectures)

Fermi-Dirac Distribution Law, Thermodynamic functions of a Completely and strongly Degenerate Fermi Gas, Fermi Energy, Electron gas in a Metal, Specific Heat of Metals, Relativistic Fermi gas,White Dwarf Stars, Chandrasekhar Mass Limit.

Reference Books:

- Statistical Mechanics, R.K. Pathria, Butterworth Heinemann: 2nd Ed., 1996, Oxford University Press.
- Statistical Physics, Berkeley Physics Course, F. Reif, 2008, Tata McGraw-Hill.
- Statistical and Thermal Physics, S. Lokanathan and R.S. Gambhir. 1991, Prentice Hall.
- Thermodynamics, Kinetic Theory and Statistical Thermodynamics, Francis W. Sears and Gerhard L. Salinger, 1986, Narosa.
- Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer.
- An Introduction to Statistical Mechanics & Thermodynamics, R.H. Swendsen, 2012, Oxford

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	3	3	-	-	2	2	3	3
CO2	1	1	1	1	-	2	1	-
CO3	2	3	2	1	3	3	1	-
CO4	2	2	1	-	2	1	-	-

BPH-374:ELECTROMAGNETIC THEORY LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

OBJECTIVE: Main objective to study this course is to have a clean understanding of electromagnetic theory.

Course Objectives:

CO1: study of maxwell's equations

CO2: understanding the EM waves

CO3: calculation of specific rotation of polarized light

CO4: study about polarization of waves

Experiments:

1. To verify the law of Malus for plane polarized light.

2. To determine the specific rotation of sugar solution using Polarimeter.

3. To analyze elliptically polarized Light by using a Babinet's compensator.

4. To study dependence of radiation on angle for a simple Dipole antenna.

5. To determine the wavelength and velocity of ultrasonic waves in a liquid (Kerosene Oil, Xylene, etc.) by studying the diffraction through ultrasonic grating.

6. To study the reflection, refraction of microwaves

7. To study Polarization and double slit interference in microwaves.

8. To determine the refractive index of liquid by total internal reflection using Wollaston's air-film.

9. To determine the refractive Index of (1) glass and (2) a liquid by total internal reflection using a Gaussian eyepiece.

10. To study the polarization of light by reflection and determine the polarizing angle for air-glass interface.

11. To verify the Stefan`s law of radiation and to determine Stefan's constant.

12. To determine the Boltzmann constant using V-I characteristics of PN junction diode.

Note: Each student is required to perform at least seven experiments.

Referred Books:

- Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia, Publishing House.
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
- A Text Book of Practical Physics, I.Prakash& Ramakrishna, 11th Ed., 2011, Kitab Mahal.
- Electromagnetic Field Theory for Engineers & Physicists, G. Lehner, 2010, Springer

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	-	2	2	3	3
CO2	1	3	1	2	1	2	1	-
CO3	2	3	2	-	3	2	1	2
CO4	2	3	-	2	2	1	-	-

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SCHOOL OF BASIC & APPLIED SCIENCE

BPH-375:STATISTICAL MECHANICS LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

OBJECTIVE: Main objective to study this course is to have a clean understanding of statistical mechanics.

Course Objectives:

CO1: study of transient behavior of systems

CO2: understanding the equilibrium state

CO3: plot specific heat capacities

CO4: study about velocity distributions

Use C/C^{++}/Scilab/other numerical simulations for solving the problems based on Statistical Mechanics like

1. Computational analysis of the behaviour of a collection of particles in a box that satisfy Newtonian mechanics and interact via the Lennard-Jones potential, varying the total number of particles N and the initial conditions:

   g) Study of local number density in the equilibrium state (i) average; (ii) fluctuations

   h) Study of transient behavior of the system (approach to equilibrium)

   i) Relationship of large N and the arrow of time

   j) Computation of the velocity distribution of particles for the system and comparison with the Maxwell velocity distribution.

   k) Computation and study of mean molecular speed and its dependence on particle mass.

   l) Computation of fraction of molecules in an ideal gas having speed near the most probable speed

2. Computation of the partition function Z(β) for examples of systems with a finite number of single particle levels (e.g., 2 level, 3 level, etc.) and a finite number of non-interacting particles N under Maxwell-Boltzmann, Fermi-Dirac and Bose- Einstein statistics:

Computation of the partition function Z(□) for examples of systems with a finite

   d) Study of how Z(β), average energy <E>, energy fluctuation □E, specific heat at constant volume C_V, depend upon the temperature, total number of particles N and the spectrum of single particle states.

   e) Ratios of occupation numbers of various states for the systems considered above.

   f) Computation of physical quantities at large and small temperature T and comparison of various statistics at large and small temperature T.

3. Plot Planck's law for Black Body radiation and compare it with Raleigh –Jeans Law at high temperature and low temperature.

4. Plot Specific Heat of Solids (a) Dulong-Petit law, (b) Einstein distribution function, (c) Debye distribution function for high temperature and low temperature and compare them for these two cases.

5. Plot the following functions with energy at different temperatures

   a. Maxwell-Boltzmann distribution

   b. Fermi-Dirac distribution

   c. Bose-Einstein distribution

Note: Each student is required to perform at least experiments.

Reference Books:

- Elementary Numerical Analysis, K.E.Atkinson, 3rd Edn. 2007, Wiley India Edition
- Statistical Mechanics, R.K. Pathria, Butterworth Heinemann: 2nd Ed., 1996, Oxford University Press.
- Introduction to Modern Statistical Mechanics, D. Chandler, Oxford University Press, 1987.
- Thermodynamics, Kinetic Theory and Statistical Thermodynamics, Francis W. Sears and Gerhard L. Salinger, 1986, Narosa.
- Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer.
- Statistical and Thermal Physics with computer applications, Harvey Gould and Jan Tobochnik, Princeton University Press, 2010.

- Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific and
- Engineering Applications: A. Vande Wouwer, P. Saucez, C. V. Fernández. 2014 Springer ISBN: 978-3319067896
- Scilab by example: M. Affouf, 2012. ISBN: 978-1479203444
- Scilab Image Processing: L.M. Surhone. 2010, Betascript Pub., ISBN: 978- 6133459274

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	2	1	2	2	3	3
CO2	1	3	1	1	1	2	1	-
CO3	1	3	3	-	3	2	3	-
CO4	2	3	-	-	2	1	-	-

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SCHOOL OF BASIC & APPLIED SCIENCE

SEMESTER-VI

BPH-326:NANO-MATERIALS & APPLICATION

L-3, T-1 P-0 Credits–4 Max Marks: 100

OBJECTIVE: Main objective to study this course is to have a clean understanding of nano-materials and technology.

Course Objectives:

CO1: study of nanomaterials

CO2: understanding the nanostructures.

CO3: learn about physical properties of nano-materials.

CO4: study about applications of nanomaterials.

Unit I: Nanomaterials and Nanotechnology (10 lectures)

Basic concepts of Nano science and technology – Quantum wire – Quantum well – Quantum dot – Properties and technological advantages of Nanomaterials– Carbon Nanotubes and applications – Material processing by Sol – Gel method, Chemical Vapour deposition and Physical Vapour deposition – Microwave Synthesis of materials – Principles of SEM, TEM and AFM.

Unit II: Nanostructures (10 lectures)

Electronic Structure of Nanoparticles- Kinetics in Nanostructured Materials- Zero dimensional, one-dimensional and two-dimensional nanostructures- clusters of metals and semiconductors, nanowires, nanostructured beams, and nanocomposites-artificial atomic clusters-Size dependent properties-size dependent absorption spectra-phonons in nanostructures.

Unit III: Physical Properties of Nanomaterials (10 lectures)

Melting point and phase transition processes- quantum-size-effect (QSE). Size-induced metal-insulator-transition (SIMIT)- nano-scale magnets, transparent magnetic materials, and ultrahigh-density magnetic recording materials chemical physics of atomic and molecular clusters.

Unit IV: Surface and Micro-structural Properties of Nanomaterials (10 lectures)

Surface energy – chemical potential as a function of surface curvature-Electrostatic stabilization-surface charge density-electric potential at the proximity of solid surface-Van der Waals attraction potential. Micro-structural Properties: Properties slightly dependent on temperature and grain size; properties strongly dependent on temperature and grain size; strengthening mechanisms; enhancement of available plasticity; grain size evolution and grain size control; Hall Petch relation, microstructure – dislocation interactions at low and high temperatures; effects of diffusion on strength and flow of materials.

Unit V: Applications of Nanomaterials (10 lectures)

Solar energy conversion and catalysis, Molecular electronics and printed electronics Nanoelectronics, Polymers with a special architecture, Liquid crystalline systems, Linear and nonlinear optical and electrooptical properties, Applications in displays and other devices, Advanced organic materials for data storage, Photonics, Plasmonics ,Chemical and biosensors, Nanomedicine and Nanobiotechnology.

Reference Books:

- Joel I. Gersten, "The Physics and Chemistry of Materials", Wiley, 2001.
- A. S. Edelstein and R. C. Cammarata, "Nanomaterials: Synthesis, Properties and Applications", Institute of Physics Pub., 1998.
- Hari Singh Nalwa, "Nanostructured Materials and Nanotechnology", Academic Press, 2002
- S.Yang and P.Shen: "Physics and Chemistry of Nanostructured Materials", Taylor & Francis, 2000.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	1	-	1	2	2	3	3
CO2	1	3	1	1	1	2	1	-
CO3	1	1	-	2	3	2	2	-
CO4	2	3	3	-	2	1	-	2

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SCHOOL OF BASIC & APPLIED SCIENCE

BPH-327: BIO-PHYSICS

L-3, T-1 P-0 Credits–4 Max Marks: 100

Objectives: The objectives of this course are to impress on students those physical laws (laws of Physics) are valid in biological systems. To establish the relationship between structure and function at the molecular level. To prepare students for higher courses in environmental and medical biophysics, genomics and proteomics.

Course outcomes:

CO1: Study about biological macromolecules, their polymeric structures, and their role.

CO2: Detailed chemical structure of the polymers and their constituent monomers

CO3: Role of covalent and non-covalent bonds and experimental techniques used in Bio-Physics

CO4: Understanding of instrument used for biophysics.

UNIT-I: Optics in biotechnology (10 lectures)

Interference: Interference of light and its necessary conditions, path & Phase difference for reflected & transmitted rays, Interference in thin films (parallel and wedge shaped film), Newton's rings. Applications in biotechnology.

Diffraction: Single, double and N- Slit Diffraction, Diffraction grating, Grating spectra, dispersive power, Rayleigh's criterion and resolving power of grating and their application in bio physics.

UNIT II: Structure & functions (10 lectures)

Intermolecular and surface forces relevant to bio-systems,(Vander Waals, hydration, steric, hydrophobic forces etc). Cell & its organelles - structure and function DNA, RNA and Protein - structure and function

UNIT III: Experimental techniques in bio-physics-I(10 lectures)

Spectroscopic techniques: Introduction to spectroscopy, basic principles, instrumentation and applications of UV-VIS absorption, infrared, Raman, atomic absorption, fluorescence, Laser spectroscopy, electron spin resonance, acoustic spectroscopy; Fourier transform techniques; applications of Laser; mass spectroscopy.

UNIT IV: Experimental techniques in bio-physics-II (10 lectures)

Microscopy: Principle, instrumentation and application of Microscopy, a) Electron Microscopy (i) Scanning Electron Microscopy (ii) Transmission Electron Microscopy b) Confocal fluorescence microscopy

UNIT:V: Bio instrumentation (10 lectures)

X-Ray Diffractometer (XRD), Dynamic Thermal Analyser/Thermogravimetric Analyzer (DTA/TGA),Ultrasound, nuclear magnetic resonance, positron emission topography whole body scanner, dose calibrators, gamma scintillation camera, digital imaging techniques, acquisition, analysis and processing of data from gamma camera, enhancement, topographic reconstruction, display and recording of image,

Reference books:

- Physical Chemistry for Life Sciences, Peter Atkins and Julio de Paula, 2006, Oxford Press
- Introduction to Biophysics by Cortell
- Tex Book of Biophysics , R N Roy, New Central Agency (P) Ltd, Culcutta
- Methods in Molecular Biophysics, Igor N S, N Zaccai& J Zaccai, (2007) Cambridge
- Principle of Biochemistry, D Voet, J Voet and CW Pratt, 3rd Ed,
- Essential Biophysics, Narayanan, New Age Publications
- Handbook of Molecular Biophysics (Methods & Application), 2009, HG Bohr, Wiley

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	2	-	2	2	2	1	1
CO2	2	3	1	-	1	2	1	-
CO3	1	2	-	-	1	2	-	-
CO4	3	3	2	-	2	1	-	-

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SCHOOL OF BASIC & APPLIED SCIENCE

BPH-376 NANO MATERIALS & APPLICATIONS LAB

L-0, T-0 P-4 Credits–2 Max Marks: 100

OBJECTIVE: Main objective to experimental knowledge of synthesis and characterization of nano-materials.

Course Objectives:

CO1: Synthesis of nanomaterials

CO2: understanding the nanostructures.

CO3: learn about physical properties of nano-materials.

CO4: Understanding about applications of nanomaterials.

1. Synthesis of Silver Nanoparticles by Chemical reduction method and their UV-VIS absorption studies.
2. Synthesis of Gold Nanoparticles with different morphology by Chemical reduction method and UV-Vis absorption studies.
3. Synthesis of Iron Oxide Nanoparticles by Polyol method and their UV-VIS absorption studies.
4. Synthesis of Gold Nanoparticles by Polyol method and their SPR studies.
5. Synthesis of TiO2 Nanoparticles by Sol-Gel Method and Characterize using XRD and SEM analysis.
6. Synthesis of Ceria Nanoparticles and Characterize using XRD and SEM analysis.
7. X-ray diffraction studies of synthesised of TiO2 nanoparticles and measuring the crystallite size.
8. Synthesis of ZnSe Nanoparticles by Co-Precipitation Method.
9. SERS studies of Gold nanoparticles
10. Synthesis of Quantum dots and Photoluminescence studies.
11. Nanofluids preparation and characterization
12. $Al2O_3$ Nanotemplate by anodization method and Tubes fabrication
13. Fabrication of thin films by Sputtering, Electron beam and Spray pyrolysis methods.
14. Fabrication of TiO2 nanofibers on ITO glass substrate by Electro-spinning technique. Synthesis of CNTs by CVD method.
15. Nanocrystalline thin film by spin coating.

16. Chemical bath deposition by dip coating.

Reference Books:

- Joel I. Gersten, "The Physics and Chemistry of Materials", Wiley, 2001.
- A. S. Edelstein and R. C. Cammarata, "Nanomaterials: Synthesis, Properties and Applications", Institute of Physics Pub., 1998.
- Hari Singh Nalwa, "Nanostructured Materials and Nanotechnology", Academic Press, 2002
- S.Yang and P.Shen: "Physics and Chemistry of Nanostructured Materials", Taylor & Francis, 2000.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	1	-	1	2	2	3	3
CO2	1	3	1	1	1	2	1	-
CO3	1	1	-	2	3	2	2	-
CO4	2	3	3	-	2	1	-	2

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BPH-377:DISSERTATION/PROJECT

L-0, T-2 P-8 Credits–10

OBJECTIVE: Main objective to study this course is to have a clean understanding of writing projects

Course Objectives:

CO1: learn to write dissertations

CO2: understanding and improving vocabulary

CO3: identifying the topics of research

CO4: learn to make presentations

1. Identification of a research Topic, reading of relevant literature, Summary of National and International Scenario of course taught.

2. Understanding of the unsolved and unresolved problems in the literature, framing of objectives for dissertation.

3. Assessment about the feasibility of identified objectives within available resources, and fine tuning of objectives for future work.

4. Experimental / computational analysis, data analysis and writing of report.

5. Writing of manuscript and Poster making for presentation in scientific conferences or publication in Journal based on above work.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	1	2	2	1	3
CO2	1	3	1	2	1	2	1	1
CO3	2	1	1	2	3	1	2	-
CO4	2	3	3	-	2	1	-	2

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SCHOOL OF BASIC & APPLIED SCIENCE

SCHEME FOR SCHEME FOR M.Sc PHYSICS

M.Sc PHYSICS			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MPH-110	Mathematical Physics	3	1	0	4
2	MPH-111	Classical Mechanics	3	1	0	4
3	MPH-112	Quantum Mechanics-I	3	1	0	4
4	MPH-113	Electro-Optic Effects in Materials (EOEM)	3	1	0	4
5	MPH-114	Electronics	3	1	0	4
6	MPH-161	General Physics Laboratory	0	0	4	2
7	MCS-163	Electro-Optic Effects in Materials (EOEM)Lab	0	0	4	2
8	MPH-164	Electronics Lab	0	0	4	2
		Total---->	**15**	**5**	**12**	**26**

SCHEME FOR SCHEME FOR M.Sc PHYSICS

M.Sc PHYSICS			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MPH-115	Quantum Mechanics-II	3	1	0	4
2	MPH-116	Theory of Radiation & Statistical Mechanics	3	1	0	4
3	MPH-117	Numerical Methods and Computational Physics	3	1	0	4
4	MPH-118	Electromagnetic theory and Electromagnetism	3	1	0	4
5	MPH-119	Atomic and Molecular Physics	3	1	0	4
6	MPH-165	Advanced Physics Laboratory	0	0	4	2
7	MPH-167	Numerical Methods and Computational Physics Lab	0	0	4	2
		Total---->	**15**	**5**	**8**	**24**

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SCHOOL OF BASIC & APPLIED SCIENCE

SCHEME FOR SCHEME FOR M.Sc PHYSICS

M.Sc PHYSICS			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MPH-210	Solid State Physics	3	1	0	4
2	MPH-211	Nuclear and Particle Physics	3	1	0	4
3	MPH-212	Fiber Optics & Laser	3	1	0	4
4	MPH-213	Electronics-I	3	1	0	4
5	MPH-214	Electronics-II	3	1	0	4
6	MPH-263	Electronics–I Lab	0	0	4	2
7	MPH-264	General Physics Laboratory-II	0	0	4	2
		Total---	**15**	**5**	**8**	**24**

SCHEME FOR SCHEME FOR M.Sc PHYSICS

M.Sc PHYSICS			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MPH-221	Measurement Techniques	3	1	0	4
2	MPH-222	Nano Science and Technology (Departmental Elective paper-II)	3	1	0	4
3	MPH-223	Electronic Communication System (Specialization Elective paper-III)	3	1	0	4
4	MPH-224	Electronic Devices (Specialization Elective paper-IV)	3	1	0	4
5	MPH-271	Measurement Techniques Lab	0	0	4	2
6	MPH-273	Electronic Communication System Lab	0	0	4	2
7	MPH-274	Project/Dissertation	0	0	24	12
		Total---->	**12**	**4**	**32**	**32**

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SCHOOL OF BASIC & APPLIED SCIENCE

SEMESTER-I

MPH-110: MATHEMATICAL PHYSICS

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective- The emphasis of course is on applications in solving problems of interest to physicists. The students are to be examined entirely based on problems, seen and unseen.

Course Outcome:

CO1: Use complex analysis in solving physical problems.

CO2: Solve ordinary and partial differential equations of second order that are common in the physical sciences.

CO3: Use the orthogonal polynomials and other special functions.

CO4: Use Fourier series and integral transformation.

UNIT-I.COMPLEX VARIABLES: 10LECTURES
Introduction, Cauchy-Riemann conditions, Cauchy's Integral formula, Laurent expansion, singularities, calculus of residues, evaluation of definite integrals, Dispersion relation.

UNIT-II.DELTA AND GAMMA FUNCTIONS: 10LECTURES
Dirac delta function, Delta sequences for one dimensional function, properties of delta function, Gamma function, factorial notation and applications, Beta function.

UNIT-III.DIFFERENTIAL EQUATIONS: 11LECTURES
Partial differential equations of theoretical physics, boundary value, problems, Neumann & Dirichlet Boundary conditions, separation of variables, singular points, series solutions, second solution.

UNIT-IV:SPECIAL FUNCTIONS: 12LECTURES
Bessel functions of first and second kind, Generating function, integral representation, and recurrence relations forBessel's functions of first kind, orthogonality. Legendre functions : generating function, recurrence relations andspecial properties, orthogonality, various definitions of Legendre polynomials. Associated Legendre functions: recurrence relations, parity, and orthogonality, Hermite functions, Laguerre functions.

UNIT-V:ELEMENTARY STATISTICS: 10LECTURES

Introductiontoprobabilitytheory,randomvariables,Binomial,PoissonandNormaldistribution.

REFERENCE BOOKS:

- Mathematical Methods for Physicists :G.Arfken and H.J.Weber (Academic Press,San Diego) 7th edition,2012.
- Mathematical Physics:P.K. Chattopadhyay (Wiley Eastern,NewDelhi),2004.
- Mathematical Physics: A.K. Ghatak,I.C. Goyal and S.J.Chua (MacMillan,India,Delhi),1986.
- Mathematical Methods in the Physical Sciences– M.L.Boas(Wiley,New York)3rdedition,2007.
- Special Functions: E.D.Rainville (Mac Millan, New York),1960.
- MathematicalMethodsforPhysicsandEngineering:K.F.Riley,M.P.HobsonandS.J.Bence(CambridgeUniversity Press, Cambridge)3rd ed., 2006.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	1	3	2	3	1
CO2	2	3	1	-	1	2	1	-
CO3	3	3	-	2	1	2	-	-
CO4	2	3	-	-	2	1	-	-

MPH-111 CLASSICAL MECHANICS

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: The aim of course will increase the understanding of the following fundamental concepts inthe dynamics of system of particles, motion of rigid body, Lagrangian and Hamiltonian formulation of mechanics.

Course outcomes:

CO1: Define and understand basic mechanical concepts related to discrete and continuous mechanical systems.

CO2: Describe and understand the vibrations of discrete and continuous mechanical systems.

CO3: Describe and understand planar and spatial motion of a rigid body.

CO4: Describe and understand the motion of a mechanical system using Lagrange-Hamilton formalism.

UNIT-I. LAGRANGIAN FORMULATION: 12LECTURES

Mechanics of a system of particles; constraints of motion, generalized coordinates, D'Alembert's Principle and Lagrange's velocity- dependent forces and the dissipation function, Applications of Lagrangian formulation.

UNIT-II.HAMILTON'SPRINCIPLES: 10LECTURES

Calculus of variations , Hamilton's principle, Lagrange's equation from Hamilton's principle, extension to nonholonomic systems, advantages of variational principal formulation, symmetry properties of space and time andconservationtheorems.

UNIT-III.HAMILTON'S EQUATIONS: 09LECTURES

Legendre Transformation, Hamilton's equations of motion, Cyclic-ordinates, Hamilton's equations from variational principle, Principle of least action.

UNIT-IV.CANONICAL TRANSFORMATION AND HAMILTON-JACOBI THEORY: 10LECTURES

Canonical transformation and its examples ,Poisson's brackets, Equations of motion, Angular momentum, Poisson's Bracket relations, infinitesimal canonical transformation, Conservation Theorems. Hamilton Jacobi equations for principal and characteristic functions, Action-angle variables for systems with one-degree of freedom.

UNIT-V.RIGID BODY MOTION AND SMALL OSCILLATIONS: 11LECTURES

Independent co-ordinates of rigid body, orthogonal transformations, Eulerian Angles and Euler's theorem, infinitesimal rotation, Rate of change of a vector, Coriolis force, angular momentum, and kinetic energy of a rigidbody, the inertia tensor, principal axis transformation, Euler equations of motion, Torque free motion of rigid body,motion of a symmetrical top. Eigenvalue equation, Free

vibrations, Normal Coordinates, Vibrations of a tri atomic molecule.

REFERENCEBOOKS:

- ClassicalMechanics:H.Goldstein,C.PooleandJ.Safko(PearsonEducationAsia,NewDelhi),3rded2002.
- ClassicalMechanicsofParticlesandRigidBodies:K.C.Gupta (WileyEastern,New Delhi),1988.Q

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	-	2	2	1	1
CO2	1	3	1	1	1	2	1	3
CO3	1	3	-	-	1	2	-	1
CO4	2	3	1	1	2	1	-	-

MPH-112 QUANTUM MECHANICS – I

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: Connect the historical development of quantum mechanics with previous knowledge and learn the basic properties of quantum world.

Course outcomes:

CO1: Pinpoint the historical aspects of development of quantum mechanics

CO2: Understand and explain the differences between classical and quantum mechanics

CO3: Understand the idea of wave function, uncertainty relations, Schrodinger equation for simple potentials

CO4: Identify and relate the eigenvalue problems for energy, momentum, angular momentum and central potentials explain the idea of spin.

UNIT-I:MATHEMATICAL TOOLS OF QUANTUM MECHANICS: 10LECTURES

Brief introduction to origins of quantum Physics. Wave packets. Dirac notation. Operators, their eigen values and eigenfunctions, orthonormality, completeness and closure. Generalized Uncertainty Principle. Unitary transformations, change of basis. Matrix Representation of operators. Continuous basis, position and momentum representation and their connection. Parityoperator.

UNIT-II: FUNDAMENTAL CONCEPTS OF QUANTUM MECHANICS: 12LECTURES

Basic postulates of quantum mechanics.Measurement.Timeevolutionofsystem'sstate.Propertiesofone-dimensional motion, free particle, potential step, potential well and barrier , tunneling effect, infinite square well potential, simple harmonic oscillator by wave equation and operator method, charged particle in a uniform magnetic field.

UNIT-III:SPHERICALLY SYMMETRIC POTENTIAL: 10LECTURES

Separation of variables in spherical & Polar coordinates, orbital angular momentum, parity, spherical harmonics,free particle in spherical polar coordinates, square well potential, hydrogen atom. radial solution and principal quantum number, orbital and magnetic quantum number. Electronprobability density,radiativetransition**.**

UNIT-IV:ANGULAR MOMENTUM: 08LECTURES

Orbital, Spin and total angular momentum operators. Pauli spin matrices, their Commutation relations. Eigenvalues and eigenfunctions L^2 of Lz.

UNIT-V:IDENTICAL PARTICLES: 08LECTURES

Many particle systems, systems of identical particles, exchange degeneracy, summarization postulate, construction of symmetric and anti-symmetric wavefunctions from un-symmetrized functions. The Pauli Exclusion Principle.

REFERENCEBOOKS:

- Franz Schwabl: Quantum Mechanics
- J.J.Sakurai: ModernQuantumMechanics
- N. Zettili: Quantum Mechanics
- P.A.M. Dirac: Principles of Quantum Mechanics
- Bohm:QuantumMechanic

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	1	2	2	1	1
CO2	2	3	1	-	1	2	1	-
CO3	1	3	-	-	1	2	-	1
CO4	2	3	-	2	2	1	2	-

MPH-113 ELECTRO-OPTIC EFFECTS IN MATERIALS (EOEM)

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: The emphasis of course is on Fundamentals and properties of Electro-optic, propagation of light in anisotropic optical media and electro-optical effects in liquid crystals.

Course outcomes:

CO1: Understanding of Fundamentals and properties of Electro-optic.

CO2: Understanding of light in anisotropic optical media.

CO3: Understanding of electro-optical effects in liquid crystals.

CO4: Understanding of liquid crystal devices.

UNIT-I.PRINCIPLES OF ELECTRO-OPTICS LECTURE8

Introduction, Fundamentals of Electro-optic effects, Pockels and Kerr effect. Electro-optic sensors and switches,spatial light modulators, phase retarders. Electro-optical materials: Inorganic crystals, organic crystals, liquid crystals, semiconductors, dye-doped polymers, dichroism in materials, field induced-anisotropy in materials.

UNIT-II.PROPAGATION OF LIGHT IN ANISOTROPIC OPTICAL MEDIA LECTURE7

Electromagnetic Waves, Polarization, Monochromatic plane waves and their polarization states: Linear polarization states, Circular polarization states, Elliptical polarization states. Propagation of Light in Uniform Anisotropic Optical Media, Birefringence, ordinary and extraordinary waves, Eigenmodes, Orthogonality of eigen modes, Energy flux, Special cases, Polarizers

UNIT-III-LIQUID CRYSTALS–THE FOURTH PHASE OF MATTER LECTURE11

Introduction,classificationofliquidcrystals,variousmesophasesofliquidcrystals,polymerliquidcrystals,chirality in liquid crystals, ferroelectric and antiferroelectric liquid crystals, discotic liquid crystals, lyotropic liquidcrystals,applications.

UNIT-IV–ELECTRO-OPTICAL EFFECTS IN LIQUID CRYSTALS LECTURE12

Order parameter, Anisotropy in liquid crystals, electrical anisotropy, optical anisotropy, deformations, electro-opticalignment, optical waveguiding, field-induced switching, Freedericksz transition, response time, confinement ofliquidcrystalsfor electro-optic effects,factorsgoverning electro-optics.

UNIT-V- LIQUID CRYSTAL DEVICES LECTURE12

Display matrices, LCD, TN displays, STN displays, fast-switching devices, phase modulators, Guest-host displays,Liquidcrystal-polymerdispersions, flexibledisplays,non-displaydevices.

REFERENCEBOOKS:

- G.R.ElionandH.A.Elion,Electro-OpticsHandbook, MarcelDekker,NewYork,
- P.Kaminow,AnIntroductiontoElectroopticDevices,AcademicPress,NewYork,
- ThePhysicsofLiquidCrystals:P.G.deGennesandJProst.OxfordUniversity press.
- LiquidCrystals-ApplicationsandUses:BBhadur(Vol.1,2,3)

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	1	2	2	1	1
CO2	2	2	1	-	1	3	2	3
CO3	1	3	3	-	1	2	-	-
CO4	2	2	-	3	2	1	-	1

MPH-114ELECTRONICS

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: To introduce students to entire circuit designs, and to provide in-depththeoretical base of Digital Electronics. The Electronics course covers semiconductor physics, physical principles of devices and their basic applications, basic circuit analysis, first-order nonlinear circuits, Analysis of Passive and Active filters, OPAMP based analog circuits and introduction to various communication techniques.

Course outcomes:

CO1: Understanding of Fundamentals and properties of semiconductor devices.

CO2: Logic circuits, digital systems and microprocessor and their peripheral devices.

CO3: Operating and designing digital systems

CO4: How to solve problems in design and/ or implementation of digital.

UNITI:SEMICONDUCTORDEVICES-I **10LECTURES**

Semiconducting Materials, conduction in semiconductors, Charge densities in a semiconductor, PN junction, spacecharge and electric field distribution at junctions, forward and reverse biased conditions, Space charge capacitance,varactor diode, Zener and avalanche breakdowns, Zener diodes, Schottky barrier, tunnel diode, photodiode, LED,p-n-p-ndevices andtheir characteristics.

UNIT-II:SEMICONDUCTOR DEVICES II **12LECTURES**

Transistors:Bipolar junction Transistor(BJT),Analysis of CE amplifier using h-parameters,TheT-network equivalent circuit, constants of CB and CE amplifier using emitter, base, collector resistance, Biasing technique to BJT,stabilization factor,temperature stabilization,operating point,fixedbias,emitter feed back bias,voltage feedback bias. Field-Effect Transistors (FET) and MOSFET:Structure, Working, Derivations of the equations for I-Vcharacteristicsunder different conditions.

UNIT–III POWER AMPLIFIER AND OSCILLATORS **11LECTURES**

Operating conditions for power amplifier,power relations,The ideal transformer,voltage limitations of the transformer, non-linear distortion, Idea of inter-modulation distortion, The class A power amplifier, The push-pull amplifier, Feedback requirements of oscillations, Basic oscillator analysis, Hartley and Colpitt oscillators, Piezo-electric,frequency control,RC oscillators.

UNIT–IV BASICS OF DIFFERENTIAL AND OPERATIONAL AMPLIFIERS **10LECTURES**

Differentialamplifier,Differentialamplifiercircuitconfiguration,Dualinputbalancedoutputdifferentialamplifier, Voltage gain, differential input resistance, inverting and non-inverting inputs, common mode rejectionratio,Operationalamplifier,inputoffsetvoltage,inputoffsetcurrents,inputbiascurrents,differential inputresistance, input capacitance, offset voltage supply, rejection ratio, Ideal OP Amp, equivalent circuit of an OP Amp,ideal voltage transfer curve, inverting, dual and non-inverting amplifier, measurement of OPAmp parameters,frequency response

UNIT-V COMMUNICATION SYSTEMS (BROAD ASPECTS): 10LECTURES

Digital transmission, ASK, FSK, PSK, Differential PSK, modulators and detectors, Broadband Communication Systems-Optical Fibre comm., Submarine cables, Satellite and cellular mobile systems, Integrated Services DigitalNetwork

REFERENCEBOOKS:

- ElectronicsFundamentalsandApplication:J.D.Ryder
- SolidStateElectronicDevices:B.G.Streetman
- ElectronicPrincipals:Malvino
- PrincipalsofMicrowave:Atwarter
- ElectromagneticWaveandRadiatingSystem:JordenandBallmon
- ElectronicDevicesandCircuits:MillmanandHalkias

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	1	2	2	1	1
CO2	2	1	1	1	3	1	1	-
CO3	1	3	1	2	1	2	-	-
CO4	1	1	-	2	2	1	-	-

MPH-161GENERAL PHYSICS LABORATORY

L-0, T-0, P-4 **Credits–2** **Max Marks: 100**

Objective: The aim and objective of the course General Physics Laboratory is to expose the students to experimental techniques in electronics, so that they can verify some of the things read in theory here or in earlier classes and develop confidence to handle sophisticated equipment.

Course outcomes:

CO1: Understanding of Fundamentals of semiconductor devices, energy,Magnetic Susceptibility .

CO2: Understanding of Hall effect in semiconductors

CO3: Understanding of Hysteresis loop curve of Magnetic Materials

CO4:Master the techniques to calculate various mechanical parameters.

ListofExperiments:

1. G.M.Tube Characteristics &AbsorptionCoefficient
2. Study of high energy interaction in nuclear emulsion
3. Study of Hall effect in semiconductors:
   - **(a)** Determination of Hall voltage and Hall coefficient,and
   - **(b)** Determination of the mobility of charge carriers and the carrier concentration.
4. Study of Magnetic Susceptibility of MnCl2
5. To determine dissociation Energy of Iodine Molecule
6. To study of Hysteresis loop curve of Magnetic Materials
7. To study conductivity of a Semiconductor using Four Probe method
8. Determination of the energy gap of a semiconductor by four probe method.
9. To determine the response of silicon solar cells and the effect of prolonged irradiation and to calculate the efficiency and fill factors of a variety of solar cells.
10. Todetermine:a).thevelocityofultrasonicwavesinaliquidand,
    b). thecompressibilityoftheliquid.
11. Dielectricconstantofice.
12. Elasticpropertiesofasolidusingpiezoelectricoscillator.
13. Measurementofe/mbyThomsoneffect.
14. Michelsoninterferometer.

Note:Eachstudentisrequiredtoperform atleast 07oftheaboveexperiments.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	1	3	2	2	1
CO2	2	2	1	-	1	1	2	1
CO3	1	3	3	-	1	2	-	-
CO4	2	3	-	3	2	1	-	1

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MPH-163Electro-Optic Effects In Materials (EOEM) Lab

L-0, T-0, P-4 **Credits–2** **Max Marks: 100**

Objective: The aim and objective are to expose the students to experimental techniques of Electro-optic, propagation of light in anisotropic optical media and electro-optical effects in liquid crystals.

Course outcomes:

CO1: Understanding of phasetransitiontemperaturesforLCmaterials.

CO2: Understanding of ResponseTime characteristicsofaPDLCcell.

CO3: Understanding of effectsofvariousfrequency-shapesontheEOproperties.

CO4:Master the techniques to Structuralandmorphologicalchangesinliquidcrystal.

1. To examine the phase transition temperatures for LC materials.
2. To study the electro-optical behavior of a Liquid Crystal cell.
3. To study the Response Time characteristics of a PDLC cell.
4. To study the angular dependence of VT characteristics in a PDLC cell.
5. To examine the polarized effects of light through a Liquid Crystal device.
6. To study effects of various frequency-shapes on the EO properties and response time of liquid crystal device.
7. Structural and morphological changes in liquid crystal director configuration under effect of an applied electric field.

Note: Eachstudentisrequiredto performatleast7oftheaboveexperiments.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	2	1	2	2	1	1
CO2	2	3	1	2	3	2	1	1
CO3	3	3	-	3	1	2	2	-
CO4	2	3	-	1	2	1	-	-

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MPH-164ELECTRONICSLAB

L-0, T-0, P-4 **Credits–2** **Max Marks: 100**

Objective: The aim and objective of the course electronics lab is to expose the students of M.Sc. (H.S.) class to experimental techniques in electronics, so that they can verify some of the things read in theory here or in earlier classes and develop confidence to handle sophisticated equipment

Course outcomes:

CO1: Understanding of types of amplifiers.

CO2: Understanding of characteristicsofPNjunctiondiode.

CO3: Experimental knowledge of Schottky diode, tunnel diode.

CO4:Experimental knowledge of different Operational Amplifier IC-741

LISTOFEXPERIMENTS:

1. Design & Study of Common Emitter Amplifier characteristics curve of PN junction diode
2. To draw the characteristics curve of PN junction diode.
3. To draw the characteristics curve of Zener diode.
4. To draw the characteristics curve of Schottky diode
5. To draw the characteristics curve of Tunnel diode
6. To draw the characteristics curve of Photodiode
7. Study of Operational Amplifier IC-741:
   a. summer,
   b. Subtractor
   c. Inverter
   d. Non-inverter
   e. differentiat orfintegrator

Note:Eachstudentisrequiredtoperform atleast7oftheaboveexperiments.

REFERENCEBOOKS:

- ElectronicsFundamentalsandApplication:J.D.Ryder
- SolidStateElectronicDevices:B.G.Streetman
- ElectronicPrincipals:Malvino
- PrincipalsofMicrowave:Atwarter

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	2	3	1	2	2	1	1
CO2	2	1	1	3	2	3	1	-
CO3	1	3	1	2	1	2	-	-
CO4	2	3	-	3	2	1	-	-

SEMESTER-II

MPH-115QUANTUMMECHANICS–II

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: This course will introduce Dirac's bra-ket formulation of quantum mechanics and make students familiar with various approximation methods applied to atomic, nuclear and solid-state physics, and to scattering.

Course outcomes:

CO1: Develop a knowledge and understanding of the concept that quantum states live in a vector space.
CO2: Develop a knowledge and understanding of perturbation theory, level splitting, and radiative transitions.
CO3: Knowledge and understanding of the role of angular momentum in atomic and nuclear physics.

CO4: Knowledge and understanding of the scattering matrix and partial wave analysis.

UNIT-I.LINEAR VECTOR SPACE AND MATRIX MECHANICS: 12LECTURES
Vector spaces, Schwarz inequality, Orthonormal basis, Schmidt ortho-normalisation method, Operators, Projectionoperator, Hermitian and Unitary operators, change of basis, Eigenvalue and Eigenvectors of operators, Dirac's braand ket notation, commutators, Simultaneous eigenvectors, Postulates of quantum mechanics, uncertainty relation.Harmonic oscillator in matrix mechanics, Time development of states and operators, Heisenberg and Schrodingerrepresentations,Exchange operatorandidenticalparticles. Density MatrixandMixed Ensemble.

UNIT-II.SYMMETRY IN QUANTUM MECHANICS 10LECTURES
Symmetry operations and unitary transformations, conservation principles, space and time translations, rotation,spaceinversionandtime reversal, symmetry,anddegeneracy.
Rotation operators, angular momentum algebra, eigenvalues of J^2 and Jz, spinors and Pauli matrices, addition ofangular momenta.Representation of general angular momentum operator, Addition ofangular momenta, C.G.coefficients.

UNIT-III.TIME-INDEPENDENT&TIME-DEPENDENT PROBLEMS APPROXIMATION METHODS 10LECTURES
Non-degenerate perturbation theory, degenerate case, Stark effect, Zeeman effect and other examples, variationalmethods,WKBmethod, tunnelling.
SchrödingerandHeisenbergpicture,time-dependentperturbationtheory,transitionprobabilitycalculations,goldenrule, adiabaticapproximation, sudden approximation,betadecayasanexample.

UNIT-IV.STATIONARYSTATEAPPROXIMATEMETHODS: 08LECTURES
Variational methodwithapplicationstothegroundstatesofharmonicoscillatorandothersamplesystems.

UNIT-V.SCATTERING THEORY 10LECTURES
Differentialcross-section,scatteringofawavepacket,integralequationforthescatteringamplitude,Bornapproximation,methodofpartialwaves,lowenergy scatteringandboundstates,resonancescattering.

REFERENCEBOOKS:

- C.Cohen-Tannoudji,B.DiuandF.Laloe,QuantumMechanics(VolumeII).
- A.Messiah,QuantumMechanics(VolumeII).
- S.Flügge, PracticalQuantumMechanics.
- J.J.Sakurai, ModernQuantumMechanics.
- K.Gottfried, QuantumMechanics.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	1	1	1	2	2	1	1
CO2	2	3	1	-	1	1	2	-
CO3	1	3	1	3	1	2	-	-
CO4	2	3	-	3	2	1	3	1

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: This course introduces the microscopic formulation of thermal physics, generally known as statistical mechanics. The course explores the general principles, from which emerge an understanding of the microscopic significance of entropy and temperature.

Course outcomes:

CO1: Understanding the concepts of microstate and macro state of a model system
CO2: Knowledge the concepts and roles of entropy and free energy from the viewpoint of statistical mechanics.
CO3: Discuss the concept and role of indistinguishability in the theory of gases; know the results expected from classical considerations and when these should be recovered.
CO4: Understanding of the Fermi-Dirac and Bose-Einstein distributions; state where they are applicable; understand how they differ and show when they reduce to the Boltzmann distribution

UNIT-I:THEORYOFRADIATION **10LECTURES**

ClassicalTheoryofRadiation:PropertiesofThermalRadiation.BlackbodyRadiation.PureTemperatureDependence,Kirchhoff'sLaw,Stefan-BoltzmannLawandWien'sDisplacementlaw.Saha'sIonizationFormula.

UNIT-II QUANTUMTHEORYOFRADIATION: **12LECTURES**

Stefan-Boltzmann Law: Thermodynamic Proof. Radiation Pressure, Spectral Distribution of Black Body Radiation.Wien's Distribution Law and Displacement Law, Rayleigh-Jean's Law, Ultraviolet Catastrophe, Planck's QuantumPostulates. Planck's Law of Blackbody Radiation : Experimental Verification. Deduction of (1) Wien's DistributionLaw,(2)Rayleigh-JeansLaw,(3)Stefan-Boltzmann Law and(4)Wien'sDisplacementLaw fromPlanck's Law.

UNIT-III.REVIEW OF THERMODYNAMICS **10LECTURES**

Extensiveandintensivevariables,lawsofthermodynamics,Legendretransformationsandthermodynamicpotentials, Maxwell relations, applications ofthermodynamics to (a) ideal gas, (b) magnetic material, and (c)dielectricmaterial.

UNIT-IV.FORMALISM OF EQUILIBRIUM STATISTICAL MECHANICS **11LECTURES**

Concept of phase space, Liouville's theorem, basic postulates of statistical mechanics, ensembles: microcanonical,canonical,grandcanonical,andisobaric,connectiontothermodynamics,fluctuations,applicationsofvariousensembles, partition function, equation of state for a non-ideal gas, Van der Waals' equation of state, Meyer clusterexpansion,virialcoefficients

UNIT-V.QUANTUM STATISTICS **12LECTURES**

Transition from classical statistical mechanics to quantum statistical mechanics, Indistinguishability and quantumstatistics, identical particles and symmetry requirements, Bose Einstein statistics, Fermi Dirac statistics, MaxwellBoltzmann statistics. Bose Einstein Condensation, Thermal properties of B.E. gas, liquid Helium, Energy andpressureofF-Dgas,Electronsinmetals,ThermionicEmission.Fermi-DiracandBose-Einsteinstatistics.

Applicationsoftheformalismto:

(a) IdealBosegas,Debyetheoryofspecificheat,propertiesofblack-bodyradiation,Bose-Einsteincondensation,experimentsonatomic BEC,BEC inaharmonicpotential.

(b) Ideal Fermi gas, properties of simple metals, Pauli Paramagnetism, electronic specific heat, white dwarfstars.

REFERENCEBOOKS:

- F.Reif, FundamentalsofStatisticalandThermalPhysics.
- K.Huang,StatisticalMechanics.
- R.K.Pathria,StatisticalMechanics.
- D.A.McQuarrie,StatisticalMechanics.
- S.K.Ma,StatisticalMechanics.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	1	2	2	2	1
CO2	1	2	1	3	1	3	1	-
CO3	1	3	3	2	1	2	2	-
CO4	2	3	-	-	2	1	-	2

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MPH-117NUMERICAL METHODS AND COMPUTATIONAL PHYSICS

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: This hands-on course introduces computational methods in solving problems in physics. It teachesprogrammingtactics,numericalmethods,andtheirimplementation,togetherwithmethodsoflinearal gebra.

Course outcomes:

CO1: Identify modern programming methods and describe the extent and limitations of computational methods in physics
CO2: Independently program computers using leading-edge tools,
CO3: Formulate and computationally solve a selection of problems in physics
CO4: Use the tools, methodologies, language, and conventions of physics to test and communicate ideas and explanations.

UNIT-I:DIFFERENTIATIONANDINTEGRATION (12LECTURES)
Differentiation:Taylorseriesmethod,NumericaldifferentiationusingNewton'sforwarddifferenceformula, Backwarddifferenceformula, Stirling'sformula, Cubicsplinesmethod.
Integration: Trapezoidal rule, Simpson's 1/3 rule, Gaussian Quadrature, Legendre–GaussQuadrature, Numericaldoubleintegration, Numericalintegrationof singularintegrals.

UNIT-II:SOLUTIONOFDIFFERENTIALEQUATIONS (12LECTURES)
Numericalsolutionofordinarydifferentialequations:Taylor'sseriesmethod,Euler'smethod,Forth-orderRungeKuttamethod,Cubicsplinesmethod;Secondorderdifferentialequations:Initialandboundaryvalueproblems, Numeric solution of Radial Schrodinger equation forHydrogen atom using Forth-order Runge-Kuttamethod(when eigen value is given), NumericalSolutions of Partial Differential Equations Using Finite DifferenceMethod.

UNIT-III:RANDOMNUMBERSANDCHAOS (12LECTURES)
Random numbers: Random number generators, Mid-square methods, Multiplicative congruentialmethod, mixedmultiplicative congruential methods, modeling radioactive decay. Hit and missMonte-Carlo methods, Monte-Carlocalculationof,Monte-Carloevaluationofintegration,Evaluationofmultidimensionalintegrals;Chaoticdynamics: Some definitions, The simplependulum, Potential energy of a dynamical system. Portraits in phase space:Undampedmotion,Dampedmotion, Driven anddampedoscillator.

UNIT-IV: SELECTED PHYSICS PROBLEMS (12LECTURES)
Algorithms to simulate interference and diffraction of light, Algorithms of charging an discharging of a capacitor,current in LR and LCR circuits,Computer models of LR and LCR circuits driven by sine and square functions.

UNIT-V:FOURIER TRANSFORMATIONS: (10LECTURES)

Fourier sine & cosine series, Analysis of a time series and search for periodicity. FFT (Fast Fourier transformation)andpower spectrumandanyother topicsused inphysicsresearch.

REFERENCEBOOKS

- J. D. Lambert , Numerical Methods for Ordinary Differential Systems.
- Kendall Atkinson, Weimin Han, Theoretical Numerical Analysis.
- Mark Newman, Computational Physics.
- Cristian C. Bordeianu, Manuel J. Paez, and Rubin H. Landau, Computational Physics: Problem Solving with Python.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	1	1	3	2	2	1	1
CO2	1	3	2	-	1	2	1	-
CO3	1	3	3	2	2	2	2	-
CO4	2	3	-	-	2	1	-	2

MPH-118ELECTROMAGNETIC THEORY & ELECTRODYNAMICS

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: In this course, the students will primarily learn how to solve the Maxwell's equations for various boundary conditions. Some emphasis will be on learning to use spherical harmonics and the Greens function methods for solving the Maxwell's equations.

Course outcomes:

CO1: Apply vector calculus to static electric-magnetic fields in different engineering situations.

CO2: Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse science problems.

CO3: Examine the phenomena of wave propagation in different media and its interfaces and in applications of wave engineering.

CO4: Analyze the nature of electromagnetic wave propagation in guided medium

UNIT-I:ELECTROSTATICS **12LECTURES**

Electric Field, Gauss Law, Differential form of Gauss Law, Electromagnetic scalar and vector potentials, Maxwell'sequations in terms of scalar and vector potentials, Non-uniqueness of Electromagnetic potentials and concept ofGauge. Lorentz gauge andcoulombgauge.Boundaryvalue problem, Poisson and Laplace equations, Solution of Laplace equation in rectangularcoordinates, Green'sTheorem, Dirichlet and Neumann boundary conditions, Formal solution ofboundary value problem with Green'sfunction,Electrostatic potentialenergyandenergydensity.

UNIT-II.MAGNETOSTATICS **10LECTURES**

Biot-Savartlaw,differentialequation forstaticmagneticfield,vectorpotential,magneticfield from localizedcurrent distributions, examples of magnetostatic problems, Faraday's law of induction, magnetic energy of steadycurrentdistributions.

UNIT-III.MAXWELL'SEQUATIONS **09LECTURES**

Displacement current, Maxwell's equations, vector and scalar potentials, gauge symmetry, Coulomb and Lorentzgauges, electromagnetic energy and momentum, conservation laws, inhomogeneous wave equation and Green'sfunctionsolution.

UNIT-IV.ELECTROMAGNETICWAVES **11LECTURES**

Plane waves in adielectricmedium, reflection and refraction at dielectric interfaces, frequencydispersionindielectrics and metals, dielectric constant and anomalous dispersion, wave propagation in one dimension, groupvelocity,metallicwaveguides,boundaryconditionsatmetallicsurfaces,propagationmodesinwaveguides,resonantmodesincavities.

UNIT-V.RADIATION & COVARIANT FORMULATIONOFELECTRODYNAMICS

12LECTURES

Field of a localized oscillating source, fields and radiation in dipole and quadrupole approximations, antenna,radiation by moving charges, Lienard-Wiechert potentials, total power radiated by an accelerated charge, Lorentzformula.

Four-vectors relevant to electrodynamics, electromagnetic field tensor and Maxwell'sequations, transformation offields,fieldsof uniformly moving particles.

Concepts of Plasma Physics:Formation of plasma,Debye theory of screening, plasma oscillations,motion of charges in electromagnetic fields, magneto-plasma, plasma confinement,hydromagnetic waves.

REFERENCEBOOKS:

- J.D.Jackson,Classical Electrodynamics.
- D.J.Griffiths,Introduction to Electrodynamics.
- J.R.Reitz,F.J.Mil ford and R.W.Christy,Foundations of ElectromagneticTheory.
- W.K.H.Pan of sky and M.Phillips, Classical Electricity and Magnetism.
- F.F.Chen, Introduction to Plasma Physics and Controlled Fusion.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	1	2	2	1	1
CO2	1	1	1	2	3	2	1	1
CO3	1	3	-	3	1	2	2	-
CO4	2	3	-	1	2	1	-	-

MPH-119 ATOMIC & MOLECULAR PHYSICS

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: This course deals principally with atomic structure and the interaction between atoms and fields. It covers electronic transitions, atomic spectra, excited states, hydrogenic and multi-electron atoms.

Course outcomes:

CO1: Derive the energy shifts due to these corrections using first order perturbation theory.
CO2: Explain the observed dependence of atomic spectral lines on externally applied electric and magnetic fields.
CO3: State and justify the selection rules for various optical spectroscopies in terms of the symmetries of molecular vibrations.
CO4: Explain how light interacting with atom and effect of magnetic field on the spectrum.

UNIT-1:ATOMICPHYSICS **12LECTURES**

Fine structure of hydrogen atoms-mass correction, Spin orbit term, Darwin term, Intensity of fine structure lines,ground state of two electron atoms-perturbation theory and variation method. Many electron atoms- LS and jj coupling schemes, Lande interval rule. Terms for equivalent & non-equivalent electron atom. Space Quantization:stern Gerlach experiment, normal & anomalous Zeeman effect, Stark effect, Paschen-Back effect; Intensities ofspectralline: Generalselectionrule, HyperfineStructure,Isotope ShiftsandNuclearSizeEffects**.**

UNIT-II:MOLECULARSTRUCTURE **08LECTURES**

Born-Oppenheimerseparationfordiatomicmolecules,rotation,vibrationandelectronic structureofdiatomicmolecules. Description of Molecular Orbital and Electronic Configuration of Diatomic Molecules: H2, H2+. Co-relationdiagramfor heteronuclear molecules.

UNIT-III:MOLECULARSPECTRA **09LECTURES**

Rotation, Vibration-rotation, and electronic spectra of diatomic molecules. TheFranck Condon Principle. RamanSpectroscopy: Introduction, pure rotational Raman Spectra,vibrational Raman spectra, nuclear spin and intensityalternationinRamanspectra, IsotopeeffectandRamanspectrometer.Dissociationandpredissociation,Dissociation energy,Rotationalfinestructure of electronicbands.

UNIT-IV:RESONANCE SPECTROSCOPY **10LECTURES**

NMR:Basic principles-classical and quantum description-Bloch Equation-spin-spin an spin-lattice relaxation times-chemical shift and coupling constant-experimental methods single and double coil methods;ESR:Basicprinciples,ESRSpectrometer-nuclear interaction and hyperfine structure-relaxation g factor.

UNIT-V:ROTATION AND VIBRATION OF MOLECULES: 11LECTURES

Solution of nuclear equation;Molecular rotation:Non-rigid rotator,Centrifugal distortion,Symmetric top molecules,Molecular vibrations:Harmonic oscillator and the and harmonic oscillator approximation,Morse potential.

Spectra of Molecules: Transition matrix elements, Vibration-rotation spectra: Pure vibrational transitions, Purerotationaltransitions, Vibration-rotationtransitions.

REFERENCEBOOKS:

- I.N.Levine,QuantumChemistry.
- R.McWeeny,Coulson'sValence.
- L.D.LandauandE.M.Lifshitz,QuantumMechanics.
- M.KarplusandR.N.Porter,AtomsandMolecules:AnIntroductionforStudentsofPhysicalChemistry.
- P.W.AtkinsandR.S.Friedman,MolecularQuantumMechanics.
- M.Tinkham,GroupTheoryandQuantumMechanics.
- L.FetterandJ.D.Walecka,QuantumTheoryofMany-ParticleSystems.
- W.A.Harrison, AppliedQuantumMechanics.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	1	1	-	2	2	1	1
CO2	3	3	1	-	1	2	1	-
CO3	2	1	3	3	1	2	-	-
CO4	2	3	-	-	2	1	-	2

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MPH-165ADVANCE PHYSICS LABORATORY

L-0, T-0 P-4 **Credits–2** **Max Marks: 100**

Objective: The aim and objective of the course General Physics Laboratory is to expose the students of M.Sc. (H.S.) class to experimental techniques in electronics, so that they can verify some of the things read in theory here or in earlier classes and develop confidence to handle sophisticated equipment.

Course outcomes:

CO1: Experimental experience on UJT, FET and MOSFET.
CO2: Understanding of Oscillator, amplifier, and Op-amp.
CO3: Experimental knowledge of Modulation & Demodulation
CO4: Experimental knowledge of Michelson InterferometerHall voltage & Hall coefficient of a semiconductor material

1. UJT-characteristics and it's applications as relaxation oscillator
2. SCR- characteristics and its applications as switching device
3. Study of Optoelectronic Devices
4. Study of Phase Shift Oscillator
5. Study of Negative & Positive Feedback Amplifier
6. FET-I/Vcharacteristics, biasing and its application as an amplifier
7. MOSFET-I/V characteristics, biasing and its application as an amplifier
8. Study of Pulse Amplitude Modulation(PAM) & Demodulation
9. A/DandD/Aconverter
10. Design &study of regulated and stabilized power supply.
11. Design &study of triangular wave generator.
12. Study of IC -555 as a stable, mono-stable and bi-stable multivibrator
13. Active filters usingop-amp
14. To determine the wavelength of a laser light
15. To determine the ridberg constant of hydrogen atom.
16. To determine the wavelength of used light by Michelson Interferometer
17. To determine the temperature coefficient of resistance of a platinum by using Callender &Grifith.
18. To draw the B-H curve of a ferromagnetic material.
19. To determine the Hall voltage & Hall coefficient of a semiconductor material
20. To determine the dielectric constant of a dielectric material.
21. To find the thickness of a wire by Interference method.
22. To determine the Boltzmann constant.
23. Mini Project
24. Electron-spin resonance
25. Faraday rotation/Kerr effect.
26. Interfacial tension and Phase separation kinetics.
27. Reaction kinetics by spectrophotometer and conductivity.

28. Study of color centers by spectrophotometer.
29. Alpha,Beta and Gamma ray spectrometer.
30. Mossbauerspectrometer.
31. Sizingnano-structures(UV-VISspectroscopy).
32. Magneto-resistanceanditsfielddependence.
33. X-ray diffraction.
34. Compton scattering.
35. Adiabatic compressibility.
36. Solid-liquid phase diagram for a mixture.

Note: Eachstudentisrequiredto performatleast12oftheaboveexperiments.

REFERANCE BOOK:

- Advanced Physics Laboratory Book inc CD-ROM byPeter Warren.
- Advanced Physics Lab Experiments, Vol-2 by Jeethendra Kumar P K, Prabhakar Sharma
- Advanced Physics LaboratoryManual by J.W. Hammer

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	1	2	2	1	1
CO2	2	3	1	-	1	1	2	-
CO3	1	3	3	-	1	2	-	-
CO4	2	3	-	3	2	1	-	1

MPH-167NUMERICAL METHODS AND COMPUTATIONAL PHYSICS LAB

L-0, T-0 P-4 **Credits–2** **Max Marks: 100**

Objective: The aim of this course is to give knowledge of computational methods in solving problems. It teachesprogrammingtactics,numericalmethods,andtheirimplementation,togetherwithmethodsoflinearalgebra.

Course outcomes:

CO1: Understanding of superposition of waves.

CO2: Knowledge of standard deviation, mean, variance, moments.

CO3: Understanding of matrix - its eigen values and eigenvectors

CO4: Experimental knowledge of Monte Carlo techniques.

ListofNumericalProblems using"Classes":

1. Data handling:find standard deviation, mean,variance,momentsetc.ofatleast25entries.
2. Choose a set of 10 values and find the least squared fitted curve.
3. Generation of waves on superposition like stationary waves and beats.
4. Fourier analysis of square waves.
5. To find the roots of quadratic equations.
6. Wave packet and uncertainty principle.
7. Find y for a given x by fitting a set of 9 values with the help of cubic spline fitting technique.
8. Find first order derivative at given x for a set of 10 values with the help of Lagrange interpolation.
9. To generate r and o m numbers between (i)1 and0,(ii)1 and100.
10. Perform numerical integration on1-D function using Simpson and Weddle rules.
11. To find determinant of a matrix- its eigen values and eigenvectors.
12. Use Monte Carlo techniques to simulate phenomenon of nuclear radioactivity.

REFERENCEBOOKS:

- NumericalMathematicalAnalysis,J.B.Scarborough(Oxford&IBHBookCo.)6thed.,1979.
- AfirstcourseinComputationalPhysics:P.L.DeVries (Wiley)2ndedition,2011.
- Computer Applications in Physics:S.Chandra(Narosa)2ndedition,2005.
- ComputationalPhysics:R.C.Verma,P.K.AhluwaliaandK.C.Sharma(NewAge)2000.
- ObjectOrientedProgrammingwithC++:Balagurusamy,(TataMcGrawHill)4thedition2008.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	1	1	2	2	1	1
CO2	2	3	1	-	1	1	2	-
CO3	1	3	3	-	1	2	-	-
CO4	2	3	-	3	2	1	-	1

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SEMESTER-III

MPH-210 SOLID STATE PHYSICS

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: The aim of this course is to give an extended knowledge of the principles and techniques of solid-state physics.

Course outcomes:

CO1: Explain the properties related to states of matter/solids.

CO2: Explain the band theory of solids.

CO3: Understand about the specific heat of solids.

CO4: To know the about the superconducting behavior of the solids.

UNIT-I.LATTICE DYNAMICS AND THERMAL PROPERTIES: 12LECTURES

Crystalline and amorphous solids. The crystal lattice. Basis vectors. Unit cell. Symmetry operations. Point, Three-dimensional crystal systems. Miller indices. Directions and planes in crystals. Inter-planar spacings. Simple crystal structures:FCC,BCC,Nacl,CsCl,Diamond and ZnS structure,HCP structure.Binding in solids;Stress components, stiffness constant, elastic constants, elastic waves in crystals Rigorous treatment of lattice vibrations,normalmodes;Densityofstates,thermodynamicpropertiesofcrystal,anharmoniceffects,thermal expansion.

UNIT-II.ENERGY BAND THEORY: 10LECTURES

The Bloch theorem. Bloch functions. Review of the Kroning-penney model. Brillouin zones. Number of states in theband.Band gap in the nearly free electron model. The tight binding model. The Fermi-surface. Electron dynamics nonelectricfield. Theeffective mass. Concept of hole.(elementary treatment)

UNIT-III.TRANSPORT THEORY: 10LECTURES

Quantized free electron theory. Fermi energy, wave vector, velocity and temperature, density of states.Electronicspecific heats. Electronic transport from classical kinetic theory; Introduction to Boltzmann transportequation;electricalandthermalconductivity ofmetals;thermoelectriceffects;Halleffectandmagnetoresistance.

UNIT-IV.DIELECTRIC PROPERTIES OF MATERIALS: 12LECTURES

Diamagnetism, Langevin equation. Quantum theory of Paramagnetism. Curie law. Hund's rules. Paramagnetism inrareearthandirongroupions.Elementaryideaofcrystalfieldeffects.Ferromagnetism.Curie-Weisslaw.Heisenberg exchange interaction. Mean field theory. Anti-ferro-magnetism. Neel point. Other kinds of magneticorder.Nuclearmagnetic resonance.

UNIT-V.SUPERCONDUCTIVITY 08LECTURES

Survey of important experimental results. Criticaltemperature.Meissnereffect.Type 1 and type II superconductors.Thermodynamics of superconducting transition. London equation. London penetration depth. Energy gap. Basicideasof BCStheory. High-Tc superconductors.

REFERENCEBOOKS:

- Introduction to Solid State Physics:C.Kittel(Wiley,NewYork),8thed.2005.
- QuantumTheory of Solids:C.Kittel(Wiley,NewYork)1987.
- Principles of theTheory of Solids:J. Ziman(CambridgeUniversityPress)1972.
- Solid State Physics:H. Ibachand, H.Luth(SpringerBerlin)3rd.ed.2002.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	2	2	2	1	1
CO2	1	3	1	-	1	2	1	-
CO3	1	3	3	2	1	2	2	-
CO4	2	3	-	-	2	1	-	2

MPH-211 NUCLEAR & PARTICLE PHYSICS

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: The aim and objective of the course on Nuclear and Particle Physics is to familiarize the students to the basic aspects of nuclear and particle physics like static properties of nuclei, radioactive decays, nuclear forces etc**.**

Course outcomes:

CO1: Explain various nuclear properties.

CO2: Understand various nuclear forces in a nucleus.

CO3: To know about the shell model of nucleus.

CO4: To know about the radioactive behavior of the solids.

UNIT-1:NUCLEAR SIZE AND SHAPE **08LECTURES**

General properties of nuclei: size, shape and charge distribution, spin and parity.muonic atoms and electronscattering, charge form factor, Magnetic dipole moment, electric quadruple moment and nuclear shape, Bindingenergy, semi-empiricalmassformula.

UNIT-II:TWO-NUCLEON PROBLEM AND NUCLEAR FORCES **09LECTURES**

Deuteron problem, Deuteron ground state, excited states, two-nucleons catering, n-p scattering, partial wave analysis, phase-shift, scattering length, p-pscattering (qualitative discussion),

Nature of the nuclear force, Charge symmetry and charge independence of nuclear forces. Exchange nature ofnuclearforces,formof nucleon-nucleonpotential,elementary discussiononYukawa'stheory.

UNIT- III. NUCLEAR MODELS **09LECTURES**

Liquid drop model, Bohr-Wheeler theory of fission, Experimental evidence for shell structure, single-particle Shellmodel, validity, and limitations of Shell model., Spin-Orbit coupling, Magic numbers, Applications of Shell modellikeAngularmomentaandparitiesofnuclear groundstates.

UNIT-IV .NUCLEAR DECAY **11LECTURES**

Elementary ideas of alpha decay and its selection rules, Beta and Gamma decay: Fermi's theory of beta decay,allowed and forbidden transitions, selection rules, non-conservation of parity in beta decay, direct evidence for theneutrino, gamma–decay and selection rules (derivation of transition probabilities not required). Fission and fusion.Nuclearreactions, reactionmechanism, compoundnucleianddirectreactions.

UNIT-V. PARTICLE PHYSICS **11LECTURES**

Classificationoffundamentalforces.Elementaryparticlesandtheirquantumnumbers(charge,spin,parity,iso spin, strangeness, etc.). Gellmann-Nishijima formula. Quark model, baryons and mesons. C, P, and T invariance.Application of symmetry arguments to particle reactions. Parity non-conservation in weak interaction. Relativistickinematics

REFERENCEBOOKS:

- Nuclear Physics: Irving Kaplan(Narosa),2002.
- Basic Ideas and Concepts in NuclearPhysics: K.Hyde(InstituteofPhysics)2004
- Introduction to High Energy Physics:D. H. Perkins(CambridgeUniversityPress), 4thed.2000.
- Elementary Particles:I.S.Hughes(CambridgeUniversityPress),3rded.1991.
- Introduction to Quarks and Partons:F.E.Close(AcademicPress, London), 1979.
- Introduction to Particle Physics:M.P.Khanna(PrenticeHallofIndia,NewDelhi),2004

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	1	1	2	2	1	1
CO2	3	3	1	-	1	2	1	-
CO3	1	3	-	1	1	2	2	2
CO4	2	3	-	1	2	1	-	-

MPH-212 FIBER OPTICS & LASER DEPARTMENTA LELECTIVE-I

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: This course will enable students to study the applications and operation of fiber optics and laser technology.

Course outcomes:

CO1: Explain various optical phenomena.

CO2: Understand various absorption and scattering phenomena in optics.

CO3: To know about basic laser theory.

CO4: To know about laser production and threshold conditions.

UNIT-I:FIBER OPTICS **10LECTURES**

Optica1 fiber modes and configuration, fiber types, Ray optics, representation, mode of the circular waveguide,Waveguide equation, Wave equation for Step index fiber, Model equation, modes in step index fiber, power flow instepindexfiber.

UNIT–II:LOSSES & WAVEGUIDE **10LECTURES**

Fiber Material fabrication attenuation, Absorption, Scattering losses. Radiative losses, Core & Cladding Losses, Signa l distortion in optical waveguide, Information capacity determination, Group delay,Material Dispersion, Wave Guide Dispersion.

UNIT-III:BASIC LASER THEORY **10LECTURES**

Historical background of laser, Einstein coefficients and stimulated light amplification :population inversion,creation of population inversion in three level &four level lasers.

UNIT-IV:LASER AMPLIFIER **10LECTURES**

Interaction of photons with electrons and holes in a semiconductor, Rates of emission and absorption, Condition foramplificationbystimulatedemission, thelaser amplifier.

UNIT-V LASER & ITS TYPES **10LECTURES**

LightEmittingDiode,LightsourceMaterial,InternalQuantumEfficiency,Modulationcapability,Transient Response, Power band width product, LASER diode, LASER -diode structure and Threshold Conditions, Modelpropertiesandradiationpatternmodulation.

REFERENCEBOOKS:

- Optics Fibre: G.Keiser
- Opto-electronics: Ghatak
- Introduction of Fiber Optics:Ajay Ghatak & K.Tyagrajan

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	-	2	2	1	1
CO2	2	3	2	2	1	-	1	2
CO3	2	1	1	-	1	2	-	-
CO4	2	3	-	1	2	3	2	1

MPH-213 ELECTRONICS-I

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: This course will enable students to study the applications and operation of digital electronics.

Course outcomes:

CO1: Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.

CO2: Ability to identify basic requirements for a design application and propose a cost-effective solution.

CO3: To develop skill to build and troubleshoot digital circuits.

CO4:The ability to identify and prevent various hazards and timing problems in a digital design.

UNIT-I BASIC LOGIC CIRCUIT **10LECTURES**

Introduction of basic gates,universal gates, number systems and codes, Boolean algebra, switching characteristicsof semiconductor devices. logic gate characteristics, Logic families- RTL, DTL, TTL, ECL interfacing , ECL andTTL,MOSlogicMOSFETNANDandNOR gates, CMOS- NAND andNOR gates.

UNIT-II LOGIC DESIGN **10LECTURES**

Minimization of Boolean functions, Karnaugh Map and Applications, Analysis and Synthesis of combinational circuit Simplification of Boolean algebra using K-map, minterm and maxterm, design of binary adder, subtractor ,digital comparator, parity generator/checkers, priority encoder, BCDto7segmentsdecoder.

UNIT III.COMBINATIONAL LOGIC CIRCUITS: **10LECTURES**

arithmetic circuits – Half adders, Full adders; Digital Comparators, Encoders, Decoders, multiplexer, multiplexer tree, demultiplexer and demultiplexer tree.

UNIT IV SEQUENTIAL CIRCUIT DESIGN–I **10LECTURES**

Excitation table of flip flops – S-R, J-K , Master-Slave – JK, D and T flip flops, clocked flip flop design – conversionofoneformofflipfloptoanothertype.DifferenttypesofCounters:RippleCounter,AsynchronousandSynchronousCounters, UP/DownCounters,Modulo (MOD)Counters.

UNIT V SEQUENTIAL CIRCUIT DESIGN-II **10LECTURES**

Shift Registers: Serial in ,Serial out, Parallel in Serial out Shift Registers, Parallel in Parallel out Shift registers, Bidirectional Shift Registers, Shift register counters, Shift Register Application, Application of Counters. Introduction toSynchronous sequential Machines.

REFERENCE BOOKS:

- M.Morris Mano."Digital Logic andComputer Design",
- M.Morris Mano,"Digital Design",Pearson EducationAsia,
- Thomas LFloyd"Digital Fundamentals"

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	2	-	1	2	3	1	1
CO2	2	2	1	-	1	2	1	-
CO3	1	1	-	1	1	2	-	-
CO4	2	1	-	-	2	3	-	-

MPH-214ELECTRONICS-II

L-3, T-1, P-0 **Credits–4** **Max Marks: 100**

Objective: This course will enable students to study the applications and operation of digital electronics.

Course outcomes:

CO1: Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.

CO2: Ability to identify basic requirements for a design application and propose a cost-effective solution.

CO3: To develop skill to build and troubleshoot digital circuits.

CO4:The ability to identify and prevent various hazards and timing problems in a digital design.

UNIT-I MICROWAVE & OPTICAL DEVICES: 10LECTURES

Microwave Electronics. Characteristics. feature of microwave Application of microwave, Generation of microwavebytubes,Limitationofconventionaltubes,Klystron,ReflexKlystron,Magnetron,Travellingwavetube.

Optical Devices: Laser and Laser resonator, LEDs, Semiconductor photo detectors; PINs and APDs, Photodiodes,APD,Photoconductor.

UNIT-II MICROWAVE MEASUREMENTS (FREQUENCY,POWER,IMPEDANCE). 10LECTURES

Optical modulator: Electro optics modulation (amplitude and phase). Optical coupler: Coupling of light from onefibertootherwiththeuseofevanescentwave,directionalcouplers,opticalswitch, phase, andamplitudemodulator**.**

UNIT-III WAVEGUIDE AND TRANSMISSION NETWORKS: 10LECTURES

Wave guides coaxial, rectangular, and cylindrical; resonators; filters; couplers; branching networks. Antennas-dipole,array; reflectors, steering strip,microstripandcoplanar structure.

Feedback control systems: Feedback system, stability, performance criteria, servo systems, automatic controlprinciple.

UNIT-IV 8085 MICROPROCESSOR: 10LECTURES

Microprocessor and its architecture and its operation , Memory interfacing, Addressing Modes ,Memory MappedI/O , Introduction to 8085/8080A Instructions , Data Transfer Operation , Arithmetic Operation , Logic Operations,Branch Operation , Writing Assembly Language programs , Interrupts , Timing Diagram, and instruction executionin8085.

UNIT-V INTERFACING I/O DEVICES: 10LECTURES

Basic interfacing concept,Interfacing output Displays, Interfacing InputDevices,Intel8212I/Oport, Programmable Peripheral Interface Intel 8255 , Programmable Interrupt Controller Intel 8259A , Direct MemoryAccess(DMA)and8257DMA Controller. D/A Converter andA/D Converter.

REFERENCEBOOKS:

- P.Bhattacharya-Semiconductor optoelectronics devices.
- RE Collin- Foundations of Microwave engineering.
- S.Y.Liao –Microwave Devices on circuits.
- J.Ryder– Networks,LinesandField.
- A.Papoulis–SignalAnalysis

- Electronic and Radio Engineering–F.ETerman.
- Digital Electronics By Goathmann.
- 7.Microwave:K.C.Gupta
- 2.Microwavecircuits:A.Y.Liyo
- Electronics communication system;George Kenedy

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	1	2	3	1	1
CO2	2	2	1	-	1	2	1	-
CO3	1	1	-	3	1	2	-	-
CO4	2	1	-	3	2	3	-	-

MPH-263:Electronics–I Lab

L-0, T-0 P-4 **Credits–2** **Max Marks: 100**

Objective: The aim of this course is to give an extended knowledge of digital electronics.

Course Outcomes:

CO1: To understand the working of digital circuits.
CO2: To understand the mechanism of adders.
CO3: Understand about the working of flip flops.
CO4: To know the working of counters, registers, and multivibrators

1. To verify the truth table of Logic gates.
2. To verify the truth table of Universal Logic gates.
3. To study half adder
4. To study full adder
5. To study S-R flip flop
6. To study JK flip flop
7. To study JKMS flipflop
8. To study counters
9. To study Registers
10. Study of IC -555 as a stable Stable multivibrator
11. Study of IC- 555as mono-stable multivibrator
12. Study of IC -555 as bi-stable multivibrator
13. Design and study of an ECLOR-NOR circuit

Note: Each student is required to perform at least 07 of the above experiments.

REFERENCEBOOKS:

1. Practical Digital Electronics by Nigel P.Cook- Goodreads

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	2	-	1	2	3	1	1
CO2	2	2	1	-	1	2	1	-
CO3	1	1	-	1	1	2	-	-
CO4	2	1	-	-	2	3	-	-

MPH-264:GENERAL PHYSICS LABORATORY-II

L-0, T-0 P-4 **Credits–2** **Max Marks: 100**

Objective: The aim of this course is to give an extended knowledge of general physics.

Course Outcomes:

CO1: To understand the working filters.

CO2: To understand the mechanism of phase shifters.

CO3: Understand about the working of microprocessors.

CO4: To know about the computer programs of performing various arithmetic operations.

List of experiments:

1. Design and study of an Active band pass filter Design and study of an active phase Shifter Design and study of an active phase shifter.
2. Write the following programs using 8085 Microprocessor:
   a. Addition of numbers using direct addressing mode
   b. Subtractionof numbers using directaddressing mode
   c. Addition of numbers using indirect addressing mode
   d. Subtraction of numbers using indirect addressing mode
3. Multiplication by repeated addition.
4. Division by repeated subtraction.
5. Handling of 16-bit Numbers.
6. Use of CALL and RETURN Instruction.
7. Arranging data in Ascending order
8. Arranging data in Descending order
9. Finding largest number
10. Findingsmallestnumber

Note: Each student is required to perform at least 07 of the above experiments.

REFERENCEBOOKS:

- Microprocessor Architecture, Programming, and Applications with the 8085"byRGaonkar
- "The8051Microcontroller and Embedded Systems: Using Assembly and C" by Muhammad Ali Mazidi
- "Advanced Microprocessors and Peripherals "by A K Ray and KMB hurchandi
- "Fundamentals of Microprocessors And Microcontrollers "Ram B
- "Introduction to Microprocessors and Microcontrollers"by Crisp John Crisp.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	2	2	2	1	1
CO2	1	-	1	-	1	-	1	-
CO3	1	3	-	3	1	2	-	-
CO4	2	-	-	-	2	1	2	-

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SEMESTER-IV

MPH-221: MEASUREMENT TECHNIQUE

L-3, T-1 P-0 **Credits–4** **Max Marks: 100**

Objective: This course is to get exposure with various aspects of instruments and their usage through various modes.

Course outcomes:

CO1: The student will demonstrate an understanding of the basic principles, theories, and laws of physicsthrough the description of physical systems and understanding.

CO2: Ability to understand construction of CRO.

CO3: To develop skill to understand the working of various generators and analysis instruments.

CO4:The ability to understand the working of various digital instruments.

UNIT-I:BASIC OF MEASUREMENT: 10LECTURES

Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects. Multimeter: Principles of measurement of dc voltage and dc current, ac voltage. Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to inputimpedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronicVoltmeter/ Multimeter and their significance. AC millivoltmeter: Type of AC millivoltmeters: Amplifier- rectifier,andrectifier-amplifier. Block diagramacmilli voltmeter,specifications and their significance

UNIT-II CATHODE RAY OSCILLOSCOPE: 10LECTURES

Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization.Frontpanelcontrols.SpecificationsofaCROandtheirsignificance.Use of CRO for the measurement of voltage (dc and ac frequency, time. Special features of dual trace,introductionto digitaloscilloscope,probes.DigitalstorageOscilloscope:Blockdiagramandprincipleofworking.

UNIT-III:SIGNAL GENERATORS AND ANALYSIS INSTRUMENTS: 10LECTURES

Block diagram, explanation, and specifications of low frequency signal generators. pulse generator, and function generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis.

UNIT-IV:IMPEDANCE BRIDGES & Q-METERS: 10LECTURES

Block diagram of bridge. working principles of basic (balancing type) RLC bridge. Specifications of RLC bridge.Blockdiagram&working principlesof aQ-Meter. DigitalLCRbridges.

UNIT-V:DIGITAL INSTRUMENTS: 10LECTURES

Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter.Working principles of digital voltmeter. Digital Multimeter: Block diagram and working of a digital multimeter.Working principle of time interval,frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy andresolution.

REFERENCEBOOKS:

- Instruments &Instrumentation byAKSawney
- Digital measurement techniques by T. S. Rathore
- Electronic Measurement Techniques by D. F. A. Edwards.
- Metrology & Measurement by Bewoor

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	1	3	-	2	2	2	1	1
CO2	2	-	1	-	3	2	1	-
CO3	1	2	-	1	1	2	-	-
CO4	1	3	-	-	2	1	-	-

MPH-222:NANOSCIENCE AND TECHNOLOGY DEPARTMENTAL ELECTIVE-II

L-3, T-1 P-0 **Credits–4** **Max Marks: 100**

Objectives: Introduction to the underlying principles and applications of the emerging field of nanotechnology and nanoscience along with practical synthesis of nanomaterials.

Course outcomes:

CO1: To develop the understanding of nano dimension in science.
CO2: To understand the quantum mechanical phenomena associated in nano materials.
CO3: To develop skill to understand various characterization techniques.
CO4:The ability to understand about various ceramic materials.

UNIT-1:INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY 10LECTURES

Introduction on nanomaterials, Properties of materials & nanomaterials,role of size in Nanomaterials:nanoparticles, semiconducting nanoparticles, nanowires, nanoclusters, quantum wells, thin films, nano-compositor and advantages. Introduction to Carbon Nanostructures: Graphene, fullerenes,CarbonNanotubes.

UNIT-II:QUANTUM MECHANICS FOR NANOSCIENCE 10LECTURES

Electronic structure of 0-D, 1-D, 2-D, 3-D. Resonant tunneling quantized energy levels, Reflection and transmission by a potential step and by a rectangular barrier, band structure and density of states at Nanoscale. Semiconductorandmetallicdots,opticalspectra,Discretechargestates,Electricaltransport in0-D,coulombblockadephenomena.

UNIT-III: GROWTH TECHNIQUES OF NANOMATERIALS 10LECTURES

Top-Down & Bottom-Up, Lithographic techniques, Non lithographic techniques, Fabrication of Nanomaterialsby different Methods: -Inert gas condensation, Arc discharge, Sputtering, Laser ablation, Laser pyrolysis, Ball Milling, Molecular beam epitaxy, Chemical vapour deposition,Electro deposition , chemical precipitation, Sol gel and greensynthesis.

UNIT-IV:CHARACTERIZATION TOOLS OF NANOMATERIALS AND APPLICATIONS 10LECTURES

X-ray diffraction, Scanning Electron Microscopy (SEM), Scanning Probe Microscopy (SPM),TEM, Scanning Tunneling Microscopy (STM), Atomic force Microscopy (AFM). UV-visible,FTIR and Raman spectroscopy.Nanosensors:biology andenvironment: Quantumdot, hetero structurelaser andsingleelectrondevices.

UNIT-V:CERAMIC MATERIALS **10LECTURES**

Refractories, silica and silicates, glasses, glass-forming constituents, types of glasses, perovskitestructure of mixedoxides, lime, cement, cement concrete, reinforced cement concrete (RCC),pre-stressed concrete, rocks and stones,clay and clay-based ceramics, chemically bonded ceramics.

REFERENCEBOOKS:

- Poole and Owens: Introduction to Nanotechnology
- Nanoscale materials-Liz Marzanand Kamat
- Nanoscience&Technology:Novelstructureand phenomena byPingSheng(Editor)
- NanoEngineeringinScience&Technology:AnintroductiontotheworldofnanodesignbyMichael Rieth.
- Nanotubes and Nanowires-CNR Rao and A Govindaraj RCS Publishing
- Nalva:Handbook of Nanostructured Materials and Nanotechnology

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	2	-	1	2	3	1	1
CO2	2	2	1	-	1	2	1	-
CO3	1	1	-	1	1	2	-	-
CO4	2	1	-	-	2	3	-	-

MPH-223: ELECTRONIC COMMUNICATION SYSTEM

(SPECIALIZATION ELECTIVE PAPER-III)

L-3, T-1 P-0 **Credits–4** **Max Marks: 100**

Objective: To understand the details of communication and transmission system.
Course outcomes:

CO1: To develop the understanding of communication system.
CO2: To understand the modulation and demodulation of frequency.
CO3: To understand the analog and pulse modulation.
CO4:The ability to understand about the broadband communication system.

UNIT-I:INTRODUCTION TOCOMMUNICATION SYSTEM **10LECTURES**
Information transmitter, channel noise, receiver, need for modulation bandwidth requirements, noise and its types,representation of AM, frequency spectrum, power relations in AM wave, techniques for generation of AM, AM transmitter, AM receiver types, single and multi-super hetro dyne receivers,communication receivers

UNIT-II:FREQUENCY MODULATION AND RADAR SYSTEM **10LECTURES**
Description of FM systems, mathematical representation, comparison of wide band and narrow band FM, FMgeneration techniques, FMdemodulators, FMreceivers

UNIT-III:ANALOG MODULATION **10LECTURES**
Fundamentals of modulation, Frequency spectra in AM modulation, power in AM modulated. class C amplifier,Efficiency modulation, linear demodulation of AM waves, frequency conversion, SSB system, Balanced modulation,filtering the signalfor SSB,phase shiftmethod, productdetector,

UNIT-IV:PULSE COMMUNICATION **10LECTURES**
Information theory, Pulse modulation: PAM, PTM, PWM, PPM, PCM(in brief), pulse modulation, types of pulsemodulation, pulse amplitude modulation (PAM), pulse width modulation (PWM), pulse position modulation (PPM)andpulse codemodulation(PCM), PCMtransmissionsystem, telegraphy.

UNIT-V: BROADBAND COMMUNICATION SYSTEM **10LECTURES**
Frequency division multiplex (FDM), Time division multiplex (TDM), coaxial cables, fiber optics links, microwavelinks, tropospheric scatter links, submarine cables, satellite communication systems, elements of long-distance telephony

REFERENCEBOOKS:

- Haykin:Communication System
- Kennedy:Electronicsand communication system
- Kulkarni:Microwaveandradarengineering
- RoddyandCoolen: Electronics Communication

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	-	2	2	1	1
CO2	1	3	1	1	1	2	1	-
CO3	1	1	-	-	2	2	-	-
CO4	2	3	-	2	2	1	-	3

MPH-223: ELECTRONIC DEVICES

L-3, T-1 P-0 **Credits–4** **Max Marks: 100**

Objective: The aim of the course is to provide students with a thorough knowledge of Semiconductor.

Course outcomes:

CO1: To develop the understanding of microwave devices.
CO2: To understand the modulation and demodulation of frequency.
CO3: To understand the working of various memory devices.
CO4:The ability to understand about the radar systems.

UNIT-I:SEMI-CONDUCTOR DEVICES **10 LECTURES**

Review of p-n junction, metal semiconductor and metal oxide semiconductor junctions, review of JFET, MESFET and MOSFET-their frequency limits. Noise: Signal to noise ratio(SNR) and enhancement of SNR in instrumentation and communication

UNIT-II:MICROWAVEDEVICES **10 LECTURES**

Tunnel diode, transfer electron devices(Gunn diode),Avalanche transit time devices(Reed,Impactdiodes,parametricdevices), vacuum tube devices, reflex klystron and magnetron.

UNIT-III:MEMORY DEVICES **10 LECTURES**

Volatile static and D-RAM,CMOS and NMOS,nonvolatile-NMOS,ferroelectricsemiconductors,opticalmemories, magnetic memories, charge coupled devices (CCD), Piezoelectric, pyroelectric, and magnetic devices,SAWandintegrated devices.

UNIT-IV:EXTERNAL PHOTOELECTRIC EFFECT DETECTOR: **12LECTURES**

Vacuum photodiode,photomultipliers,micro-channels,InternalPhotoelectric Effect detectors:PNjunctionphotodiode, solar cell (open circuit voltage, short circuit current, fill factor), pin photodiode, avalanche photodiode,Phototransistor, Light emitting diode.

UNIT-V: RADAR SYSTEMS: **10 LECTURES**

Basics principals, pulsed radar systems, moving targets indication ,radar beacons,CW Doppler radar,frequency modulated CW radar, phased array radars, planar array, radar

REFERENCE BOOKS:

- Integrated Electronics By Millman &Halkias.
- Electronic Devices & Circuits By Millman &Halkias.
- Electronic Circuits –Discrete And Integrated By Schilling Belov.
- Micro Electronics By Millman And Grabel.
- Electronic Devices and Circuits –T.F.Bogart, J.S.Beasley andG.Rico,PearsonEducation,6th edition,2004.

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	-	2	2	3	3
CO2	1	3	1	-	1	2	1	-
CO3	1	3	3	-	2	2	-	-
CO4	2	3	-	-	2	1	1	-

MPH-271: MEASUREMENT TECHNIQUE LAB

L-0, T-0 P-4 **Credits–2** **Max Marks:100**

Objective: The aim of this course is to give an extended knowledge of various measurement techniques.

Course Outcomes:

CO1: To understand the working of oscilloscope.

CO2: To understand the mechanism of multimeters.

CO3: Understand about the working of transformers.

CO4: To know the mechanism of balancing bridges.

The test of lab skills will be of the following test items:

1. Use of an oscilloscope.
2. CRO as a versatile measuring device.
3. Circuit tracing of Laboratory electronic equipment,
4. Use of Digital multimeter/VTVM for measuring voltages
5. Circuit tracing of Laboratory electronic equipment,
6. Winding a coil/transformer.
7. Study the layout of receiver circuit.
8. Troubleshooting a circuit
9. Balancing of bridges

LaboratoryExercises:

1. To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance.
2. To observe the limitations of a multimeter for measuring high frequency voltage and currents.
3. To measure Q of a coil and its dependence on frequency, using a Q-meter.
4. Measurement of voltage, frequency, time period and phase angle using CRO.
5. Measurement of time period, frequency, average period using universal counter/frequency counter.
6. Measurement of rise, fall and delay times using a CRO.
7. Measurement of distortion of a RF signal generator using distortion factor meter.
8. Measurement of R, L and C using a LCR bridge/ universal bridge.

Open Ended Experiments:

1. Using a Dual Trace Oscilloscope
2. Converting the range of a given measuring instrument (voltmeter,ammeter)

Note:**Each student is required to perform at least 07 of the above experiments.**

REFERENCEBOOKS:

- A textbook in Electrical Technology- B L Theraja- S Chand and Co.
- Performance and design of AC machines-MGSay ELBS Edn.
- Electronic Devices and circuits, S. Salivahanan& N. S. Kumar, 3rd Ed., 2012,
- Tata Mc-Graw HillElectroniccircuits:Handbookofdesignandapplications,U.Tietze,Ch.Schenk,2008,
- SpringerElectronicDevices,ThomasL. Floyd, 2008, PearsonIndia

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	1	-	-	2	2	1	1
CO2	1	3	1	1	1	2	1	-
CO3	1	1	-	-	2	2	-	-
CO4	2	3	-	2	2	1	-	3

MPH-273: ELECTRONIC COMMUNICATION SYSTEM

(SPECIALIZATIONELECTIVEPAPER-III)Lab

L-0, T-0 P-4 **Credits–2** **Max Marks:100**

Objective: The aim of this course is to give an extended knowledge of electronic communication systems.

Course Outcomes:

CO1: To understand the working of modulation and demodulation.
CO2: To understand the mechanism of amplitude modulation.
CO3: Understand about the pulse modulation.
CO4: To know about the working of frequency modulation.

1. Study of Amplitude modulation & demodulation.
2. Study of frequency modulation & demodulation.
3. Study of phase modulation & demodulation.
4. Study of Amplitude shift keying.
5. Study of Phase shift keying.
6. Study of Frequency shift keying.
7. Study of Pulse Amplitude modulation & demodulation.
8. Study of Pulse frequency modulation & demodulation.
9. Study of pulse phase modulation & demodulation.
10. Study of pulse code modulation &demodulation.

Note: Each student is required to perform at least 07 of the above experiments.

REFERENCEBOOKS

- Communication Systems Engineering(2ndEdition):John G.Proakis
- ElectronicsEngineer'sReferenceBook- 6thEdition - Elsevier
- Electronic Communication Systemby-Kennedy

POs COs	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1	2	3	-	-	2	2	3	3
CO2	1	3	1	-	1	2	1	-
CO3	1	3	3	-	2	2	-	-
CO4	2	3	-	-	2	1	1	-

Objective- The emphasis of course is on applications in solving problems of interest to physicists. The students are to be examined entirely based on problems, seen and unseen.

Course Outcome:

CO1: Use complex analysis in solving physical problems.

CO2: Solve ordinary and partial differential equations of second order that are common in the physical sciences.

CO3: Use the orthogonal polynomials and other special functions.

CO4: Use Fourier series and integral transformation.

UNIT-I.COMPLEX VARIABLES: 10LECTURES

Introduction, Cauchy-Riemann conditions, Cauchy's Integral formula, Laurent expansion, singularities, calculus of residues, evaluation of definite integrals, Dispersion relation.

UNIT-II.DELTA AND GAMMA FUNCTIONS: 10LECTURES

Dirac delta function, Delta sequences for one dimensional function, properties of delta function, Gamma function, factorial notation and applications, Beta function.

UNIT-III.DIFFERENTIAL EQUATIONS: 11LECTURES

Partial differential equations of theoretical physics, boundary value, problems, Neumann & Dirichlet Boundary conditions, separation of variables, singular points, series solutions, second solution.

UNIT-IV:SPECIAL FUNCTIONS: 12LECTURES

Bessel functions of first and second kind, Generating function, integral representation, and recurrence relations forBessel's functions of first kind, orthogonality. Legendre functions : generating function, recurrence relations andspecial properties, orthogonality, various definitions of Legendre polynomials. Associated Legendre functions: recurrence relations, parity, and orthogonality, Hermite functions, Laguerre functions.

UNIT-V:ELEMENTARY STATISTICS: 10LECTURES

Introductiontoprobabilitytheory,randomvariables,Binomial,PoissonandNormaldistribution.

REFERENCE BOOKS:

- Mathematical Methods for Physicists :G.Arfken and H.J.Weber (Academic Press,San Diego) 7th edition,2012.
- Mathematical Physics:P.K. Chattopadhyay (Wiley Eastern,NewDelhi),2004.
- Mathematical Physics: A.K. Ghatak,I.C. Goyal and S.J.Chua (MacMillan,India,Delhi),1986.
- Mathematical Methods in the Physical Sciences– M.L.Boas(Wiley,New York)3rdedition,2007.
- Special Functions: E.D.Rainville (Mac Millan, New York),1960.
- MathematicalMethodsforPhysicsandEngineering:K.F.Riley,M.P.HobsonandS.J.Bence(CambridgeUniversity Press, Cambridge)3rd ed., 2006.

Course Code: MPH-111	Subject Name: CLASSICAL MECHANICS	L T P	Cr.
		3+1+0	4

Objective: The aim of course will increase the understanding of the following fundamental concepts in the dynamics of system of particles, motion of rigid body, Lagrangian and Hamiltonian formulation of mechanics.

Course outcomes:

CO1: Define and understand basic mechanical concepts related to discrete and continuous mechanical systems.

CO2: Describe and understand the vibrations of discrete and continuous mechanical systems.

CO3: Describe and understand planar and spatial motion of a rigid body.

CO4: Describe and understand the motion of a mechanical system using Lagrange-Hamilton formalism.

UNIT-I. LAGRANGIAN FORMULATION: 12LECTURES

Mechanics of a system of particles; constraints of motion, generalized coordinates, D'Alembert's Principle and Lagrange's velocity- dependent forces and the dissipation function, Applications of Lagrangian formulation.

UNIT-II.HAMILTON'SPRINCIPLES: 10LECTURES

Calculus of variations , Hamilton's principle, Lagrange's equation from Hamilton's principle, extension to nonholonomic systems, advantages of variational principal formulation, symmetry properties of space and time and conservation theorems.

UNIT-III.HAMILTON'S EQUATIONS: 09LECTURES

Legendre Transformation, Hamilton's equations of motion, Cyclic-ordinates, Hamilton's equations from variational principle, Principle of least action.

UNIT-IV.CANONICAL TRANSFORMATION AND HAMILTON-JACOBI THEORY: 10LECTURES

Canonical transformation and its examples ,Poisson's brackets, Equations of motion, Angular momentum, Poisson's Bracket relations, infinitesimal canonical transformation, Conservation Theorems. Hamilton Jacobi equations for principal and characteristic functions, Action-angle variables for systems with one-degree of freedom.

UNIT-V.RIGID BODY MOTION AND SMALL OSCILLATIONS: 11LECTURES

Independent co-ordinates of rigid body, orthogonal transformations, Eulerian Angles and Euler's theorem, infinitesimal rotation, Rate of change of a vector, Coriolis force, angular momentum, and kinetic energy of a rigidbody, the inertia tensor, principal axis transformation, Euler equations of motion, Torque free motion of rigid body, motion of a symmetrical top. Eigenvalue equation, Free vibrations, Normal Coordinates, Vibrations of a tri atomic molecule.

REFERENCE BOOKS:

- Classical Mechanics: H. Goldstein, C. Poole and J. Safko (Pearson Education Asia, New Delhi), 3rd ed2002.
- Classical Mechanics of Particles and Rigid Bodies: K.C. Gupta (Wiley Eastern, New Delhi),1988.

Course Code: MPH-112	Subject Name: QUANTUM MECHANICS – I	L T P	Cr.
		3+1+0	4

Objective: Connect the historical development of quantum mechanics with previous knowledge and learn the basic properties of quantum world.

Course outcomes:

CO1: Pinpoint the historical aspects of development of quantum mechanics

CO2: Understand and explain the differences between classical and quantum mechanics

CO3: Understand the idea of wave function, uncertainty relations, Schrodinger equation for simple potentials

CO4: Identify and relate the eigenvalue problems for energy, momentum, angular momentum and central potentials explain the idea of spin.

UNIT-I:MATHEMATICAL TOOLS OF QUANTUM MECHANICS: 10LECTURES

Brief introduction to origins of quantum Physics. Wave packets. Dirac notation. Operators, their eigen values and eigenfunctions, orthonormality, completeness and closure. Generalized Uncertainty Principle. Unitary transformations, change of basis. Matrix Representation of operators. Continuous basis, position and momentum representation and their connection. Parity operator.

UNIT-II: FUNDAMENTAL CONCEPTS OF QUANTUM MECHANICS: 12LECTURES

Basic postulates of quantum mechanics.Measurement.Timeevolutionofsystem'sstate.Propertiesofone-dimensional motion, free particle, potential step, potential well and barrier , tunneling effect, infinite square well potential, simple harmonic oscillator by wave equation and operator method, charged particle in a uniform magnetic field.

UNIT-III:SPHERICALLY SYMMETRIC POTENTIAL: 10LECTURES

Separation of variables in spherical & Polar coordinates, orbital angular momentum, parity, spherical harmonics, free particle in spherical polar coordinates, square well potential, hydrogen atom. radial solution and principal quantum number, orbital and magnetic quantum number. Electron probability density, radiative transition.

UNIT-IV:ANGULAR MOMENTUM: 08LECTURES

Orbital, Spin and total angular momentum operators. Pauli spin matrices, their Commutation relations. Eigenvalues and eigenfunctions L^2 of Lz.

UNIT-V:IDENTICAL PARTICLES: 08LECTURES

Many particle systems, systems of identical particles, exchange degeneracy, summarization postulate, construction of symmetric and anti-symmetric wavefunctions from un-symmetrized functions. The Pauli Exclusion Principle.

REFERENCE BOOKS:

- Franz Schwabl: Quantum Mechanics
- J. J. Sakurai: Modern Quantum Mechanics
- N. Zettili: Quantum Mechanics
- P.A.M. Dirac: Principles of Quantum Mechanics
- Bohm: Quantum Mechanic

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Course Code: MPH-113	Subject Name: ELECTRO-OPTIC EFFECTS IN MATERIALS (EOEM)	L T P	Cr.
		3+1+0	4

Objective: The emphasis of course is on Fundamentals and properties of Electro-optic, propagation of light in anisotropic optical media and electro-optical effects in liquid crystals.

Course outcomes:

CO1: Understanding of Fundamentals and properties of Electro-optic.

CO2: Understanding of light in anisotropic optical media.

CO3: Understanding of electro-optical effects in liquid crystals.

CO4: Understanding of liquid crystal devices.

UNIT-I.PRINCIPLES OF ELECTRO-OPTICS LECTURE8

Introduction, Fundamentals of Electro-optic effects, Pockels and Kerr effect. Electro-optic sensors and switches, spatial light modulators, phase retarders. Electro-optical materials: Inorganic crystals, organic crystals, liquid crystals, semiconductors, dye-doped polymers, dichroism in materials, field induced-anisotropy in materials.

UNIT-II.PROPAGATION OF LIGHT IN ANISOTROPIC OPTICAL MEDIA LECTURE7

Electromagnetic Waves, Polarization, Monochromatic plane waves and their polarization states: Linear polarization states, Circular polarization states, Elliptical polarization states. Propagation of Light in Uniform Anisotropic Optical Media, Birefringence, ordinary and extraordinary waves, Eigenmodes, Orthogonality of eigen modes, Energy flux, Special cases, Polarizers

UNIT-III-LIQUID CRYSTALS–THE FOURTH PHASE OF MATTER LECTURE11

Introduction,classificationofliquidcrystals,variousmesophasesofliquidcrystals,polymerliquidcrystals,chirality in liquid crystals, ferroelectric and antiferroelectric liquid crystals, discotic liquid crystals, lyotropic liquid crystals, applications.

UNIT-IV–ELECTRO-OPTICAL EFFECTS IN LIQUID CRYSTALS LECTURE12

Order parameter, Anisotropy in liquid crystals, electrical anisotropy, optical anisotropy, deformations, electro-optic alignment, optical waveguiding, field-induced switching, Freedericksz transition, response time, confinement of liquid crystals for electro-optic effects, factors governing electro-optics.

UNIT-V- LIQUID CRYSTAL DEVICES LECTURE12

Display matrices, LCD, TN displays, STN displays, fast-switching devices, phase modulators, Guest-host displays, Liquid crystal-polymer dispersions, flexible displays, non-display devices.

REFERENCE BOOKS:

- G. R. Elionand H. A. Elion, Electro-Optics Handbook, Marcel Dekker, New York,
- P.Kaminow,AnIntroductiontoElectroopticDevices,AcademicPress,NewYork,
- ThePhysicsofLiquidCrystals:P.G.deGennesandJProst.OxfordUniversity press.
- Liquid Crystals- Applications and Uses: B Bhadur (Vol.1,2,3)

Course Code: MPH-114	Subject Name: ELECTRONICS	L T P 3+1+0	Cr. 4

Objective: To introduce students to entire circuit designs, and to provide in-depth theoretical base of Digital Electronics. The Electronics course covers semiconductor physics, physical principles of devices and their basic applications, basic circuit analysis, first-order nonlinear circuits, Analysis of Passive and Active filters, OPAMP based analog circuits and introduction to various communication techniques.

Course outcomes:

CO1: Understanding of Fundamentals and properties of semiconductor devices.
CO2: Logic circuits, digital systems and microprocessor and their peripheral devices.
CO3: Operating and designing digital systems
CO4: How to solve problems in design and/ or implementation of digital.

UNITI:SEMICONDUCTOR DEVICES-I 10LECTURES

Semiconducting Materials, conduction in semiconductors, Charge densities in a semiconductor, PN junction, space charge and electric field distribution at junctions, forward and reverse biased conditions, Space charge capacitance, varactor diode, Zener and avalanche breakdowns, Zener diodes, Schottky barrier, tunnel diode, photodiode, LED, p-n-p-n devices and their characteristics.

UNIT-II:SEMICONDUCTOR DEVICES II 12LECTURES

Transistors: Bipolar junction Transistor(BJT),Analysis of CE amplifier using h-parameters, The T-network equivalent circuit, constants of CB and CE amplifier using emitter, base, collector resistance, Biasing technique to BJT, stabilization factor, temperature stabilization, operating point, fixed bias, emitter feed back bias, voltage feedback bias. Field-Effect Transistors (FET) and MOSFET: Structure, Working, Derivations of the equations for I-V characteristics under different conditions.

UNIT–III POWER AMPLIFIER AND OSCILLATORS 11LECTURES

Operating conditions for power amplifier, power relations, The ideal transformer, voltage limitations of the transformer, non-linear distortion, Idea of inter-modulation distortion, The class A power amplifier, The push-pull amplifier, Feedback requirements of oscillations, Basic oscillator analysis, Hartley and Colpitt oscillators, Piezo-electric, frequency control, RC oscillators.

UNIT–IV BASICS OF DIFFERENTIAL AND OPERATIONAL AMPLIFIERS 10LECTURES

Differentialamplifier,Differentialamplifiercircuitconfiguration,Dualinputbalancedoutputdifferentialamplifier, Voltage gain, differential input resistance, inverting and non-inverting inputs, common mode rejectionratio,Operationalamplifier,inputoffsetvoltage,inputoffsetcurrents,inputbiascurrents,differential inputresistance, input capacitance, offset voltage supply, rejection ratio, Ideal OP Amp, equivalent circuit of an OP Amp, ideal voltage transfer curve, inverting, dual and non-inverting amplifier, measurement of OP Amp parameters, frequency response

UNIT-V COMMUNICATION SYSTEMS (BROAD ASPECTS): 10LECTURES

Digital transmission, ASK, FSK, PSK, Differential PSK, modulators and detectors, Broadband Communication Systems-Optical Fibre comm., Submarine cables, Satellite and cellular mobile systems, Integrated Services Digital Network

REFERENCE BOOKS:

- Electronics Fundamentals and Application: J. D. Ryder
- Solid State Electronic Devices: B. G. Streetman
- Electronic Principals: Malvino
- Principals of Microwave: Atwarter
- Electromagnetic Wave and Radiating System: Jorden and Ballmon
- Electronic Devices and Circuits Millman and Halkias

Course Code: MPH-161	Subject Name: GENERAL PHYSICS LABORATORY	L T P	Cr.
		0+0+4	2

Objective: The aim and objective of the course General Physics Laboratory is to expose the students to experimental techniques in electronics, so that they can verify some of the things read in theory here or in earlier classes and develop confidence to handle sophisticated equipment.

Course outcomes:

CO1: Understanding of Fundamentals of semiconductor devices, energy, Magnetic Susceptibility .
CO2: Understanding of Hall effect in semiconductors
CO3: Understanding of Hysteresis loop curve of Magnetic Materials
CO4:Master the techniques to calculate various mechanical parameters.

List of Experiments:

15. G.M. Tube Characteristics & Absorption Coefficient

16. Study of high energy interaction in nuclear emulsion

17. Study of Hall effect in semiconductors:

(a) Determination of Hall voltage and Hall coefficient, and
(b) Determination of the mobility of charge carriers and the carrier concentration.

18. Study of Magnetic Susceptibility of $MnCl_2$

19. To determine dissociation Energy of Iodine Molecule

20. To study of Hysteresis loop curve of Magnetic Materials

21. To study conductivity of a Semiconductor using Four Probe method

22. Determination of the energy gap of a semiconductor by four probe method.

23. To determine the response of silicon solar cells and the effect of prolonged irradiation and to calculate the efficiency and fill factors of a variety of solar cells.

24. To determine: a).the velocity of ultrasonic waves in a liquid and,
b). the compressibility of the liquid.

25. Dielectric constant of ice.

26. Elastic properties of a solid using piezoelectric oscillator.

27. Measurement of e/m by Thomson effect.

28. Michelson interferometer.

Note: Each student is required to perform at least 07oftheaboveexperiments.

Course Code: MPH-163	Subject Name: Electro-Optic Effects In Materials (EOEM) Lab	L T P	Cr.
		0+0+4	2

Objective: The aim and objective are to expose the students to experimental techniques of Electro-optic, propagation of light in anisotropic optical media and electro-optical effects in liquid crystals.

Course outcomes:
CO1: Understanding of phase transition temperatures for L C materials.
CO2: Understanding of Response Time characteristics of a PDLC cell.
CO3: Understanding of effects of various frequency-shapes on the EO properties.
CO4:Master the techniques to Structural and morphological changes in liquid crystal.

8. To examine the phase transition temperatures for LC materials.
9. To study the electro-optical behavior of a Liquid Crystal cell.
10. To study the Response Time characteristics of a PDLC cell.
11. To study the angular dependence of VT characteristics in a PDLC cell.
12. To examine the polarized effects of light through a Liquid Crystal device.
13. To study effects of various frequency-shapes on the EO properties and response time of liquid crystal device.
14. Structural and morphological changes in liquid crystal director configuration under effect of an applied electric field.

Note: Each student is required to performatleast7oftheaboveexperiments.

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Course Code: MPH-164	Subject Name: ELECTRONICS LAB	L T P	Cr.
		0+0+4	2

Objective: The aim and objective of the course electronics lab is to expose the students of M.Sc. (H.S.) class to experimental techniques in electronics, so that they can verify some of the things read in theory here or in earlier classes and develop confidence to handle sophisticated equipment

Course outcomes:
CO1: Understanding of types of amplifiers.
CO2: Understanding of characteristics of PN junction diode.
CO3: Experimental knowledge of Schottky diode, tunnel diode.
CO4:Experimental knowledge of different Operational Amplifier IC-741

LISTOFEXPERIMENTS:

8. Design & Study of Common Emitter Amplifier characteristics curve of PN junction diode
9. To draw the characteristics curve of PN junction diode.
10. To draw the characteristics curve of Zener diode.
11. To draw the characteristics curve of Schottky diode
12. To draw the characteristics curve of Tunnel diode
13. To draw the characteristics curve of Photodiode
14. Study of Operational Amplifier IC-741:
    a. summer,
    b. Subtractor
    c. Inverter
    d. Non-inverter
    e. Differentiat
    or integrator

Note: Each student is required to perform atleast7oftheaboveexperiments.

REFERENCE BOOKS:

- Electronics Fundamentals and Application: J. D. Ryder
- Solid State Electronic Devices: B. G. Streetman
- Electronic Principals: Malvino
- Principals of Microwave: Atwarter

SEMESTER-II

Course Code: MPH-115	Subject Name: QUANTUM MECHANICS–II	L T P	Cr.
		3+1+0	4

Objective: This course will introduce Dirac's braket formulation of quantum mechanics and make students familiar with various approximation methods applied to atomic, nuclear and solid-state physics, and to scattering.

Course outcomes:

CO1: Develop a knowledge and understanding of the concept that quantum states live in a vector space.

CO2: Develop a knowledge and understanding of perturbation theory, level splitting, and radiative transitions.

CO3: Knowledge and understanding of the role of angular momentum in atomic and nuclear physics.

CO4: Knowledge and understanding of the scattering matrix and partial wave analysis.

UNIT-I.LINEAR VECTOR SPACE AND MATRIX MECHANICS: 12LECTURES

Vector spaces, Schwarz inequality, Orthonormal basis, Schmidt ortho-normalisation method, Operators, Projection operator, Hermitian and Unitary operators, change of basis, Eigenvalue and Eigenvectors of operators, Dirac's bra and ket notation, commutators, Simultaneous eigenvectors, Postulates of quantum mechanics, uncertainty relation. Harmonic oscillator in matrix mechanics, Time development of states and operators, Heisenberg and Schrodinger representations, Exchange operator and identical particles. Density Matrix and Mixed Ensemble.

UNIT-II.SYMMETRY IN QUANTUM MECHANICS 10LECTURES

Symmetry operations and unitary transformations, conservation principles, space and time translations, rotation, space inversion and time reversal, symmetry, and degeneracy.

Rotation operators, angular momentum algebra, eigenvalues of J^2 and Jz, spinors and Pauli matrices, addition of angular momenta. Representation of general angular momentum operator, Addition of angular momenta, C.G. coefficients.

UNIT-III.TIME-INDEPENDENT &TIME-DEPENDENT PROBLEMS APPROXIMATION METHODS 10LECTURES

Non-degenerate perturbation theory, degenerate case, Stark effect, Zeeman effect and other examples, variational methods, W K B method, tunnelling.

Schrödinger and Heisenberg picture, time-dependent perturbation theory, transition probability calculations, golden rule, adiabatic approximation, sudden approximation, beta decay as an example.

UNIT-IV.STATIONARY STATE APPROXIMATE METHODS: 08LECTURES

Variational method with applications to the ground states of harmonic oscillator and other sample systems.

UNIT-V.SCATTERING THEORY 10LECTURES

Differential cross-section, scattering of a wave packet, integral equation for the scattering amplitude, Born approximation, method of partial waves, low energy scattering and bound states, resonance scattering.

REFERENCE BOOKS:

- C. Cohen- Tannoudji, B. Diuand F. Laloe, Quantum Mechanics (Volume II).
- A. Messiah, Quantum Mechanics(Volume II).
- S. Flügge, Practical Quantum Mechanics.
- J. J. Sakurai, Modern Quantum Mechanics.
- K. Gottfried, Quantum Mechanics.

Course Code: MPH-116	Subject Name: THEORY OF RADIATION & STATISTICAL MECHANICS	L T P	Cr.
		3+1+0	4

Objective: This course introduces the microscopic formulation of thermal physics, generally known as statistical mechanics. The course explores the general principles, from which emerge an understanding of the microscopic significance of entropy and temperature.

Course outcomes:

CO1: Understanding the concepts of microstate and macro state of a model system

CO2: Knowledge the concepts and roles of entropy and free energy from the viewpoint of statistical mechanics.

CO3: Discuss the concept and role of indistinguishability in the theory of gases; know the results expected from classical considerations and when these should be recovered.

CO4: Understanding of the Fermi-Dirac and Bose-Einstein distributions; state where they are applicable; understand how they differ and show when they reduce to the Boltzmann distribution

UNIT-I:THEORY OF RADIATION 10LECTURES

ClassicalTheoryofRadiation:PropertiesofThermalRadiation.BlackbodyRadiation.PureTemperatureDependence,Kirchhoff'sLaw,Stefan-BoltzmannLawandWien'sDisplacementlaw.Saha'sIonizationFormula.

UNIT-II QUANTUM THEORY OF RADIATION: 12LECTURES

Stefan-Boltzmann Law: Thermodynamic Proof. Radiation Pressure, Spectral Distribution of Black Body Radiation. Wien's Distribution Law and Displacement Law, Rayleigh-Jean's Law, Ultraviolet Catastrophe, Planck's Quantum Postulates. Planck's Law of Blackbody Radiation : Experimental Verification. Deduction of (1) Wien's Distribution Law,(2)Rayleigh-Jeans Law,(3)Stefan-Boltzmann Law and(4)Wien's Displacement Law from Planck's Law.

UNIT-III.REVIEW OF THERMODYNAMICS 10LECTURES

Extensive and intensive variables, laws of thermodynamics, Legendre transformations and thermodynamic potentials, Maxwell relations, applications of thermodynamics to (a) ideal gas, (b) magnetic material, and (c)dielectric material.

UNIT-IV.FORMALISM OF EQUILIBRIUM STATISTICAL MECHANICS 11LECTURES

Concept of phase space, Liouville's theorem, basic postulates of statistical mechanics, ensembles: microcanonical,canonical,grandcanonical,andisobaric,connectiontothermodynamics,fluctuations,applic

ationsofvariousensembles, partition function, equation of state for a non-ideal gas, Van der Waals' equation of state, Meyer cluster expansion, virial coefficients

UNIT-V.QUANTUM STATISTICS 12LECTURES

Transition from classical statistical mechanics to quantum statistical mechanics, Indistinguishability and quantum statistics, identical particles and symmetry requirements, Bose Einstein statistics, Fermi Dirac statistics, Maxwell Boltzmann statistics. Bose Einstein Condensation, Thermal properties of B.E. gas, liquid Helium, Energy and pressure of F-Dgas, Electrons in metals, Thermionic Emission. Fermi-Dirac and Bose- Einstein statistics.

Applications of the formalism to:

(c) Ideal Bose gas, Debye theory of specific heat, properties of black-body radiation, Bose-Einstein condensation, experiments on atomic BEC,BEC in a harmonic potential.

(d) Ideal Fermi gas, properties of simple metals, Pauli Paramagnetism, electronic specific heat, white dwarf stars.

REFERENCE BOOKS:

- F. Reif, Fundamentals of Statistical and Thermal Physics.
- K. Huang, Statistical Mechanics.
- R. K. Pathria, Statistical Mechanics.
- D. A. Mc Quarrie, Statistical Mechanics.
- S.K. Ma, Statistical Mechanics.

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Course Code: MPH-117	Subject Name: NUMERICAL METHODS AND COMPUTATIONAL PHYSICS	L T P	Cr.
		3+1+0	4

Objective: This hands-on course introduces computational methods in solving problems in physics. It teaches programming tactics, numerical methods, and their implementation, together with methods of linear algebra.

Course outcomes:

CO1: Identify modern programming methods and describe the extent and limitations of computational methods in physics

CO2: Independently program computers using leading-edge tools,

CO3: Formulate and computationally solve a selection of problems in physics

CO4: Use the tools, methodologies, language, and conventions of physics to test and communicate ideas and explanations.

UNIT-I:DIFFERENTIATION AND INTEGRATION (12LECTURES)

Differentiation: Taylor series method, Numerical differentiation using Newton's forward difference formula, Backward difference formula, Stirling's formula, Cubic splines method.

Integration: Trapezoidal rule, Simpson's 1/3 rule, Gaussian Quadrature, Legendre–Gauss Quadrature, Numerical double integration, Numerical integration of singular integrals.

UNIT-II:SOLUTIONOFDIFFERENTIALEQUATIONS (12LECTURES)

Numerical solution of ordinary differential equations: Taylor's series method, Euler's method, Forth-order Runge Kutta method, Cubic splines method; Second order differential equations: Initial and boundary value problems, Numeric solution of Radial Schrodinger equation for Hydrogen atom using Forth-order Runge-Kutta method(when eigen value is given), Numerical Solutions of Partial Differential Equations Using Finite Difference Method.

UNIT-III:RANDOMNUMBERSANDCHAOS (12LECTURES)

Random numbers: Random number generators, Mid-square methods, Multiplicative congruential method, mixed multiplicative congruential methods, modeling radioactive decay. Hit and miss Monte-Carlo methods, Monte-Carlo calculation of, Monte-Carlo evaluation of integration, Evaluation of multi-dimensional integrals; Chaotic dynamics: Some definitions, The simple pendulum, Potential energy of a dynamical system. Portraits in phase space: Undamped motion, Damped motion, Driven and damped oscillator.

UNIT-IV: SELECTED PHYSICS PROBLEMS (12LECTURES)

Algorithms to simulate interference and diffraction of light, Algorithms of charging an discharging of a capacitor, current in LR and LCR circuits, Computer models of LR and LCR circuits driven by sine and square functions.

UNIT-V:FOURIER TRANSFORMATIONS: (10LECTURES)

Fourier sine & cosine series, Analysis of a time series and search for periodicity. FFT (Fast Fourier transformation)and power spectrum and any other topics used in physics research.

REFERENCE BOOKS

- J. D. Lambert , Numerical Methods for Ordinary Differential Systems.
- Kendall Atkinson, Weimin Han, Theoretical Numerical Analysis.
- Mark Newman, Computational Physics.
- Cristian C. Bordeianu, Manuel J. Paez, and Rubin H. Landau, Computational Physics: Problem Solving with Python.

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Course Code: MPH-118	Subject Name: ELECTROMAGNETIC THEORY & ELECTRODYNAMICS	L T P	Cr.
		3+1+0	4

Objective: In this course, the students will primarily learn how to solve the Maxwell's equations for various boundary conditions. Some emphasis will be on learning to use spherical harmonics and the Greens function methods for solving the Maxwell's equations.

Course outcomes:

CO1: Apply vector calculus to static electric-magnetic fields in different engineering situations.

CO2: Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse science problems.

CO3: Examine the phenomena of wave propagation in different media and its interfaces and in applications of wave engineering.

CO4: Analyze the nature of electromagnetic wave propagation in guided medium.

UNIT-I:ELECTROSTATICS 12LECTURES

Electric Field, Gauss Law, Differential form of Gauss Law, Electromagnetic scalar and vector potentials, Maxwell's equations in terms of scalar and vector potentials, Non-uniqueness of Electromagnetic potentials and concept of Gauge. Lorentz gauge and coulomb gauge. Boundary value problem, Poisson and Laplace equations, Solution of Laplace equation in rectangular coordinates, Green's Theorem, Dirichlet and Neumann boundary conditions, Formal solution of boundary value problem with Green's function, Electrostatic potential energy and energy density.

UNIT-II.MAGNETOSTATICS 10LECTURES

Biot-Savart law, differential equation for static magnetic field, vector potential, magnetic field from localized current distributions, examples of magnetostatic problems, Faraday's law of induction, magnetic energy of steady current distributions.

UNIT-III.MAXWELL'SEQUATIONS 09LECTURES

Displacement current, Maxwell's equations, vector and scalar potentials, gauge symmetry, Coulomb and Lorentz gauges, electromagnetic energy and momentum, conservation laws, inhomogeneous wave equation and Green's function solution.

UNIT-IV.ELECTROMAGNETICWAVES 11LECTURES

Plane waves in a dielectric medium, reflection and refraction at dielectric interfaces, frequency dispersion in dielectrics and metals, dielectric constant and anomalous dispersion, wave propagation in one dimension, group velocity, metallic wave guides, boundary conditions at metallic surfaces, propagation modes in wave guides, resonant modes in cavities.

UNIT-V.RADIATION & COVARIANT FORMULATIONOFELECTRODYNAMICS 12LECTURES

Field of a localized oscillating source, fields and radiation in dipole and quadrupole approximations, antenna, radiation by moving charges, Lienard- Wiechert potentials, total power radiated by an accelerated charge, Lorentz formula.

Four-vectors relevant to electrodynamics, electromagnetic field tensor and Maxwell's equations, transformation of fields, fields of uniformly moving particles.

Concepts of Plasma Physics: Formation of plasma, Debye theory of screening, plasma oscillations, motion of charges in electromagnetic fields, magneto-plasma, plasma confinement, hydromagnetic waves.

REFERENCE BOOKS:

- J.D. Jackson, Classical Electrodynamics.
- D.J. Griffiths, Introduction to Electrodynamics.
- J.R.Reitz,F.J.Mil ford and R.W. Christy, Foundations of Electromagnetic Theory.
- W.K.H. Pan of sky and M. Phillips, Classical Electricity and Magnetism.
- F.F.Chen, Introduction to Plasma Physics and Controlled Fusion.

Course Code: MPH-119	Subject Name: ATOMIC & MOLECULAR PHYSICS	L T P	Cr.
		3+1+0	4

Objective: This course deals principally with atomic structure and the interaction between atoms and fields. It covers electronic transitions, atomic spectra, excited states, hydrogenic and multi-electron atoms.

Course outcomes:

CO1: Derive the energy shifts due to these corrections using first order perturbation theory.

CO2: Explain the observed dependence of atomic spectral lines on externally applied electric and magnetic fields.

CO3: State and justify the selection rules for various optical spectroscopies in terms of the symmetries of molecular vibrations.

CO4: Explain how light interacting with atom and effect of magnetic field on the spectrum.

UNIT-1:ATOMIC PHYSICS 12LECTURES

Fine structure of hydrogen atoms-mass correction, Spin orbit term, Darwin term, Intensity of fine structure lines, ground state of two electron atoms-perturbation theory and variation method. Many electron atoms- LS and jj coupling schemes, Lande interval rule. Terms for equivalent & non-equivalent electron atom. Space Quantization: stern Gerlach experiment, normal & anomalous Zeeman effect, Stark effect, Paschen-Back effect; Intensities of spectral line: General selection rule, Hyperfine Structure, Isotope Shifts and Nuclear Size Effects.

UNIT-II:MOLECULAR STRUCTURE 08LECTURES

Born-Oppenheimer separation for dia to mic molecules, rotation, vibration and electronic structure of diatomic molecules. Description of Molecular Orbital and Electronic Configuration of Diatomic Molecules: H2, H2+. Co-relation diagram for heteronuclear molecules.

UNIT-III:MOLECULARSPECTRA 09LECTURES

Rotation, Vibration-rotation, and electronic spectra of diatomic molecules. The Franck Condon Principle. Raman Spectroscopy: Introduction, pure rotational Raman Spectra, vibrational Raman spectra, nuclear spin and intensity alternation in Raman spectra, Isotope effect and Raman spectrometer. Dissociation and pre dissociation, Dissociation energy, Rotational fine structure of electronic bands.

UNIT-IV:RESONANCE SPECTROSCOPY 10LECTURES

NMR: Basic principles-classical and quantum description-Bloch Equation-spin-spin an spin-lattice relaxation times-chemical shift and coupling constant-experimental methods single and double coil methods; ESR: Basic principles, ESR Spectrometer-nuclear interaction and hyperfine structure-relaxation g factor.

UNIT-V:ROTATION AND VIBRATION OF MOLECULES: 11LECTURES

Solution of nuclear equation; Molecular rotation: Non-rigid rotator, Centrifugal distortion, Symmetric top molecules, Molecular vibrations: Harmonic oscillator and the and harmonic oscillator approximation, Morse potential.

Spectra of Molecules: Transition matrix elements, Vibration-rotation spectra: Pure vibrational transitions, Pure rotational transitions, Vibration-rotation transitions.

REFERENCE BOOKS:

- I.N. Levine, Quantum Chemistry.
- R.Mc Weeny, Coulson's Valence.
- L.D. Landau and E.M. Lifshitz, Quantum Mechanics.

- M. Karplus and R.N.Porter, Atoms and Molecules: An Introduction for Students of Physical Chemistry.
- P.W. Atkins and R.S. Friedman, Molecular Quantum Mechanics.
- M. Tinkham, Group Theory and Quantum Mechanics.
- L. Fetter and J.D. Walecka, Quantum Theory of Many-Particle Systems.
- W.A. Harrison, Applied Quantum Mechanics.

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Course Code: MPH-165	Subject Name: ADVANCE PHYSICS LABORATORY	L T P	Cr.
		0+0+4	2

Objective: The aim and objective of the course General Physics Laboratory is to expose the students of M.Sc. (H.S.) class to experimental techniques in electronics, so that they can verify some of the things read in theory here or in earlier classes and develop confidence to handle sophisticated equipment.

Course outcomes:

CO1: Experimental experience on UJT, FET and MOSFET.
CO2: Understanding of Oscillator, amplifier, and Op-amp.
CO3: Experimental knowledge of Modulation & Demodulation
CO4: Experimental knowledge of Michelson Interferometer Hall voltage & Hall coefficient of a semiconductor material

37. UJT-characteristics and it's applications as relaxation oscillator
38. SCR- characteristics and its applications as switching device
39. Study of Optoelectronic Devices
40. Study of Phase Shift Oscillator
41. Study of Negative & Positive Feedback Amplifier
42. FET-I/V characteristics, biasing and its application as an amplifier
43. MOSFET-I/V characteristics, biasing and its application as an amplifier
44. Study of Pulse Amplitude Modulation(PAM) & Demodulation
45. A/D and D/A converter
46. Design &study of regulated and stabilized power supply.
47. Design &study of triangular wave generator.
48. Study of IC -555 as a stable, mono-stable and bi-stable multivibrator
49. Active filters using op-amp
50. To determine the wavelength of a laser light
51. To determine the ridberg constant of hydrogen atom.
52. To determine the wavelength of used light by Michelson Interferometer
53. To determine the temperature coefficient of resistance of a platinum by using Callender & Grifith.
54. To draw the B-H curve of a ferromagnetic material.
55. To determine the Hall voltage & Hall coefficient of a semiconductor material
56. To determine the dielectric constant of a dielectric material.
57. To find the thickness of a wire by Interference method.
58. To determine the Boltzmann constant.
59. Mini Project
60. Electron-spin resonance
61. Faraday rotation/Kerr effect.
62. Interfacial tension and Phase separation kinetics.
63. Reaction kinetics by spectrophotometer and conductivity.
64. Study of color centers by spectrophotometer.
65. Alpha, Beta and Gamma ray spectrometer.
66. Mossbauer spectrometer.
67. Sizing nano-structures(UV-VIS spectroscopy).
68. Magneto-resistance and its field dependence.

69. X-ray diffraction.
70. Compton scattering.
71. Adiabatic compressibility.
72. Solid-liquid phase diagram for a mixture.

Note: Each student is required to performatleast12oftheaboveexperiments.

REFERANCE BOOK:

- Advanced Physics Laboratory Book inc CD-ROM by Peter Warren.
- Advanced Physics Lab Experiments, Vol-2 by Jeethendra Kumar P K, Prabhakar Sharma
- Advanced Physics Laboratory Manual by J.W. Hammer

Course Code: MPH-167	Subject Name: NUMERICAL METHODS AND COMPUTATIONAL PHYSICS LAB	L T P	Cr.
		0+0+4	2

Objective: The aim of this course is to give knowledge of computational methods in solving problems. It teaches programming tactics, numerical methods, and their implementation ,together with methods of linear algebra.

Course outcomes:

CO1: Understanding of superposition of waves.
CO2: Knowledge of standard deviation, mean, variance, moments.
CO3: Understanding of matrix - its eigen values and eigenvectors
CO4: Experimental knowledge of Monte Carlo techniques.

List of Numerical Problems using "Classes":

13. Data handling: find standard deviation, mean,variance,momentsetc.ofatleast25entries.
14. Choose a set of 10 values and find the least squared fitted curve.
15. Generation of waves on superposition like stationary waves and beats.
16. Fourier analysis of square waves.
17. To find the roots of quadratic equations.
18. Wave packet and uncertainty principle.
19. Find y for a given x by fitting a set of 9 values with the help of cubic spline fitting technique.
20. Find first order derivative at given x for a set of 10 values with the help of Lagrange interpolation.
21. To generate r and o m numbers between (i)1 and0,(ii)1 and100.
22. Perform numerical integration on1-D function using Simpson and Weddle rules.
23. To find determinant of a matrix- its eigen values and eigenvectors.
24. Use Monte Carlo techniques to simulate phenomenon of nuclear radioactivity.

REFERENCE BOOKS:

- Numerical Mathematical Analysis, J.B. Scarborough (Oxford & IBH Book Co.)6th ed.,1979.
- A first course in Computational Physics: P.L. DeVries (Wiley)2nd edition,2011.
- Computer Applications in Physics: S. Chandra (Narosa)2nd edition,2005.
- Computational Physics: R.C. Verma, P.K. Ahluwalia and K.C. Sharma(New Age)2000.
- Object Oriented Programming with C++:Balagurusamy,(Tata Mc Graw Hill)4th edition2008.

SEMESTER-III

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Course Code: MPH-210	Subject Name: SOLID STATE PHYSICS	L T P	Cr.
		3+1+0	4

Objective: The aim of this course is to give an extended knowledge of the principles and techniques of solid-state physics.

Course outcomes:

CO1: Explain the properties related to states of matter/solids.

CO2: Explain the band theory of solids.

CO3: Understand about the specific heat of solids.

CO4: To know the about the superconducting behavior of the solids.

UNIT-I.LATTICE DYNAMICS AND THERMAL PROPERTIES: 12LECTURES

Crystalline and amorphous solids. The crystal lattice. Basis vectors. Unit cell. Symmetry operations. Point, Three-dimensional crystal systems. Miller indices. Directions and planes in crystals. Inter-planar spacings. Simple crystal structures: FCC, BCC, Nacl, CsCl, Diamond and ZnS structure, HCP structure. Binding in solids; Stress components, stiffness constant, elastic constants, elastic waves in crystals Rigorous treatment of lattice vibrations, normal modes; Density of states, thermodynamic properties of crystal, anharmonic effects, thermal expansion.

UNIT-II.ENERGY BAND THEORY: 10LECTURES

The Bloch theorem. Bloch functions. Review of the Kroning- penney model. Brillouin zones. Number of states in the band. Band gap in the nearly free electron model. The tight binding model. The Fermi-surface. Electron dynamics nonelectric field. The effective mass. Concept of hole.(elementary treatment)

UNIT-III.TRANSPORT THEORY: 10LECTURES

Quantized free electron theory. Fermi energy, wave vector, velocity and temperature, density of states. Electronic specific heats. Electronic transport from classical kinetic theory; Introduction to Boltzmann transport equation; electrical and thermal conductivity of metals; thermos electric effects; Hall effect and magnetoresistance.

UNIT-IV.DIELECTRIC PROPERTIES OF MATERIALS: 12LECTURES

Diamagnetism, Langevin equation. Quantum theory of Paramagnetism. Curie law. Hund's rules. Paramagnetism in rare earth and iron group ions. Elementary idea of crystal field effects. Ferromagnetism. Curie-Weiss law. Heisenberg exchange interaction. Mean field theory. Anti-ferro-magnetism. Neel point. Other kinds of magnetic order. Nuclear magnetic resonance.

UNIT-V.SUPERCONDUCTIVITY 08LECTURES

Survey of important experimental results. Critical temperature. Meissner effect. Type 1 and type II superconductors. Thermodynamics of superconducting transition. London equation. London penetration depth. Energy gap. Basic ideas of BC Stheory. High-Tc superconductors.

REFERENCE BOOKS:

- Introduction to Solid State Physics: C.Kittel (Wiley, New York),8thed.2005.
- Quantum Theory of Solids: C.Kittel (Wiley, New York)1987.
- Principles of the Theory of Solids:J. Ziman(Cambridge University Press)1972.
- Solid State Physics: H. Ibachand, H. Luth(Springer Berlin)3rd.ed.2002.

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Course Code: MPH-211	Subject Name: NUCLEAR & PARTICLE PHYSICS	L T P	Cr.
		3+1+0	4

Objective: The aim and objective of the course on Nuclear and Particle Physics is to familiarize the students to the basic aspects of nuclear and particle physics like static properties of nuclei, radioactive decays, nuclear forces etc.

Course outcomes:

CO1: Explain various nuclear properties.

CO2: Understand various nuclear forces in a nucleus.

CO3: To know about the shell model of nucleus.

CO4: To know about the radioactive behavior of the solids.

UNIT-1:NUCLEAR SIZE AND SHAPE 08LECTURES

General properties of nuclei: size, shape and charge distribution, spin and parity. muonic atoms and electron scattering, charge form factor, Magnetic dipole moment, electric quadruple moment and nuclear shape, Binding energy, semi-empirical mass formula.

UNIT-II:TWO-NUCLEON PROBLEM AND NUCLEAR FORCES 09LECTURES

Deuteron problem, Deuteron ground state, excited states, two-nucleons catering, n-p scattering, partial wave analysis, phase-shift, scattering length, p-p scattering (qualitative discussion),
Nature of the nuclear force, Charge symmetry and charge independence of nuclear forces. Exchange nature of nuclear forces, form of nucleon-nucleon potential, elementary discussion on Yukawa's theory.

UNIT- III. NUCLEAR MODELS 09LECTURES

Liquid drop model, Bohr-Wheeler theory of fission, Experimental evidence for shell structure, single-particle Shell model, validity, and limitations of Shell model., Spin-Orbit coupling, Magic numbers, Applications of Shell model like Angular momenta and parities of nuclear ground states.

UNIT-IV .NUCLEAR DECAY 11LECTURES

Elementary ideas of alpha decay and its selection rules, Beta and Gamma decay: Fermi's theory of beta decay, allowed and forbidden transitions, selection rules, non-conservation of parity in beta decay, direct evidence for the neutrino, gamma–decay and selection rules (derivation of transition probabilities not required). Fission and fusion. Nuclear reactions, reaction mechanism, compound nuclei and direct reactions.

UNIT-V. PARTICLE PHYSICS 11LECTURES

Classificationoffundamentalforces.Elementaryparticlesandtheirquantumnumbers(charge,spin,parity,iso spin, strangeness, etc.). Gellmann- Nishijima formula. Quark model, baryons and mesons. C, P, and T invariance. Application of symmetry arguments to particle reactions. Parity non-conservation in weak interaction. Relativistic kinematics

REFERENCE BOOKS:

➢ Nuclear Physics: Irving Kaplan(Narosa),2002.

➢ Basic Ideas and Concepts in Nuclear Physics: K. Hyde (Institute of Physics)2004

➢ Introduction to High Energy Physics: D. H. Perkins (Cambridge University Press), 4thed.2000.

➢ Elementary Particles: I.S. Hughes (Cambridge University Press),3rded.1991.
➢ Introduction to Quarks and Partons: F.E. Close (Academic Press, London), 1979.
➢ Introduction to Particle Physics: M.P. Khanna (Prentice Hall of India, New Delhi),2004.

Course Code: MPH-212	Subject Name: FIBER OPTICS & LASER DEPARTMENTA LELECTIVE-I	L T P	Cr.
		3+1+0	4

Objective: This course will enable students to study the applications and operation of fiber optics and laser technology.

Course outcomes:

CO1: Explain various optical phenomena.

CO2: Understand various absorption and scattering phenomena in optics.

CO3: To know about basic laser theory.

CO4: To know about laser production and threshold conditions.

UNIT-I:FIBER OPTICS 10LECTURES

Optica1 fiber modes and configuration, fiber types, Ray optics, representation, mode of the circular wave guide, Wave guide equation, Wave equation for Step index fiber, Model equation, modes in step index fiber, power flow instep index fiber.

UNIT–II:LOSSES & WAVEGUIDE 10LECTURES

Fiber Material fabrication attenuation, Absorption, Scattering losses. Radiative losses, Core & Cladding Losses, Signa l distortion in optical waveguide, Information capacity determination, Group delay, Material Dispersion, Wave Guide Dispersion.

UNIT-III:BASIC LASER THEORY 10LECTURES

Historical background of laser, Einstein coefficients and stimulated light amplification :population inversion, creation of population inversion in three level &four level lasers.

UNIT-IV:LASER AMPLIFIER 10LECTURES

Interaction of photons with electrons and holes in a semiconductor, Rates of emission and absorption, Condition for amplification by stimulated emission, the laser amplifier.

UNIT-V LASER & ITS TYPES 10LECTURES

LightEmittingDiode,LightsourceMaterial,InternalQuantumEfficiency,Modulationcapability,Transient Response, Power band width product, LASER diode, LASER -diode structure and Threshold Conditions, Model properties and radiation pattern modulation.

REFERENCE BOOKS:

➢ Optics Fibre: G. Keiser
➢ Opto-electronics: Ghatak
➢ Introduction of Fiber Optics: Ajay Ghatak & K. Tyagrajan

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Course Code: MPH-213	Subject Name: ELECTRONICS-I	L T P	Cr.
		3+1+0	4

Objective: This course will enable students to study the applications and operation of digital electronics.

Course outcomes:

CO1: Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.

CO2: Ability to identify basic requirements for a design application and propose a cost-effective solution.

CO3: To develop skill to build and troubleshoot digital circuits.

CO4:The ability to identify and prevent various hazards and timing problems in a digital design.

UNIT-I BASIC LOGIC CIRCUIT 10LECTURES

Introduction of basic gates, universal gates, number systems and codes, Boolean algebra, switching characteristics of semiconductor devices. logic gate characteristics, Logic families- RTL, DTL, TTL, ECL interfacing , ECL and TTL,MOS logic MOSFET NAND and NOR gates, CMOS- NAND and NOR gates.

UNIT-II LOGIC DESIGN 10LECTURES

Minimization of Boolean functions, Karnaugh Map and Applications, Analysis and Synthesis of combinational circuit Simplification of Boolean algebra using K-map, minterm and maxterm, design of binary adder, subtractor ,digital comparator, parity generator/checkers, priority encoder, BCDto7segmentsdecoder.

UNIT III.COMBINATIONAL LOGIC CIRCUITS: 10LECTURES

arithmetic circuits – Half adders, Full adders; Digital Comparators, Encoders, Decoders, multiplexer, multiplexer tree, demultiplexer and demultiplexer tree.

UNIT IV SEQUENTIAL CIRCUIT DESIGN–I 10LECTURES

Excitation table of flip flops – S-R, J-K , Master-Slave – JK, D and T flip flops, clocked flip flop design – conversion of one form of flip flop to another type. Different types of Counters: Ripple Counter, A synchronous and Synchronous Counters, UP/Down Counters, Modulo (MOD) Counters.

UNIT V SEQUENTIAL CIRCUIT DESIGN-II 10LECTURES

Shift Registers: Serial in ,Serial out, Parallel in Serial out Shift Registers, Parallel in Parallel out Shift registers, Bidirectional Shift Registers, Shift register counters, Shift Register Application, Application of Counters. Introduction to Synchronous sequential Machines.

REFERENCE BOOKS:

- M. Morris Mano. "Digital Logic and Computer Design",
- M. Morris Mano, "Digital Design", Pearson Education Asia,
- Thomas L Floyd" Digital Fundamentals"

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Course Code: MPH-214	Subject Name: ELECTRONICS-II	L T P	Cr.
		3+1+0	4

Objective: This course will enable students to study the applications and operation of digital electronics.

Course outcomes:

CO1: Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.

CO2: Ability to identify basic requirements for a design application and propose a cost-effective solution.

CO3: To develop skill to build and troubleshoot digital circuits.

CO4:The ability to identify and prevent various hazards and timing problems in a digital design.

UNIT-I MICROWAVE & OPTICAL DEVICES: 10 LECTURES

Microwave Electronics. Characteristics. feature of microwave Application of microwave, Generation of microwave by tubes, Limitation of conventional tubes, Klystron, Reflex Klystron, Magnetron, Travelling wave tube.

Optical Devices: Laser and Laser resonator, LEDs, Semiconductor photo detectors; PINs and APDs, Photo diodes, APD, Photo conductor.

UNIT-II MICROWAVE MEASUREMENTS (FREQUENCY, POWER, IMPEDANCE). 10LECTURES

Optical modulator: Electro optics modulation (amplitude and phase). Optical coupler: Coupling of light from onefibertootherwiththeuseofevanescentwave,directionalcouplers,opticalswitch, phase, and amplitude modulator.

UNIT-III WAVEGUIDE AND TRANSMISSION NETWORKS: 10LECTURES

Wave guides coaxial, rectangular, and cylindrical; resonators; filters; couplers; branching networks. Antennas-dipole, array; reflectors, steering strip, microstrip and coplanar structure.

Feedback control systems: Feedback system, stability, performance criteria, servo systems, automatic control principle.

UNIT-IV 8085 MICROPROCESSOR: 10LECTURES

Microprocessor and its architecture and its operation , Memory interfacing, Addressing Modes ,Memory Mapped I/O , Introduction to 8085/8080A Instructions , Data Transfer Operation, Arithmetic Operation, Logic Operations, Branch Operation, Writing Assembly Language programs, Interrupts, Timing Diagram, and instruction execution in 8085.

UNIT-V INTERFACING I/O DEVICES: 10LECTURES

Basic interfacing concept, Interfacing output Displays, Interfacing InputDevices,Intel8212 I/O port, Programmable Peripheral Interface Intel 8255 , Programmable Interrupt Controller Intel 8259A , Direct Memory Access(DMA)and8257DMA Controller. D/A Converter and A/D Converter.

REFERENCE BOOKS:

- P. Bhattacharya-Semiconductor optoelectronics devices.
- RE Collin- Foundations of Microwave engineering.
- S.Y. Liao –Microwave Devices on circuits.
- J. Ryder– Networks, Lines and Field.
- A. Papoulis–Signal Analysis
- Electronic and Radio Engineering–F.E Terman.
- Digital Electronics By Goathmann.
- Microwave: K.C.Gupta
- Microwave circuits: A.Y. Liyo
- Electronics communication system; George Kenedy

Course Code: MPH-263	Subject Name: Electronics–I Lab	L T P	Cr.
		0+0+4	2

Objective: The aim of this course is to give an extended knowledge of digital electronics.

Course Outcomes:

CO1: To understand the working of digital circuits.
CO2: To understand the mechanism of adders.
CO3: Understand about the working of flip flops.
CO4: To know the working of counters, registers, and multivibrators

14. To verify the truth table of Logic gates.
15. To verify the truth table of Universal Logic gates.
16. To study half adder
17. To study full adder
18. To study S-R flip flop
19. To study JK flip flop
20. To study JKMS flipflop
21. To study counters
22. To study Registers
23. Study of IC -555 as a stable Stable multivibrator
24. Study of IC- 555as mono-stable multivibrator
25. Study of IC -555 as bi-stable multivibrator
26. Design and study of an ECLOR-NOR circuit

Note: Each student is required to perform at least 07 of the above experiments.

REFERENCE BOOKS:

2. Practical Digital Electronics by Nigel P.Cook- Goodreads

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Course Code: MPH-264	Subject Name: GENERAL PHYSICS LABORATORY-II	L T P	Cr.
		0+0+4	2

Objective: The aim of this course is to give an extended knowledge of general physics.

Course Outcomes:

CO1: To understand the working filters.

CO2: To understand the mechanism of phase shifters.

CO3: Understand about the working of microprocessors.

CO4: To know about the computer programs of performing various arithmetic operations.

List of experiments:

11. Design and study of an Active band pass filter Design and study of an active phase Shifter Design and study of an active phase shifter.
12. Write the following programs using 8085 Microprocessor:
    a. Addition of numbers using direct addressing mode
    b. Subtraction of numbers using directed dressing mode
    c. Addition of numbers using indirect addressing mode
    d. Subtraction of numbers using indirect addressing mode
13. Multiplication by repeated addition.
14. Division by repeated subtraction.
15. Handling of 16-bit Numbers.
16. Use of CALL and RETURN Instruction.
17. Arranging data in Ascending order
18. Arranging data in Descending order
19. Finding largest number
20. Finding smallest number

Note: Each student is required to perform at least 07 of the above experiments.

REFERENCE BOOKS:

- Microprocessor Architecture, Programming, and Applications with the 8085" by R Gaonkar
- "The8051Microcontroller and Embedded Systems: Using Assembly and C" by Muhammad Ali Mazidi
- "Advanced Microprocessors and Peripherals "by A K Ray and KMB hurchandi
- "Fundamentals of Microprocessors And Microcontrollers "Ram B
- "Introduction to Microprocessors and Microcontrollers" by Crisp John Crisp.

SEMESTER-IV

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SCHOOL OF BASIC & APPLIED SCIENCE

Course Code: MPH-221	Subject Name: MEASUREMENT TECHNIQUE	L T P	Cr.
		3+1+0	4

Objective: This course is to get exposure with various aspects of instruments and their usage through various modes.

Course outcomes:

CO1: The student will demonstrate an understanding of the basic principles, theories, and laws of physics through the description of physical systems and understanding.

CO2: Ability to understand construction of CRO.

CO3: To develop skill to understand the working of various generators and analysis instruments.

CO4:The ability to understand the working of various digital instruments.

UNIT-I:BASIC OF MEASUREMENT: 10LECTURES

Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects. Multimeter: Principles of measurement of dc voltage and dc current, ac voltage. Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance. AC millivoltmeter: Type of AC millivoltmeters: Amplifier- rectifier, and rectifier-amplifier. Block diagram ac milli voltmeter, specifications and their significance

UNIT-II CATHODE RAY OSCILLOSCOPE: 10LECTURES

Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance. Use of CRO for the measurement of voltage (dc and ac frequency, time. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.

UNIT-III:SIGNAL GENERATORS AND ANALYSIS INSTRUMENTS: 10LECTURES

Block diagram, explanation, and specifications of low frequency signal generators. pulse generator, and function generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis.

UNIT-IV:IMPEDANCE BRIDGES & Q-METERS: 10LECTURES

Block diagram of bridge. working principles of basic (balancing type) RLC bridge. Specifications of RLC bridge. Block diagram & working principles of a Q-Meter. Digital LCR bridges.

UNIT-V:DIGITAL INSTRUMENTS: 10LECTURES

Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter. Working principles of digital voltmeter. Digital Multimeter: Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution.

REFERENCE BOOKS:

- Instruments &Instrumentation by A K Sawney
- Digital measurement techniques by T. S. Rathore

- Electronic Measurement Techniques by D. F. A. Edwards.
- Metrology & Measurement by Bewoor.

Course Code: MPH-222	Subject Name: NANOSCIENCE AND TECHNOLOGY DEPARTMENTAL ELECTIVE-II	L T P	Cr.
		3+1+0	4

Objectives: Introduction to the underlying principles and applications of the emerging field of nanotechnology and nanoscience along with practical synthesis of nanomaterials.

Course outcomes:

CO1: To develop the understanding of nano dimension in science.

CO2: To understand the quantum mechanical phenomena associated in nano materials.

CO3: To develop skill to understand various characterization techniques.

CO4:The ability to understand about various ceramic materials.

UNIT-1:INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY 10LECTURES

Introduction on nanomaterials, Properties of materials & nano materials, role of size in Nanomaterials: nanoparticles, semiconducting nanoparticles, nanowires, nanoclusters, quantum wells, thin films, nano-compositor and advantages. Introduction to Carbon Nanostructures: Graphene, fullerenes, Carbon Nanotubes.

UNIT-II:QUANTUM MECHANICS FOR NANOSCIENCE 10LECTURES

Electronic structure of 0-D, 1-D, 2-D, 3-D. Resonant tunneling quantized energy levels, Reflection and transmission by a potential step and by a rectangular barrier, band structure and density of states at Nanoscale. Semiconductorandmetallicdots,opticalspectra,Discretechargestates,Electricaltransport in0-D,coulombblockadephenomena.

UNIT-III: GROWTH TECHNIQUES OF NANOMATERIALS 10LECTURES

Top-Down & Bottom-Up, Lithographic techniques, Non lithographic techniques, Fabrication of Nano materials by different Methods: -Inert gas condensation, Arc discharge, Sputtering, Laser ablation, Laser pyrolysis, Ball Milling, Molecular beam epitaxy, Chemical vapour deposition, Electro deposition , chemical precipitation, Sol gel and green synthesis.

UNIT-IV:CHARACTERIZATION TOOLS OF NANOMATERIALS AND APPLICATIONS 10LECTURES

X-ray diffraction, Scanning Electron Microscopy (SEM), Scanning Probe Microscopy (SPM),TEM, Scanning Tunneling Microscopy (STM), Atomic force Microscopy (AFM). UV-visible, FTIR and Raman spectroscopy. Nano sensors: biology and environment: Quantum dot, hetero structure laser and single electron devices.

UNIT-V:CERAMIC MATERIALS 10LECTURES

Refractories, silica and silicates, glasses, glass-forming constituents, types of glasses, perovskite structure of mixed oxides, lime, cement, cement concrete, reinforced cement concrete (RCC), pre-stressed concrete, rocks and stones, clay and clay-based ceramics, chemically bonded ceramics.

REFERENCE BOOKS:

- Poole and Owens: Introduction to Nanotechnology
- Nanoscale materials-Liz Marzan and Kamat
- Nanoscience & Technology: Novel structure and phenomena by Ping Sheng(Editor)
- NanoEngineeringinScience&Technology:AnintroductiontotheworldofnanodesignbyMichael Rieth.
- Nanotubes and Nanowires-CNR Rao and A Govindaraj RCS Publishing
- Nalva: Handbook of Nanostructured Materials and Nanotechnology

Course Code: MPH-223	Subject Name: ELECTRONIC COMMUNICATION SYSTEM (SPECIALIZATION ELECTIVE PAPER-III)	L T P	Cr.
		3+1+0	4

Objective: To understand the details of communication and transmission system.
Course outcomes:

CO1: To develop the understanding of communication system.

CO2: To understand the modulation and demodulation of frequency.

CO3: To understand the analog and pulse modulation.

CO4:The ability to understand about the broadband communication system.

UNIT-I:INTRODUCTION TOCOMMUNICATION SYSTEM 10LECTURES

Information transmitter, channel noise, receiver, need for modulation bandwidth requirements, noise and its types, representation of AM, frequency spectrum, power relations in AM wave, techniques for generation of AM, AM transmitter, AM receiver types, single and multi-super hetro dyne receivers, communication receivers

UNIT-II:FREQUENCY MODULATION AND RADAR SYSTEM 10LECTURES

Description of FM systems, mathematical representation, comparison of wide band and narrow band FM, FM generation techniques, FM demodulators, FM receivers

UNIT-III:ANALOG MODULATION 10LECTURES

Fundamentals of modulation, Frequency spectra in AM modulation, power in AM modulated. class C amplifier, Efficiency modulation, linear demodulation of AM waves, frequency conversion, SSB system, Balanced modulation, filtering the signal for SSB, phase shift method, product detector,

UNIT-IV:PULSE COMMUNICATION 10LECTURES

Information theory, Pulse modulation: PAM, PTM, PWM, PPM, PCM(in brief), pulse modulation, types of pulse modulation, pulse amplitude modulation (PAM), pulse width modulation (PWM), pulse position modulation (PPM)and pulse code modulation(PCM), PCM transmission system, telegraphy.

UNIT-V: BROADBAND COMMUNICATION SYSTEM 10LECTURES

Frequency division multiplex (FDM), Time division multiplex (TDM), coaxial cables, fiber optics links, microwave links, tropospheric scatter links, submarine cables, satellite communication systems, elements of long-distance telephony

REFERENCE BOOKS:

- Haykin: Communication System
- Kennedy: Electronics and communication system
- Kulkarni: Microwave and radar engineering
- Roddy and Coolen: Electronics Communication

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Course Code: MPH-224	Subject Name: ELECTRONIC DEVICES	L T P	Cr.
		3+1+0	4

Objective: The aim of the course is to provide students with a thorough knowledge of Semiconductor.
Course outcomes:

CO1: To develop the understanding of microwave devices.

CO2: To understand the modulation and demodulation of frequency.

CO3: To understand the working of various memory devices.

CO4:The ability to understand about the radar systems.

UNIT-I:SEMI-CONDUCTOR DEVICES 10 LECTURES

Review of p-n junction, metal semiconductor and metal oxide semiconductor junctions, review of JFET, MESFET and MOSFET-their frequency limits. Noise: Signal to noise ratio(SNR) and enhancement of SNR in instrumentation and communication

UNIT-II:MICROWAVEDEVICES 10 LECTURES

Tunnel diode, transfer electron devices(Gunn diode),Avalanche transit time devices (Reed, Impact diodes, parametric devices), vacuum tube devices, reflex klystron and magnetron.

UNIT-III:MEMORY DEVICES 10 LECTURES

Volatile static and D-RAM,CMOS and NMOS,non volatile-NMOS, ferroelectric semiconductors, optical memories, magnetic memories, charge coupled devices (CCD), Piezoelectric, pyroelectric, and magnetic devices, SAW and integrated devices.

UNIT-IV:EXTERNAL PHOTOELECTRIC EFFECT DETECTOR: 12LECTURES

Vacuum photodiode, photo multipliers, micro-channels, Internal Photoelectric Effect detectors: PN junction photodiode, solar cell (open circuit voltage, short circuit current, fill factor), pin photodiode, avalanche photodiode, Phototransistor, Light emitting diode.

UNIT-V: RADAR SYSTEMS: 10 LECTURES

Basics principals, pulsed radar systems, moving targets indication ,radar beacons, CW Doppler radar, frequency modulated CW radar, phased array radars, planar array, radar

REFERENCE BOOKS:

- Integrated Electronics By Millman & Halkias.
- Electronic Devices & Circuits By Millman & Halkias.
- Electronic Circuits –Discrete And Integrated By Schilling Belov.
- Micro Electronics By Millman And Grabel.
- Electronic Devices and Circuits –T.F. Bogart, J.S. Beasley and G.Rico, Pearson Education,6th edition, 2004.

Course Code: MPH-271	Subject Name: MEASUREMENT TECHNIQUE LAB	L T P	Cr.
		0+0+4	2

Objective: The aim of this course is to give an extended knowledge of various measurement techniques.

Course Outcomes:

CO1: To understand the working of oscilloscope.

CO2: To understand the mechanism of multimeters.

CO3: Understand about the working of transformers.

CO4: To know the mechanism of balancing bridges.

The test of lab skills will be of the following test items:

10. Use of an oscilloscope.
11. CRO as a versatile measuring device.
12. Circuit tracing of Laboratory electronic equipment,
13. Use of Digital multimeter/VTVM for measuring voltages
14. Circuit tracing of Laboratory electronic equipment,
15. Winding a coil/transformer.
16. Study the layout of receiver circuit.
17. Troubleshooting a circuit
18. Balancing of bridges

Laboratory Exercises:

4. To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance.
5. To observe the limitations of a multimeter for measuring high frequency voltage and currents.
6. To measure Q of a coil and its dependence on frequency, using a Q-meter.
9. Measurement of voltage, frequency, time period and phase angle using CRO.
10. Measurement of time period, frequency, average period using universal counter/frequency counter.
11. Measurement of rise, fall and delay times using a CRO.
12. Measurement of distortion of a RF signal generator using distortion factor meter.
13. Measurement of R, L and C using a LCR bridge/ universal bridge.

Open Ended Experiments:

3. Using a Dual Trace Oscilloscope
4. Converting the range of a given measuring instrument (voltmeter, ammeter)

Note: Each student is required to perform at least 07 of the above experiments.

REFERENCE BOOKS:

- A textbook in Electrical Technology- B L Theraja- S Chand and Co.
- Performance and design of AC machines-MG Say ELBS Edn.
- Electronic Devices and circuits, S. Salivahanan & N. S. Kumar, 3rd Ed., 2012,
- Tata Mc-Graw HillElectroniccircuits:Handbookofdesignandapplications,U.Tietze,Ch.Schenk,2008,
- Springer Electronic Devices, Thomas L. Floyd, 2008, Pearson India

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Course Code: MPH-273	Subject Name: ELECTRONIC COMMUNICATION SYSTEM LAB	L T P	Cr.
		0+0+4	2

Objective: The aim of this course is to give an extended knowledge of electronic communication systems.

Course Outcomes:

CO1: To understand the working of modulation and demodulation.

CO2: To understand the mechanism of amplitude modulation.

CO3: Understand about the pulse modulation.

CO4: To know about the working of frequency modulation.

1. Study of Amplitude modulation & demodulation.
2. Study of frequency modulation & demodulation.
3. Study of phase modulation & demodulation.
4. Study of Amplitude shift keying.
5. Study of Phase shift keying.
6. Study of Frequency shift keying.
7. Study of Pulse Amplitude modulation & demodulation.
8. Study of Pulse frequency modulation & demodulation.
9. Study of pulse phase modulation & demodulation.
10. Study of pulse code modulation &demodulation.

Note: Each student is required to perform at least 07 of the above experiments.

REFERENCE BOOKS

- Communication Systems Engineering (2nd Edition):John G. Proakis
- Electronics Engineer's Reference Book- 6th Edition - Elsevier
- Electronic Communication System by-Kennedy

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Course Code: MPH-274	Subject Name: Dissertation	L T P	Cr.
		0+0+24	12

Description
Students are required to work on the allotted topic and must make a presentation in front of advisory committee and M.Sc. Students. Students are expected to provide latest facts and updated information by consulting latest editions of textbooks, reference books, monographs, and peer-reviewed national & international research journals.

S.No.	Course details
1.	Research work
2.	Seminar
3.	Evaluation by Research committee
4.	Research work by taking 52 credit hours

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Scheme for B.Tech. (Regular)

B.Tech.			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BSC-101	Physics	3	1	0	4
2	BSC-103	Mathematics-I	3	1	0	4
3	ESC-101	Basic Electrical Engineering	3	1	0	4
4	ESC-103	Introduction to Computer Systems & Internet Basics	3	0	0	3
5	ESC-153	Engineering Graphics & Design	0	0	6	3
6	HSS-101	English	2	0	0	2
7	BSC-151	Physics Lab	0	0	2	1
8	ESC-151	Basic Electrical Engineering Lab	0	0	2	1
9	HSS-151	English Lab	0	0	2	1
10	MC-101	Environmental Science	2	0	0	2
11	PDP-101	Induction & Nurturing Hobbies	0	0	2	1
		Total				**24**

B.Tech.	Semester	II

SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BSC 102	Chemistry	3	1	0	4
2	BSC-104	Mathematics-II	3	1	0	4
3	ESC-102	Programming for problem solving	3	0	0	3
4	HSS-102	Effective Technical Communication	3	0	0	3
5	ESC-154	Workshop/Manufacturing Practice	0	0	4	2
6	BSC 152	Chemistry Lab	0	0	2	1
7	ESC-152	Programming for problem solving Lab	0	0	4	2
8	PDP-102	People Connect	0	0	2	1
9	MC-102	Constitution of India	0	0	0	0
		Total				**20**

B.Tech.			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
	BSC-201	Mathematics-III (Numerical Methods)	3	1	0	4
	ME203C	Fluid Mechanics	3	1	0	4
	ME205C	Engineering Mechanics	3	1	0	4
	CE201C	Introduction to Civil Engineering	3	0	0	3
	CE203C	Building Materials & Construction	3	0	0	3
	CE251C	Computer Aided Civil Engineering Drawing	0	0	2	1
	BSC-251	Mathematics-III (Numerical Methods) Lab	0	0	2	1
	ME256C	Fluid Mechanics Lab	0	0	2	1
	PDP201	Personality Development & Grooming	0	0	2	1
		Total				**22**

B.Tech. (I. B.Tech 3rd Year- SEMESTER-VI)			Semester	IV
SN	Course	Course Name	Periods	Credits

	Code					
			L	T	P	
1	CE202C	Soil Mechanics & Engineering Geology	3	1	0	4
2	CE204C	Disaster Preparedness & Planning	3	0	0	3
3	ME204C	Strength of Materials	3	1	0	4
4	CE206C	Surveying & Geomatics	3	1	0	4
5	CE208C	Environmental Engineering	3	1	0	4
6	HSS202	Engineering Economics & Management	3	0	0	3
7	CE252C	Soil Mechanics & Engineering Geology Lab	0	0	2	1
8	ME254C	Strength of Materials Lab	0	0	2	1
9	CE254C	Surveying & Geomatics Lab	0	0	2	1
10	CE256C	Environmental Engineering Lab	0	0	2	1
11	PDP202	Life Skills	**0**	**0**	**2**	**1**
		Total				**27**

B.Tech.			Semester	V
SN	**Course Code**	**Course Name**	**Periods**	**Credits**

			L	T	P	
1	CE301C	Concrete Technology	3	0	0	3
2	CE303C	Geotechnical Engineering	3	1	0	4
3	CE305C	Hydrology	3	1	0	4
4	CE307C	Highway Engineering	3	1	0	4
5	CE309C	Design of Concrete Structures	3	1	0	3
6		Program Elective-I	3	0	0	4
7	CE351C	Concrete Technology Lab	0	0	2	1
8	CE353C	Geotechnical Engineering Lab	0	0	2	1
9	CE355C	Hydraulic Engineering Lab	0	0	2	1
10	CE357C	Highway Engineering Lab	0	0	2	1
11	PDP301	Leadership & Entrepreneurial Development	0	0	2	1
		Total				**27**

	COURSE CODE	COURSE NAME
	CE311C	Repair & Rehabilitation of Structures

Program Elective-I	CE313C	Construction Equipment's & Automation
	CE315C	Building Construction Practice

B.Tech.			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CE302C	Specification Estimation & Costing				4
2	CE304C	Structural Analysis-I				4
3	CE306C	Design of Steel Structures				4
4	CE308C	Open Channel Flow				3
5		Program Elective-I				3
6		Program Elective-II				3
7		Program Elective-III				1
8	CE352C	Structural Analysis-I Lab				1
9	CE354C	Major Project-I				2
10	PDP302	Problem Solving Skills				1
		Total				**26**

	COURSE CODE	COURSE NAME

Program Elective-II	CE310C	Construction Project Management
	CE314C	Construction Productivity
	CE318C	Construction Project Planning & System
Program Elective-III	CE312C	Traffic Planning & Management
	CE316C	Transportation Economics
	CE320C	Traffic Engineering
Program Elective-IV	CE356C	Construction Project Management Lab
	CE358C	Building Drawing Lab
	CE360C	Structural Drawing Lab

B.Tech			Semester			VII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	

1	CE-401C	Earthquake Resistant Design of Structures	3	1	0	4
2	CE-403C	Channel Hydraulics	3	1	0	4
3	CE-405C	Traffic Engineering	3	0	0	3
4	CE-407C	Waste Management	3	0	0	3
5	CE-409C	Foundation Engineering	3	1	0	4
6	OE	Open Elective – I (CE-423C -Hydropower Engineering)	3	0	0	3
7	CE-451C	Traffic & Transport Engg. Lab.	0	0	2	1
8	CE-453C	Seminar	0	0	4	2
9	PDP-401	Campus to Corporate	0	0	2	1
		Total				**25**

LIST OF OE

	COURSE CODE	**COURSE NAME**
OE	CE-423C	Hydropower Engineering
OE	CE-425C	Transportation Engineering & Systems

B.Tech.	**Semester**	**VIII**

SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	CE402C	Metro Systems & Engineering	3	0	0	3
2	CE452C	Internship	0	0	32	16
	CE454C	Seminar on Internship	0	0	2	1
		Total	**3**	**0**	**32**	**19**

Course Code	Course Name	L-T-P	Credit
BSC-101	Physics	3-1-0	4

Unit I: Electrostatics and Magnetostatics (12 lectures)

Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential, Boundary conditions of electric field and electrostatic potential; method of images; energy of a charge distribution and its expression in terms of electric field.

Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution for givencurrent densities.

Unit II: Mechanics (**8 lectures**)

Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction; Extension to cylindrical and spherical Coordinates

Unit III: Quantum Mechanics (8 lectures)

Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle.

Unit IV: Wave optics (10 lectures)

Huygens' principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Mach-Zehnder interferometer.

Fraunhauffer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

Unit V: Lasers (8 lectures)

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO2), solid-state

lasers (ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine.

Suggested Text/Reference Books

(i) David Griffiths, Introduction to Electrodynamics.
(ii) W. H. Hayt and J. A. Buck. Engineering Electromagnetics.
(iii) Engineering Mechanics, 2nd ed. — MK Harbola.
(iv) Introduction to Mechanics — MK Verma
(v) Eisberg and Resnick, Introduction to Quantum Physics
(vi) D. J. Griffiths, Quantum mechanics.
(vii) A. Ghatak, Optics
(viii) O. Svelto, Principles of Lasers

Course Code	Course Name	L-T-P	Credit
BSC-103	Mathematics - I	3-1-0	4

Unit I: Matrices (10 lectures)

Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, Skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Unit II: Sequences and series: (12 lectures)

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit III: Calculus: (8 lectures)

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit IV: Calculus: (8 lectures)

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminateforms and L'Hospital's rule; Maxima and minima.

Unit V: Multivariable Calculus (Differentiation): (10 lectures)

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

Suggested Text/Reference Books

(i) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
(ii) Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
(iii) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
(iv) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
(v) D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
(vi) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
(vii) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Course Outcomes

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Code	Course Name	L-T-P	Credit
ESC-101	Basic Electrical Engineering	3-1-0	4

Learning Objectives:

To understand and analyze basic electric and magnetic circuits

To study the working principles of electrical machines and power converters.
To introduce the components of low voltage electrical installations.

Detailed contents:

Unit 1: DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin, Norton and maximum power transfer Theorems.

Unit 2: AC Circuits (8 hours)

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three phase balanced circuits, voltage and current relations in star and delta connections.

Unit 3: Transformers (8 hours)

Construction, working principle of transformer, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and its comparison with ordinary transformer.

Unit 4: Electrical Machines (8 hours)

Generation of rotating magnetic fields, Construction and working of a three-phase induction

motor, Significance of torque-slip characteristic, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of dc motor. Construction and working of synchronous generators.

Unit 5: Power Converters & Electrical Installations (8 hours)

DC-DC converters and AC-DC converters, Switches, Fuses, MCBs, Earthing and its types, Important Characteristics for Batteries and battery backup. Elementary calculations for energy consumption, power factor improvement.

Suggested Text / Reference Books

(i) D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
(ii) D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
(iii)L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
(iv) E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
(v) V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Course Outcomes

Students are able to understand and analyze basic electric and magnetic circuits

Students are able to understand the working principles of electrical machines and power converters.

Course Code	Course Name	L-T-P	Credit
ESC-103	Introduction to Computer Systems & Internet Basics	3-0-0	3

Objective: To give basic knowledge of Computer Hardware, Software systems & internets

Unit 1. Computer Systems

Overview of Computer Systems, Evolution of Computer Systems, Generations of computers, Characteristics of Computer: speed, storage, Accuracy, Categories of computer: Micro Computers, Mini Computers, Main Frames, Super Computers, Computer Organization: Central processing unit, Arithmetic and Logic Unit, Control Unit, Memory System: Primary memory, secondary memory and Data Representation in a Computer System. Number system : decimal, Binary, Octal, Hexadecimal representation and conversion

Unit 2. Programming Languages & Operating System basics

Software Basics: Application software, System Software, Utility Software, Programming languages: Low level languages, Machine language, Assembly language, Limitations of Low level languages, High Level languages, Translator, Assembler, Interpreter, Compiler, Operating System: Need of Operating System, Function of Operating System, Types of Operating System

Unit 3. Network Systems, Internet & Web

Introduction to networking, Local and Wide Area Networks, communication media: wired and wireless, Network Topologies: Star, Ring, Bus, Networking devices: Switch, Hub, Bridge, Internet overview, Internet Architecture, The idea of hypertext and hyper media; how the browser works: MIME types, plug-ins and helper applications; XML, XHTML, XSLT and the W3C, Hosting and Domains:

Unit 4: **Hypertext Markup Language:** The anatomy of an HTML document; marking up for structure and style: ordered and unordered lists, Structuring content with HTML using natural divisions, Marquee, Anchor Tag, Email Link; embedding images and controlling appearance, table creation: Frames and Nesting, iframes, forms, Semantic elements of HTML5, HTML5 Form elements, Media tags in HTML5, HTML5 Data Storage

Unit 5. Computer Security

Security Threats: Intruders, Password Cracking, Different types of malicious Software: Virus, Worms, Trojan Horse, Prevention from malicious Software: Antivirus (Introduction)

Text Books:

1. Computer Fundamentals: P. K. Sinha, BPB pub.
2. Fundamentals of Computer Science and Programming with C: A. K. Sharma, Dhanpat Rai Pub.
3. Uttam K. Roy, "Web Technology", Oxford Publication

Reference Books:

1. Computing Fundamentals & C Programming: E. Balaguruswamy, TMH.Fundamentals of Computers: V Rajaraman, PHI

Course Code	Course Name	L-T-P	Credit
ESC-153	Engineering Graphics & Design	0-0-6	3

Learning Outcomes:

Engineering drawing is an effective language of engineers. It is the foundation block which strengthens the engineering and technological structure. Moreover, it's the transmitting link between ideas and realization. After learning the course the students should be able to understand conventions and the methods of engineering drawing and interpret engineering drawings, using fundamental technical mathematics, construct basic and intermediate geometric improve their visualization skills so that they can apply these skills in developing new projects improve their technical communication skill in the form of communicative drawings, comprehend the theory of projections and acquire basic knowledge of computer aided drafting**.**

Module 1: Introduction to Engineering Drawing

Principles of Engineering Graphics and their significance, usage of drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Dimensioning

Module 2: Orthographic Projections

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes;

Module 3: Projections of Solids

Projections of planes inclined Planes - Auxiliary Planes; Projection of Regular Solids covering those inclined to both the planes, Auxiliary Views; Section of such solids and the true shape of the section.

Module 4: Sections and Sectional Views of Right Angular Solids

Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; objects from industry and dwellings (foundation to slab only) Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids Conversion of Isometric Views to Orthographic Views and Vice-versa

Module 5: Overview of Computer Graphics,

Introduction to Computer Aided Drafting and CAD software [such as: The Menu System, Toolbars (Standard,Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

Suggested Text/Reference Books:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House

2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech
5. Publishers (Corresponding set of) CAD Software Theory and User Manuals

Course Outcomes

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software.This course is designed to address:

- to prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- to prepare you to communicate effectively
- to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

The student will learn :

Introduction to engineering design and its place in society

- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics

standardsExposure to solid modelling

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY
Department of Civil Engineering
Year/Semester: 1st Year/1st Semester

Course Code	Course Name	L-T-P	Credit
HSS-101	English	2-0-0	2

Detailed contents

1. Vocabulary Building
1.1 The concept of Word Formation
1.2 Root words from foreign languages and their use in English
1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
1.4 Synonyms, antonyms and standard abbreviations.

2. Basic Writing Skills

2.1 Sentence Structures
2.2 Use of phrases and clauses in sentences
2.3 Importance of proper punctuation
2.4 Creating coherence
2.5 Organizing principles of paragraphs in documents
2.6 Techniques for writing precisely
2.7 Jane Austen: *Pride and Prejudice(novel)*

3. Identifying Common Errors in Writing

3.1 Subject-verb agreement
3.2 Noun-pronoun agreement
3.3 Misplaced modifiers
3.4 Articles
3.5 Prepositions
3.6 Redundancies
3.7 Clichés

4. Nature and Style of sensible Writing

4.1 Describing
4.2 Defining
4.3 Classifying
4.4 Providing examples or evidence
4.5 Writing introduction and conclusion

5. Writing Practices

5.1 Comprehension
5.2 Précis Writing
5.3 Essay Writing

5.4 Charles Dickens : *Oliver Twist*(novel)

6. Oral Communication

Suggested Readings:

(i) *Practical English Usage.* Michael Swan. OUP. 1995. (ii) *Remedial English Grammar.* F.T. Wood. Macmillan.2007 (iii) *On Writing Well.* William Zinsser. Harper Resource Book. 2001

(iv) *Study Writing.* Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

(v) *Communication Skills*. Sanjay Kumar and PushpLata. Oxford University Press. 2011. (vi)

Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
BSC-151	Physics Lab	0-0-2	1

List of Experiments:

1) To study response curve of a series LCR circuit.
2) To determine the Planck's constant using LEDs.
3) To determine the Rydberg's constant of Hydrogen atom.
4) To find the refractive index and Cauchy's constants of a prism.
5) To find the wavelength of light by Newton's rings experiment.
6) To determine the thickness of a thin wire by interference.
7) To determine the wavelength of LASER using diffraction grating.
8) To determine the resolving power of a telescope.
9) To find the numerical aperture of an optical fiber cable.
10) To find the wavelength of light using Michelson's interferometer.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
ESC-151	Basic Electrical Engineering Lab	0-0-2	1

List of Experiments:

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi – meter, oscilloscope. Resistors, capacitors and inductors.
2. Demonstration of cut – out sections of machines.
3. Torque speed characteristic of dc motor.
4. Parallel operation of single-phase Transformer.
5. Open circuit & short circuit test on single phase transformer.
6. To verify the Thevenin's & Norton's theorem.
7. To verify the Superposition theorem.
8. To study frequency response of series & parallel RLC Circuit.
9. Load test on D.C. Shunt generator
10. Torque – speed characteristics of three phase Induction motor & direction reversal by changeof phase sequence of connection.
11. To plot field current Vs Armature voltage characteristics of synchronous generator.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
HSS-151	English Lab	0-0-2	1

1. Comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Common Everyday Situations: Conversations and Dialogues communication at Workplace
4. Interviews
5. Formal Presentations

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
MC-101	Environmental Science	2-0-0	0

1. **THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:** Basic definitions related to environment; Scope, vis-à-vis environmental science and environmental engineering; a uses of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principals involved in environmental education, environmental awareness, Environmental ethics, environmental organization and their involvement.

2. **NATURAL RESOURCES:** Renewable and non-renewable resources; forest resources, over-exploitation, and deforestation / afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; Food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non-renewable energy sources, solar energy, wind energy, hydro energy, biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.

3. **ECOSYSTEMS:** Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids; characteristic features, structure and function of the following ecosystem - forest ecosystem, grassland ecosystem desert ecosystem and aquatic ecosystems.

4. **BIODIVERSITY AND ITS CONSERVATION:** Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

5. **ENVIRONMENTAL POLLUTION:** Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution; solid waste management, e- waste management; disaster management –floods, earthquake, cyclone and landslides.

6. **SOCIAL ISSUES AND THE ENVIRONMENT:** Water conservation, rain water harvesting, watershed management; climate change, global warming, acid rain, ozone layer depletion; Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act.

7. **HUMAN POPULATION AND THE ENVIRONMENT:** Population growth, population explosion – family welfare programmes; role of information technology in environment and human health; case studies, Chipko movement, Sardar Sarovar dam, mining and quarrying in Udaipur, salinity and water logging in Punjab, Haryana and Rajasthan, Bhopal gas tragedy, Chernobyl nuclear disaster, arsenic pollution in ground water.

TEXT BOOK

Kaushik, Anubha, and Kaushik, C.P., “Perspectives in Environmental Studies”, 4th Edition, New Age International Publishers, 2004

REFERENCE BOOKS

1. Agarwal, K.C., “Environmental Biology”, 2nd Edition, Nidhi Publ. Ltd., Bikaner, 2001.
2. Bharucha Erach, “The Biodiversity of India”, 2nd Edition, Mapin Publishing Pvt. Ltd., 2006.
3. Brunner R. C., “Hazardous Waste Incineration”, 1st Edition McGraw Hill Inc., 1989.
4. Clark R.S., “Marine Pollution”, 1st Edition Clanderson Press Oxford,1989
5. .Cunningham, W.P., Cooper, T.H. Gorhani, E. & Hepworth, M.T., Environmental Encyclopedia”, 2nd Edition, Jaico Publ. House, 2001.
6. De, A. K., “Environmental Chemistry”, 2nd Edition, Wiley Eastern, 1989
7. Jadhav, H. and Bhosale, V.M ., “Environmental Protection and Laws”, 1st Edition, Himalaya Pub. House, Delhi, 1995.
8. Mckinney, M.L. and Schocl. R.M., “Environmental Science Systems & Solutions”, 2nd Edition, Web enhanced edition, 1996.
9. Rao M.N. and Datta, A.K.,“Waste Water Treatment”, 2nd Edition, Oxford & IBH Publ.Co., 1987.
10. Sharma B.K., “Environmental Chemistry”, 2nd Edition, Goel Publ. House, Meerut, 2001 Trivedi R.K. and Goel, P.K., “Introduction to Air Pollution”, 2nd Edition, Techno-science Publications,1996.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
PDP-101	Induction & Nurturing Hobbies	0-0-2	1

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
BSC-102	Chemistry	3-1-0	4

Unit-I PHASE RULE

Terminology, Definition of phase rule, Derivation of phase rule equation, One component system (H_2O system and CO_2 system), two components system, Simple eutectic system (Pb – Ag), Pattinson's Process, congruent system (Zn–Mg), incongruent system (Na-K system), Merits and demerits of phase rule.

UNIT-II THERMODYNAMICS

Second law of thermodynamics, entropy change for reversible & irreversible processes, Entropy change for ideal gas, variation of free energy with temperature & pressure, Gibbs-Helmholtz equation, Clapeyron- Clausius equation & it's integrated form Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.

UNIT-III CORROSION AND ITS PREVENTION

Definition, Types of corrosion: Dry, wet corrosion (rusting of iron), galvanic corrosion, differential aeration corrosion, stress corrosion. Factors affecting corrosion, preventive measures (proper design, Cathodic and Anodic protection, sacrificial protection and barrier protection), Soil Corrosion.

UNIT-IV SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Part-A:Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterisation techniques.

UNIT-V INTERMOLECULAR FORCES AND POTENTIAL ENERGY SURFACES

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena, Potential energy surfaces of H_3, H_2F and HCN and trajectories on these surfaces.

UNIT-VI ORGANIC REACTIONS AND SYNTHESIS OF A DRUG MOLECULE

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule.

UNIT-VII STEREOCHEMISTRY

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal

compounds

Suggested Text Books :

(i) University chemistry, by B. H. Mahan
(ii) Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
(iii) Fundamentals of Molecular Spectroscopy, by C. N. Banwell

(iv) Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
(v) Physical Chemistry, by P. W. Atkins

(vi) Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5thEdition
http://bcs.whfreeman.com/vollhardtschore5e/default.asp

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
BSC-104	Mathematics - II	3-1-0	4

Unit I: Basic Probability: (12 lectures)

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

Unit II: Continuous Probability Distributions: (6 lectures)

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Unit III: Complex Variable – Differentiation: (14 lectures)

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof).

Unit IV: First order ordinary differential equations: (8 lectures)

Exact, linear and Bernoulli’s equations, Euler’s equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut’s type.

Unit V: Ordinary differential equations of higher orders: (10 lectures)

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Suggested Text/Reference Books

(i) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
(ii) P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
(iii)S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
(iv) W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
(v) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
(vi) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
(vii)E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
(viii) E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.

Course Outcomes

The objective of this course is to familiarize the students with statistical techniques. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
ESC-102	Programming for Problem Solving	3-0-0	3

Unit-1: BASICS OF PROGRAMMING AND OVERVIEW OF C PROGRAMMING:

Programming Fundamental, Problem definition, Idea of Algorithm, steps to solve logical and numerical problems, Representation of Algorithms: Flow charts/ Pseudocode with example, Types of programming languages, Translators, From algorithms to programs; source code, variables and memory location, Introduction to C, Structure of C program, C character set, Identifier and Keywords, Data types, constants, variables, Declaration, Arithmetic expressions & precedence , statements, Symbolic constants, type conversion, Types of operators, Input and output functions in C, header files, common programming errors, Control Statements, Sequencing, Selection, Condition and iteration.

Unit-2: ARRAYS AND STRING: Declaring, Referencing and initializing arrays, array subscript, using for loop for sequential access, multi-dimensional array, String basics string library functions, assignment and substring, concatenation, string comparison.

Unit-3: FUNCTIONS AND POINTERS: Definition of function, function prototype, Purpose of main function, passing parameters, Scope of function, recursion, Call by value and reference, Types of storage classes, Scope of variable: Global and local, static variables, Recursion.. Pointer variables, initializing pointers, pointer operators, pointer expressions, pointers and arrays, pointer and functions,

Unit-4: STRUCTURES, UNIONS & RECURSION

Defining a structure, Declaring structure variables, Structure initialization, Copying and Comparing Structure variables, Array of structures, Arrays within structure, nested structures, Unions. Recursion as adifferent way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

Unit-5: DYNAMIC MEMORY ALLOCATION AND FILE PROCESSING: C's dynamic allocation functions. Streams and file types, opening and closing a data file, input and output operations, text mode versus binary mode, formatted input output operations with files, random access to files.

Reference Books:-

1. Programming in C by Schaum Series, McGraw Hills Publishers, New Delhi.
2. Let Us C by YashwantKanetkar; BPB Publication, New Delhi.
3. Exploring C by YashwantKanetkar; BPB Publications, New Delhi.

4. Application Programming in C by RS Salaria, Khanna Book Publishing Co. (P) Ltd., New Delhi.
5. Programming in C by R Subburaj, Vikas Publishing House Pvt. Ltd., Jangpura, New Delhi.
6. Programming with C Language by C Balaguruswami, Tata McGraw Hill, New Delhi.
7. Programming in C by BP Mahapatra, Khanna Publishers, New Delhi

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
HSS-102	Effective Technical Communication	3-0-0	3

Module 1:

Information Design and Development- Different kinds of technical documents,

Information development life cycle, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media.

Module 2:

Technical Writing, Grammar and Editing- Technical writing process, forms of

discourse, Writing drafts and revising, Collaborative writing, creating indexes, technical writing style and language. Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication, Usability, Hunan factors, Managing technical communication projects, time estimation, Single sourcing,ocalization.

Module 3:

Self Development and Assessment- Self assessment, Awareness, Perception and

Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity

Module 4:

Communication and Technical Writing- Public speaking, Group discussion, Oral presentation, Interviews, Graphic presentation, Presentation aids, Personality Development.

Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, event report.

Module 5:

Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes,

Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity.

Text/Reference Books:

1.David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004
2.Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843) 3.Shiv Khera, You Can Win, Macmillan Books, New York, 2003.

4.Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5.Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN:07828357-4)
6.Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
7.Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
ESC-152	Workshop/Manufacturing Practice	0-0-4	2

Course Objectives:

- To teach students the practices of workshop management and maintenance.
- To familiarize students with workshop machinery like drills, lathes, welding torches, files, saws, hammers, etc.
- To teach students the need to economize materials when managing a workshop.
- To teach students the safety measures needed in a workshop and how to deal with accidents atwork.
- To teach student welding and manufacture of selected items.
- To teach students the practice of plumbing.
- To teach students the basics of electrical installations.

Course Outcomes: Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. Upon completion of this course, the students will gain knowledge of the different manufacturing processes and day to day industrial as well domestic life which are commonly employed in the industry, to fabricate components using different materials.

(A) Fitting Trade:

1. Preparation of T-Shape Work piece as per the given specifications.
2. Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.

(B) Machine shop: Study of machine tools in particular Lathe machine (different parts, different operations, study of cutting tools)

1. To obtain required diameters (steps) on a cylinder work piece with the given lengths.
2. To obtain the required diameters (taper) on a cylinder work piece with the given dimensions.

(C) Carpentry: Study of Carpentry Tools, Equipment and different joints

1. To make a dovetail lap joint.
2. To make a cross half lap joint.

(D) Foundry Trade: Introduction to foundry, Patterns, pattern allowances, ingredients of molding sand and melting furnaces. Foundry tools and their purposes

1. To prepare a sand mold, using the given single piece pattern.
2. To prepare a sand mold, using the given split piece pattern.

(E) Welding: Introduction, Study of Tools and welding Equipment (Gas and Arc welding)

1. To make a single v-butt joint, using the given mild steel pieces and by arc welding.
2. To make a T-joint using the given mild steel pieces and by arc welding.

(F) Electrical and Electronics: Introduction to House wiring, different types of cables. Types of power supply, types of motors, Starters, distribution of power supply, types of bulbs, parts of tube light, Electrical wiring symbols.

1. Two lamps connected in series - measure and check the voltage and current using multimeter.
2. Two lamps connected in parallel - measure and check the voltage and current using multimeter.

(G) CNC Machining: To study the working principle of CNC machining.

Reference Books:

1. Mechanical Workshop Practice by K C John, PHI Learning
2. Workshop Technology Vol. 1 and 2 by Raghuvanshi B.S. DhanpatRai& Sons 1998
3. Workshop Technology by Chapman W.A. J and Arnold E. Viva low priced student edition, 1998

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
BSC-152	Chemistry Lab	0-0-2	1

Chemistry Laboratory

Choice of 10-12 experiments from the following:

♣Determination of surface tension and viscosity

♣Thin layer chromatography

♣Ion exchange column for removal of hardness of water

♣Determination of chloride content of water

♣Colligative properties using freezing point depression

♣Determination of the rate constant of a reaction

♣Determination of cell constant and conductance of solutions

♣Potentiometry - determination of redox potentials and emfs

♣Synthesis of a polymer/drug

♣Saponification/acid value of oil

♣Chemical analysis of a salt

♣Lattice structures and packing of spheres

♣Models of potential energy surfaces

♣Chemical oscillations- Iodine clock reaction

♣Determination of the partition coefficient of a substance between two immiscible liquids

♣Adsorption of acetic acid by charcoal

♣Use of the capillary viscosimeters to the demonstrate of the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg.

Laboratory Outcomes

•The chemistry laboratory course will consist of experiments illustrating the principles of chemistryrelevant to the study of science and engineering. The students will learn to:

•Estimate rate constants of reactions from concentration of reactants/products as a function of time

- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redoxpotentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyses a salt sample.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
ESC-152	Programming for Problem Solving Lab	0-0-2	1

LIST OF EXPERIMENTS

(Students have to do at 3-4 programs from each section)

SEQUENTIAL CONTROL STATEMENTS

1. Write a program to Print HELLO
2. Write a program to add two numbers
3. Write a program to calculate simple interest
4. Write a program to calculate average of three numbers
5. Write a program to swap two numbers
6. Write a program to illustrate mixed data types
7. Write a program to calculate area and circumference of circle
8. Write a program to evaluate a polynomial expression
9. Write a program to add digits of a four digit number
10. Write a program to check whether the person if eligible for voting or not

- **CONDITIONAL CONTROL STATEMENTS**

11. Write a program to find greatest of two numbers
12. Write a program to find out which type of triangle it is
13. Write a program to find out greatest of three numbers
14. Write a program to evaluate performance of the student
15. Write a program to make a basic calculator

- **LOOP CONTROL STATEMENTS**

16. Write a program to print Fibonacci up-to the given limit
17. Write a program to find the sum of digits of a number
18. Write a program to find factorial of a number
19. Write a program to print table of any number
20. Write program for printing different pyramid pattern

- **ARRAYS AND STRINGS**

21. Write a program to enter the elements in a one dimensional array
22. Write a program to find the sum and average of five numbers
23. Write a program to sort the array elements
24. Write a program to enter the marks of 50 students an calculate the average
25. Write a program to add 2 matrix
26. Write a program to multiply 2 matrices
27. Write a program to calculate the length of string
28. Write a program to concatenate 2 strings
29. Write a program to reverse the string
30. Write a program to count the numbers of characters in a strin

. Write a program that converts lower case characters to upper case

31. Write a program without using predefined functions to check whether the string is palindrome or not

FUNCTIONS & POINTERS

1. Write a program using function to find the largest of three numbers
2. Write a program using function to sum the digits of a number
3. Write a program to calculate factorial of a number using recursive function
4. Write a program to print first n Fibonacci using recursive function
5. Write a program to illustrate the concept of chain of pointers
6. Write a program using function to swap two numbers using call by reference
7. Write a program to calculate the area and perimeter of circle using pointers
8. Write a program to copy the contents of one array into another in the reverse order using pointers

STRUCTURES

9. Write a program to read an employee record using structure and print it
10. Write a program to prepare salary chart of employee using array of structures
11. Write a program to print the name and percentage of 20 students (array of structures and arrayswithin structures).
12. Write a program to demonstrate structure within structure.

FILE HANDLING

13. Write a program to create, open, and close files.
14. Write a program to demonstrate the purpose of different file opening modes
15. Write a program to count the number of characters, spaces, tabs, new line characters in a file.
16. Write a program to receive strings from keyboard and write them to a file
17. Write a program to copy a file to another
18. Write a program to read strings from a file and display them on screen.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
PDP-102	People Connect	0-0-2	1

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
MC-102	Constitution of India	2-0-0	2

Objective: Constitution of India is the lengthiest written Constitution in the world. Came into existence as a result of the independence, the Constitution strikes a perfect balance between the State (allocation of powers) and a citizen within his/her individual capacity (providing the rights). This paper will emphasize on some of the important provisions of the Constitution, giving an insight about the functioning of the State and its essential pillars.

UNIT – 1

19. Making and Basic structure of the Constitution
20. Salient features of the Constitution
21. Citizenship

UNIT – 2

22. Fundamental Rights of a citizen
23. Fundamental Duties of a citizen
24. Directives principles of State policy

UNIT – 3

25. Union and the Executive (President, Vice-President, Judiciary)

UNIT – 4

26. Emergency Provisions

UNIT – 5

State Liability

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
BSC-201	Mathematics – III (Numerical Methods)	3-1-0	4

Unit I: Matrices (10 lectures)

Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, Skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Unit II: Sequences and series: (12 lectures)

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit III: Calculus: (8 lectures)

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit IV: Calculus: (8 lectures)

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminateforms and L'Hospital's rule; Maxima and minima.

Unit V: Multivariable Calculus (Differentiation): (10 lectures)

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

Suggested Text/Reference Books

(i) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

(ii) Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
(iii) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
(iv) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
(v) D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
ME-203C	Fluid Mechanics	3-1-0	4

UNIT-1: FLUID PROPERTIES AND FLUID STATICS

Concept of fluid and flow; ideal and real fluids; Continuum concept; properties of fluids; Newtonian and non-Newtonian fluids; Pascal's Law; hydrostatic equation; hydrostatic forces on plane and curved surfaces; stability of Floating and submerged bodies; relative equilibrium; Problems

UNIT-2: FLUID KINEMATICS AND DYNAMICS

Eulerian and Lagrangian description of fluid flow; stream; streak and path lines; types of flows; flow rate and continuity equation; differential equation of Continuity; rotation; vorticity and circulation; stream and potential functions; Problems Concept of system and control volume; Euler's equation; Bernoulli's equation; venturimeter; pitot tubes; orifice meter; kinetic and momentum correction factors;Impulse momentum relationship and its applications; Problems

UNIT-3: VISCOUS FLOW

Flow regimes and Reynolds's number; Relationship between shear stress and pressure gradient; uni-directional flow between stationary and moving parallel plates; Counter flow; laminar flow through pipes

UNIT-4: FLOW THROUGH PIPES

Friction loss in pipe flow; Darcy-Weisbach formula co-efficient of friction and friction factor: Major and minor losses in pipes; hydraulic Gradient and total energy lines; series and parallel connection of pipes; branched pipes; Equivalent pipe; power transmission through pipes; Problems

UNIT-5: BOUNDARY LAYER CONCEPT

Displacement; momentum and energy thickness; von-karman momentum integral equation; laminar and turbulent boundary layer flows; drag on a flat plate; boundary layer separation; Stream lined and bluff bodies; lift and drag on a cylinder and an airfoil; Problems

TEXT BOOKS: Kumar, K.L., "Engineering Fluid Mechanics", Eurasia Publication House, 2002

REFERENCE BOOKS:

1. Kumar, D. S., "Fluid Mechanics and Fluid Power Engineering", SK Kataria and Sons,1998
2. Wylie, E. B, Streeter VL; "Fluid Mechanics";McGrawHill1983
3. SomSKandBiswasG.,"IntroductiontoFluidMechanicsandFluidMachines",TataMcGrawHill, 1998
4. Bansal RK, "A Text Book of Fluid Mechanics" Laxmi Publications
5. Agrawal, S.K."Fluid Mechanics and Machinery",Tata McGraw Hill.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
ME-205C	Engineering Mechanics	3-1-0	4

UNIT-1: FORCE SYSTEMS

Basic concepts of space, time, mass, force, particle and rigid body; scalars and vectors; principle of transmissibility; force classification; Representation of force in vector form; rectangular components of two-dimensional force systems; resultant of two dimensional and concurrent force systems. moment about a point; Varignon's theorem; Representation of moment in vector form; couple. Numerical.

UNIT-2: EQUILIBRIUM

Equilibrium in two dimensions; Lame's Theorem; system isolation and the free-body-diagram; modelling the action of forces; equilibrium conditions; Numerical.

UNIT-3: PROPERTIES OF SURFACES/CROSS SECTIONS

Centre of mass; determining the centre of gravity; centre of gravity of areas including composite sections; moments of inertia; MI of plane figures; parallel axis & perpendicular axis theorem; MI of composite figures. Numerical.

UNIT-4: RECTILINEAR AND CURVILINEAR MOTION

Types of motion, definitions of displacement, distance, velocity, speed, acceleration Newton's laws of motion, Uniform and non-uniform motion equations of motion, motion under gravity. Numerical.

UNIT-5: PROJECTILES

Angle of projection, Trajectory, Range of projectile, Duration of flight, Path of Projectile, Greatest height attained by a projectile. Numerical

TEXT BOOKS

Meriam, J. L. "Engineering Mechanics", John Wiley & Sons.

Beer, F.P. and Johnston, E.R. "Mechanics of Materials", Tata McGraw Hill
Shames, I.H. "Engineering Mechanics", 4th Edition, Pearson Education, 2003

Pytel, A and Kiusalaas, J. Thomsom, "Mechanics of Materials", Brooks & Cole, 2003

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-201C	Introduction to Civil Engineering	3-0-0	3

UNIT I: Evolution and history of Civil Engineering.
Classification and domains of Civil Engineering.

Surveying; Compass survey, chain survey, Introductions to modern surveying equipment's and techniques such as EDM or Distometer, Total station, Remote sensing & GPS.

UNIT II: Basic building materials and constructions: Common building materials, properties, Bricks, limes, timbers, stones, asphalt, bitumen, tar, Foundations, Types of buildings, Masonary: brick & composite, plastering, walls, roofs, floors.

UNIT III: Concrete materials and technology: Concrete materials & their compositions, properties, cements, grades of concrete, admixtures, formwork, concrete handling in fields.

UNIT IV: Traffic & Transportation Engineering: History of transportation engineering, Modes of transportation, Classification of roads, road plans, traffic signs, traffic signals, road markings, traffic & parking surveys, street lights, road accidents, railway engineering, airport engineering and planning, airport components, zonings, obstructions.

UNIT V: Environmental & hydraulic Engineering: Water supply, waste water, irrigation & hydraulic structures.

Geotechnical Engineering & soil mechanics: Soil constituents, water contents, void ratio, porosity, soil classification, soil stabilization, soil exploration, bearing capacity.

Books:

1. Building materials, S.C. Rangwala
2. Building Construction, B.C Punmia
3. Concrete Technology, Neville & Brooks, Pearson
4. Highway Engineering, S.K. Khanna, Soil Mechanics, K. R. Arora

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-203C	Building Material & Construction	3-0-0	3

Unit I: Introduction: Common building material, Mechanical properties of material, Comparison of various mechanical properties. **Stones**: Common building stones, Requirement of a good building stones, Dressing and preservation of stones. **Bricks**: Manufacture of clay bricks, Classification and testing of claybricks, Problems of efflorescence.

Unit II: Lime: Manufacture, Classification of lime. **Timber**: Classification and wood based products of timber, Defects and their prevention, Factors effecting the strength of timber., Seasoning and preservationof timber. **Asphalt, Bitumen and Tar**: Terminology, Bituminous materials, Specification and usage **Cement**: Properties, Uses and types; manufacturing and materials, Plastering and Form Work.

Unit III: Introduction of Buildings and Foundations: General Introduction of Buildings, Types of Buildings, Components of Buildings, Design Loads, Introduction of Foundation, Types of Foundation, Function of Foundation, Essential Requirements of a good Foundation, Site Investigation and Sub-Soil Exploration, Method of Site Exploration, Settlement of Foundation, Causes of Failures **of** Foundations and Remedial Measures

Unit IV: Bricks Masonry and Composite Masonry: Introduction of Brick Masonry, Types of bricks, Bonds in brick work, Supervision of brick work, Defects in brick masonry, Strengths of brick masonry, Introduction of Composite Masonry, Reinforced brick masonry, Stone composite masonry, Brick-stone composite masonry, Concrete block masonry, Hollow clay block masonry, Damp Proofing, Termite proofing and Fire Protection of Buildings.

Unit V: Walls: Types of walls, Introduction of cavity walls, General features of cavity walls, Construction of cavity walls, Introduction of partition walls, Brick partitions, Clay block partition walls, Concrete partitions, Glass partitions.

Floors and Roofs: Introduction of a Floor, Components of a Floor, Materials for Construction, Selection of Flooring Material, Cement Concrete Flooring, Brick Flooring, Marble flooring, Asphalt Flooring, Introduction of Roofs, Types of Roofs, Trussed Roofs, Steel Roof Trusses

Books:

1. Building Construction, B. C. Punmia
2. Construction Materials, S. C. Rangwala

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-251C	Computer Aided Civil Engineering Drawing	0-0-2	1

List of Experiments:

1. Introduction and Refreshing to AutoCAD (Introduction of AutoCAD and Various Commands)
2. Fundamental Line Drawings (Fundamental line drawings & Practice Drawings)
3. Foundation Drawings (Various Types of Foundation drawings)
4. Brick Masonry Drawings (Drawings of Various Types of Bond of Brick Masonry)
5. House Planning Drawing (Planning and Drawings of Plumbing and Electrical in all Floors)
6. House Planning Drawing (Planning and Drawings of Different Floors)
7. Office Building Drawing (Planning and Drawings of Different Floors)
8. To design and draw a Primary Health Centre
9. To design and draw a Primary School
10. To design and draw a Rest House

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
BSC-251	Mathematics – III (Numerical Methods) Lab	0-0-2	1

List of Experiments: (Using C++ Software)

1. Bisection Method.
2. Newton Raphson Method.
3. Secant Method.
4. Regulai Falsi Method.
5. LU decomposition Method.
6. Gauss-Jacobi Method.
7. Gauss-Siedel Method.
8. Lagrange Interpolation or Newton Interpolation.
9. Simpson's rule.
10. Trapezoidal Rule

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
ME-256C	Fluid Mechanics Lab	0-0-2	1

List of Experiments:

1. To study the constructional details and draw characteristic and constant efficiency curves of aPelton turbine
2. To study the constructional details and draw characteristic and constant efficiency curvesof a Francis turbine
3. To study the constructional details and draw characteristic and constant efficiency curves of aKaplan turbine
4. To study the constructional details and draw characteristic curve of centrifugal pump
5. To study the constructional details and draw characteristic curve of a reciprocating pump
6. To study the constructional details and draw performance curve of gear oil pump
7. To study the constructional details and determine the efficiency of a hydraulic Ram
8. To study the constructional details of a centrifugal compressor
9. To study the model of hydro power plant and draw it's layout
10. To determine the volumetric efficiency of a reciprocating compressor

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
PDP-201	Personality Development & Grooming	0-0-2	1

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-202C	Soil Mechanics & Engineering Geology	3-1-0	4

Unit 1:

General Geology

Engineering Geology: Introduction; Formations of Rocks; Characterization; Weathering Processes, Types of Rocks, Fold and fault in Rock, Physical Properties of Minerals

Unit 2:

Introduction of Soil Engineering:

Soil and soil-mass constituents, water content, specific gravity, void ratio, porosity, degree of saturation, air void and air content, unit weights, density index etc. Inter- relationships of the above. Determination of index properties of soil: water content, specific gravity, particle size distribution, consistency limits, void ratio and density index. Classification of soil for general engineering purposes: particle size and I.S. Classification systems.

Unit 3:

Soil Permeability

Permeability of soil and its determination in laboratory. Field pumping out tests, factors affecting permeability, permeability of stratified soil masses

Unit 4:

Stress in soil mass and compaction of soil

Stresses in soil mass: total, effective and neutral pressure, calculation of stresses, influence of water table on effective stress, quick sand phenomenon. Seepage and Seepage Pressure, Principles of soil compaction, laboratory compaction tests; Proctor's test Modified Proctor tests

Unit 5:

Shearing strength of soil

shearing strength of soil, parameters of shear strength, Coulomb's failure envelope, determination of shear parameters by Direct Shear Box. Tri-axial and unconfined compression test apparatuses

Suggested Readings:

1. Parbin Singh-A Text Book of Engineering & General Geology- S.K.Kataria & sons
2. K.R. Arora - A text Book of Soil Mechanics
3. N Chenna Kesavulu- A Text book of Engineering Geology- Macmillan India Ltd.
4. M.T.Maruthesha Reddy- A Text book of Applied Engineering Geology- New Age International Publisher

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-204C	Disaster Preparedness & Planning	3-0-0	3

Unit 1: Introduction - Concepts and definitions: disaster, hazard, vulnerability, risks- severity, frequency and details, capacity, impact, prevention, mitigation).

Unit 2: Disasters - Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

Unit 3: Disaster Impacts - Disaster impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.

Unit 4: Disaster Risk Reduction (DRR) - Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control, security, communications); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

Unit 5: Disasters, Environment and Development - Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

Text/Reference Books:

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority)
2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
3. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
4. Singh B.K., 2008, Handbook of Disaster Management: Techniques & Guidelines, Rajat Publication.
5. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation
6. Disaster Medical Systems Guidelines. Emergency Medical Services Authority, State of California, EMSA no.214, June 2003
7. Inter Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
ME-204C	Strength of Materials	3-1-0	4

UNIT-1: SIMPLE STRESSES AND STRAINS

Resistance to deformation; Hook's law and stress-strain diagram; types of stresses; stresses and strains in bars of varying sections; stresses in composite bars; lateral strain and Poisson's ratio; volumetric strain, modulus of rigidity and bulk modulus; relation between elastic constants. Numerical

UNIT-2: TORSION OF CIRCULAR SHAFTS AND REACTION OF BEAMS

Torsion formula of circular shaft, power transmission by shaft, types of beams and loads, reaction produced on supports for beams with point load uniformly distributed load, uniformly varying load andcombined loads. Numerical.

UNIT-3: SHEAR FORCE & BENDING MOMENT

Definitions: SF and BM diagrams for cantilevers, simply supported beams with or without overhang and calculation of max. BM and SF and point of contra-flexure under i) concentrated loads, ii) uniformly distributed loads over wholes pan or part of it iii) combination of concentrated and uniformlydistributed loads

UNIT-4: ANALYSIS OF PERFECT FRAMES

Types of frames, Assumptions made in finding out the forces in frames, Reactions of supports of a frame, Analysis of frame by Method of Joint, Analysis of frames by Method of Section.

UNIT-5: MOHR CIRCLE OF STRESSES

Mohr's circle of stress for a material under similar stresses in two mutually perpendicular plane, Mohr's circle of stress for a material under dissimilar stresses in two mutually perpendicular plane Mohr's circle of stress for a material under similar stresses in two mutually perpendicular plane along with shear stresses acting on all the planes, Mohr's circle for a material under dissimilar stresses in two mutually perpendicular plane along with shear stresses acting on all the planes. Numerical

TEXT BOOKS

Ferdinand P Beer &Russel E Johnston; Mechanics of Materials‖, Tata McGraw Hill;2009

REFERENCE BOOKS:

1. Hibbeler, R. C., Mechanics of Materials, Pearson Education, 2005
2. Ryder,G H., Strength of Materials, Macmillan, 2001
3. Srinath LS, Strength of Materials, Macmillan, 2001
4. Andrew / Kiusalaas, Jaan, Mechanics of Materials‖, Thomson, 2003

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-206C	Surveying & Geomatics	3-1-0	4

Unit I: Introduction to Surveying: Basic principles, Concept and purpose of surveying, Measurements & its Units, Instruments used for taking measurements Classification based on surveying instruments, etc. **Chain Surveying**: Introduction Advantages and Disadvantages, Direct and indirect ranging Offsets and Recording of field notes. **Compass surveying**: Purpose, Use of prismatic compass.

Unit II: Levelling: Definitions of various terms in levelling. Different types of levelling, sources of errors in levelling curvature and refraction corrections. Temporary adjustment of dumpy and tilting levels. Computation and adjustment of levels. Profile levelling; L-Section and cross-sections. Mid ordinate, Average ordinate, Trapezoidal rule, Simpsons rule.

Plane Table Surveying: Purpose of plane table surveying, Equipment used in plane table survey, Setting of a plane table, Methods of plane table surveying Radiation Intersection Traversing Resection, Concept of Twopoint and Three point problems, Errors in plane table survey and precautions to control them Testing and adjustment of plane table and alidade.

Unit III: Triangulation: Merits and demerits of traversing, triangulation and trilateration. Grades of triangulation, Strength of figure, field procedure of triangulation. Reconnaissance and selection of triangulation stations. **Adjustment of Triangulation Figures:** Adjustment of levels. Adjustment of triangulations figures, braced quadrilateral Triangle with central, station. Approximate and method ofleast squares for figure adjustment, Trilateration.

Unit IV: Measurement of Distances, directions and elevations by different methods. Traversing. Vertical control, Precise levelling, Trigonometric levelling. **Contouring:** Characteristics of contours, contour interval, contour gradient, Methods of locating contours, uses of contour maps. **Measurement of Angles & Direction:** Different types of direction measuring instruments and their uses. Reference meridians, Bearing and azimuths, magnetic declination and its variation. Use and adjustment of surveyors and prismatic compass Errors of measurements and their adjustments.

Unit V: Introduction to the use of Modern Surveying equipment and techniques such as: EDM or Distomat, Total station, Study and use of Digital Planimeter, Introduction to remote sensing and GPS.

Text Book:

1. Surveying & Levelling by B. C. Punmia.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-208C	Environmental Engineering	3-1-0	4

Unit 1: *Water:* -Sources of Water and quality issues, water quality requirement for different beneficial uses, Water quality standards, water quality indices, water safety plans, Water Supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design.

Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes

Unit 2: *Sewage*- Domestic and Storm water, Quantity of Sewage, Sewage flow variations. Conveyance of sewage- Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems. Small bore systems, Storm Water-Quantification and design of Storm water; Sewage and Sullage, Pollution due to improper disposal of sewage, National River cleaning plans, Wastewater treatment, aerobic and anaerobic treatment systems, suspended and attached growth systems, recycling of sewage – quality requirements for various purposes. **Unit 3**: *Air* - Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air pollution- Occupational hazards, Urban air pollution automobile pollution, Chemistry of combustion, Automobile engines, quality of fuel, operating conditions and interrelationship. Air quality standards, Control measures for Air pollution, construction and limitations

Noise- Basic concept, measurement and various control methods.

Module 4: *Solid waste management*-Municipal solid waste, Composition and various chemical and physical parameters of MSW, MSW management: Collection, transport, treatment and disposal of MSW. Special MSW: waste from commercial establishments and other urban areas, solid waste from construction activities, biomedical wastes, Effects of solid waste on environment: effects on air, soil, recovery and recycle. Disposal methods- Integrated solid waste management. Hazardous waste: Typesand nature of hazardous waste as per the HW Schedules of regulating authorities.

Module 5: *Building Plumbing*-Introduction to various types of home plumbing systems for water supply and waste water disposal, high rise building plumbing, Pressure reducing valves, Break pressure tanks,

Storage tanks, Building drainage for high rise buildings, various kinds of fixtures and
fittings used.

Suggested Readings:

1- Water Supply by S.K. Garg, Khanna Publishing Co.

2. Environmental Engineering by Peavy, H.S., Rowe D.R. and Techobanoglous, Mc Graw Hill, Book Company.

3. Manual of Water Supply and Water Treatment, Ministry of Urban Development, Govt.of India.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
HSS-202	Engineering Economics & Management	3-0-0	3

Unit- 1: Introduction to Economics:

Definitions, Nature, Scope, Difference between Microeconomics & Macroeconomics Theory of Demand & Supply; meaning, determinants, law of demand, law of supply, equilibrium between demand & supply Elasticity; elasticity of demand, price elasticity, income elasticity, cross elasticity.

Unit-2: Theory of Production

production function, meaning, factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur), Law of variable proportions & law of returns to scale Cost; meaning, short run & long run cost, fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis; meaning, explanation, numerical

Unit- 3 : Macro-Economic Indicators

Macro-Economic Indicators, Changes in the Gross Domestic Product (GDP), Gross National Product (GNP), Inflation, Employment & Unemployment Indicators, Currency Strength, Interest rates, Corporate Profits, Balance of Trade, Agricultural Production, Current Account balance, Foreign exchange, Foreign Trade, Industrial Production Index, Wholesale Price Index (WPI), Retail Price Index (RPI), Consumer Price Index (CPI).

Unit-4 : Introduction to Management

Definitions, Nature, scope Management & administration, skill, types and roles of managers Management Principles; Scientific principles, Administrative principles, Maslow's Hierarchy of needs theory.

Functions to Management: Planning, Organizing, Staffing, Directing, Controlling (meaning, nature and importance) Organizational Structures; meaning, principles of organization, types-formal and informal, line, line & staff, matrix, hybrid (explanation with merits and demerits), span of control, departmentalization.

Unit-5 : Introduction to Marketing & Production Management

Marketing Mix, concepts of marketing, demand forecasting and methods, market segmentation Introduction to Finance Management; meaning, scope, sources, functions

Production Management: Definitions, objectives, functions, plant layout-types & factors affecting it, plant location- factors affecting it. Introduction to Human Resource Management; definitions, objectives of manpower planning, process, sources of recruitment, process of selection

Reference Books:

1. Engineering Economics, R.Paneerselvam, PHI publication
2. Fundamentals of Management: Essential Concepts and Applications, Pearson Education, Robbins S.P. and Decenzo David A.
3. Economics: Principles of Economics, N Gregory Mankiw, Cengage Learning
4. Principles and Practices of Management by L.M.Prasad
5. Principles of Management by Tripathy and Reddy

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-252C	Soil Mechanics & Engineering Geology Lab	0-0-2	1

List of Experiments:

1. Physical Properties of Minerals
2. Physical Properties of Rocks
3. Identification of Minerals in Hand Specimen
4. Identification of Rocks in Hand Specimen
5. Determination of C-ϕ values by direct shear test apparatus
6. Grain size distribution by sieving
7. Determination of water content by Pycnometer
8. Determination of specific gravity by Pycnometer

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
ME-254C	Strength of Materials Lab	0-0-2	1

List of Experiments:

1. To perform the Brinell Hardness Test
2. To perform the Rockwell Hardness Test
3. To study the Impact Testing Machine and perform the Impact Tests (IZOD &CHARY)
4. To study UTM and Torsion Testing Machine
5. To perform the Tensile Test on UTM
6. To perform the Shear Test on UTM
7. To perform the torsion test on Torsion Testing Machine
8. To determine the Moment of Inertia of a Flywheel about its own axis of rotation
9. To study the Erichsen Sheet Metal Testing Machine and Perform the Erichsen Sheet Metal Test.
10. To verify support reactions for different types of loads at different locations on the beam

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-254C	Surveying & Geomatics Lab	0-0-2	1

List of Experiments:

1. To determine the difference in elevation of two given points Dumpy Level with Al Stand
2. Profile leveling and cross sectioning of a given route.
3. To measure the horizontal angle by the method of reiteration and repetition, theodolite traversing anderror adjustment.
4. To prepare the contour map of an area by the method of radial lines.
5. Determination of elevation of top of tower using theodolite
6. Plane tabling by the method of radiation and intersection.
7. Solution of Three-point problem in plane tabling
8. Setting out of simple circular curve by one theodolite and by two theodolite method
9. To prepare the contour map of an area by the method of Total Station.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-256C	Environmental Engineering Lab	0-0-2	1

List of Experiments:

1. To determine the pH of the given sample of water.
2. To determine the turbidity of the given sample of water
3. To determine Total Solids of the given water sample.
4. To determine the Total Dissolved Solids of the given water sample.
5. To find out conductivity of the given water sample.
6. To determine hardness of the given water sample.
7. To find out chloride of the given water sample.
8. To determine alkalinity of the given water sample.
9. To find out acidity of the given water sample.
10. To determine hardness of the given water sample.
11. To determine the optimum dose of alum by Jar test.
12. To study various water supply Fittings.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
PDP-202	Life Skills	0-0-2	1

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-301C	Concrete Technology	3-0-0	3

Unit 1:

Cement Hydration: Cement Types, Paste Micro-structure; Workability; Durability; Factors affecting strength of concrete. **Ingredients of concrete:** Cement: hydration of cement and its basic compounds, structure of hydrated cement, C-S-H gel, heat of hydration, gelspace ratio and its significance.

Aggregates: types, physical properties and standard methods for their determination.

Unit 2:

Concrete : Grade of concrete, proportioning of ingredients, water content and its quality for concrete, water/cement ratio and its role, Properties of fresh concrete including workability, air content, Flow ability, Segregation, Bleeding and Viscosity etc. _ Factors affecting, methods of determination Hardening plasticity and fatigue; Creep and shrinkage; Fresh concrete modelling; Moisture/Ionic diffusion in concrete.

Unit 3:

Admixture in concrete: Chemical and mineral admixtures, their types and uses: water reducers, accelerator, retarders, water-proofing plasticizers, super plasticizers, air-entraining agents. Use of fly ash and silica fume in concrete, their properties and effect.

Unit 4:

Quality control; Concrete mix design; Types of concrete; Concrete production; Tests of concrete in structures; Failure criteria; Fracture mechanics;

Concrete Handling in Field: Batching, mixing, placing and transportation of concrete, equipment's for material handling, various methods their suitability and precautions. Compaction of concrete: methods & equipment's. Curing of concrete: various methods their suitability. Durability of concrete

Unit 5:

Fabrication and Erection Work: Fabrication of Structural steel at slopes and sites, Handling and transportation of units to be erected, Erection of Fabricated steel structures, Prefabricated/precast construction; relative advantages & disadvantage and various precast units & Erection of Precast Reinforced Concrete Structures

Suggested Readings:

1. Concrete Technology by Neville & Brooks, Pearson Education.
2. Concrete: Microstructure, Properties & Materials by Mehta P.K, Tata Mc Graw Hill.
3. Concrete Technology by M.S.Shetty, S.Chand & Co.
4.Concrete materials by Popovics, Standard Publishers

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-303C	Geotechnical Engineering	3-1-0	4

Unit I: Soil Exploration : Planning for soil exploration, Spacing of boring, Depth of boring, Soil Sampling, Sample disturbance, Split Spoon Sampler

Soil Bearing Capacity : Ultimate soil bearing capacity, Terzaghi's theory, Effect of ground water table on bearing capacity, Settlement of foundation, Construction practices to avoid differential settlement

Unit II: Lateral Earth Pressure: Introduction, Types of earth retaining structures, Lateral earth pressures, Earth Pressure at Rest, Earth Pressure theories, Active and Passive Pressures

Stability of Retaining Walls: Stability considerations for gravity retaining walls, Coulombs theory Vs Rankins theory, Choice of appropriate theory, Numerical Problems based on lateral earth pressure and stability of retaining walls

Unit III: Slope Stability: Infinite Slopes, Finite Slopes, Total Stress analysis for purely cohesive soil, Effect of tension cracks, Method of slices for a cohesive frictional soil, Effective Stress Analysis, Steady seepage, Rapid drawdown.

Unit IV: Shallow Foundation: Introduction to Shallow Foundation, Types of foundations settlement, Elastic settlement based on the theory of elasticity, Elastic Settlement of foundations on saturated clay, Elastic Settlement of Sand Soil, Types of Shallow foundation.

Deep Foundation: Introduction, Necessity, Classification of piles, Uses of Piles, Load carrying capacity of piles, Negative skin friction.

Design of Pile Foundation: Design of pile foundation, Construction of pile foundations, laterally loaded piles (Batter Piles)

Unit V: Well Foundations: Introduction, Advantages of well foundations, Elements of well foundation, Design Aspects of well foundation, Grip length, Forces acting on well foundation, Terzaghi analysis, Tilts and Shifts, Remedial measures for rectification of tilts and shifts

Machine Foundation: Natural frequency of machine foundation, Transmissibility, Transmitted force, Machine foundation Special features, Design Approach for machine foundation, Vibration Isolation,

Properties of isolating materials, Construction
Aspectsof machine foundations

Text Books: 1. SOIL MECHANICS AND FOUNDATION ENGINEERING by K.R ARORA, STANDARD PUBLISHERS & DISTRIBUTORS, 3rd Edition, (2011)

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-305C	Hydrology & Water Resource Engineering	3-1-0	4

Unit I: INTRODUCTION TO WATER RESOURCES ENGINEERING

Need of water resources projects, Preliminary aspects of Environmental Impact Assessment of Water Resources Projects, Hydrologic cycle, scope and application, hydro-metrology, hydrologic equation, hydrologic models, water resources engineering

Unit II: PRECIPITATION AND ABSTRACTIONS

Mechanism of precipitation, types and forms of precipitation, measurement techniques, rain gauge network, variability in precipitation, estimation of missing data, test for consistency of rainfall record, rainfall hyetograph, rainfall mass curve, areal average rainfall, intensity duration curves, evaporation, factors affecting evaporation, evaporimeters, estimation of evaporation, evapotranspiration, measurement of evapotranspiration, initial loss, infiltration and infiltration indices.

Unit III: RUN OFF AND HYDROGRAPH

Direct runoff and base flow; run off characteristics of streams, computation of runoff, rainfall-runoff relationships, components of hydrograph and factors affecting shape of hydrograph, base flow separation, effective rainfall hyetograph, unit hydrograph theory.

STREAM GAUGING AND DESIGN FLOOD: Site selection for stream gauging, direct methods of discharge measurements, computation of design flood.

Unit IV: GROUND WATER HYDROLOGY

Occurrence, distribution of ground water, specific yield of aquifers, movement of groundwater, Darcy's law, permeability, safe yield of a basin, compressibility of aquifer, storage coefficient, specific storage, hydraulics of wells under steady & introduction to unsteady condition in confined and unconfined aquifers, yield of wells, pumping and recuperation tests, types of tube wells.

Unit V: FLOOD ROUTING

Reservoir and channel flood routing methods.

OPEN CHANNEL FLOW: Channel Characteristics and parameters, Uniform flow, Critical flow, Specific Energy concepts, Gradually Varied Flows, Rapidly Varied flow with special reference to hydraulic jump.

LIST OF RECOMMENDED BOOKS:

1. K. Subramanya, " Engineering Hydrology", Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi,1990.
2. Asawa G.L.,"Irrigation and water resources Engineering", New Age International Publishers, New Delhi, 2005.
3. Garg S. K., "Irrigation Engineering and Hydraulic Structures", Khanna Publishers, New Delhi, 1996.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-307C	Highway Engineering	3-1-0	4

Unit 1: Highway development and planning-Classification of roads, road development in India, Current road projects in India; highway alignment and project preparation.

Unit 2: Geometric design of highways-: Introduction; highway cross section elements; sight distance, design of horizontal alignment; design of vertical alignment; design of intersections, problems

Unit 3: Traffic engineering & control- Traffic Characteristics, traffic engineering studies, traffic flow and capacity, traffic regulation and control; design of road intersections; design of parking facilities; highway lighting; problems

Unit 4: Pavement materials- Materials used in Highway Construction- Soils, Stone aggregates, bituminous binders, bituminous paving mixes; Portland cement and cement concrete: desirable properties,tests, requirements for different types of pavements. Problems

Unit 5: Design of pavements- Introduction; flexible pavements, factors affecting design and performance; stresses in flexible pavements; design of flexible pavements as per IRC; rigid pavements components and functions; factors affecting design and performance

List of Recommended Books:

1. Transportation Engg by S.K Sharma
2. Highway Engg by L.R Khadiyali
3. Highway Engg by Justo and Khanna

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-309C	Design of Concrete Structures	3-1-0	4

Unit I: Fundamentals of working Stress Method: Concept of reinforced concrete, Stress strain characteristics of concrete and steel reinforcement, Elastic theory, singly reinforced beam, Balanced section, under reinforced section, over reinforced section, Analysis and design of singly reinforced rectangular section, doubly reinforced

rectangular section and T-sections, Design of one way and two-way slab as per IS- 456

Fundamentals of ultimate strength theory: Curved stress distribution, Compressive stress block, Simplified rectangular stress block as per Whitney's approach, Ultimate moment of resistance of singly reinforced section

Unit II: Introduction to limit state method of design : Concepts of probability and reliability, Characteristic loads, Characteristic strength, Partial safety factors for load sand materials, Introduction tolimit states of collapse in flexure, Stress strain relationship for concrete, Stress strain relationship for steel,Design Stress block parameters, Determination of neutral axis depth, Computation of moment of resistance, Analysis and design of singly reinforced beam, doubly reinforced beam and T beam Sections
Unit III: Shear, Bond and Torsion : Limit state of Collapse-Shear, Development Length, Bond,anchorage, development length and splicing, Limit State of Collapse-Torsion.

Limit State of Serviceability: Introduction, Limit state of Deflection-Short term and long term, Control of deflection, Limit state of Cracking

Design of slabs: Introduction to one way and two-way slab, Design of one-way slab, Design of two way simply supported slab on the four edges with corners not held down and carrying u.d.l, Design of two wayslab simply supported on the four edges with corners held down and carrying u.d.l

Unit IV: Foundation: Introduction, pressure distribution beneath footing, Indian Standard code recommendation for design of footings, Design concepts of isolated and combined footing, Detailed design of isolated wall and column footings

Unit V: Axially Loaded Columns: Introduction, types of columns, Assumptions in limit state of collapse in axial compression, Short Axially loaded member in axial compression, Short axially loaded column with minimum eccentricity, Compression members with helical reinforcement

Books: 1. LIMIT STATE DESIGN OF REINFORCED CONCRETE (IS 456 : 2000) by DR. BCPUNMIA, ASHOK KUMAR JAIN AND ARUN KUMAR JAINT, LAXMI PUBLICATIONS, 1st

Edition, (2010)

2. REINFORCED CONCRETE DESIGN by PILLAI AND D MENON, MCGRAW HILLEDUCATION, 2nd Edition, (2007)

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-351C	Design of Concrete Structures Lab	0-0-2	1

List of Experiments:

1. Introduction to concrete mix design
2. Design of one-way Slab
3. Design of two-way Slab
4. Design of Beam
5. Design of Column
6. Design of Stair
7. Design of Sunshade
8. Design of Lintel
9. Design of Foundation
10. Design of retaining wall.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-353C	Geotechnical Engineering Lab	0-0-2	1

List of Experiments:

1. Determination of liquid limit by Casagrande's apparatus.
2. Determination of plastic limit
3. Determination of shrinkage limit
4. Determination of field density by sand replacement method
5. Determination of compaction properties by standard Proctor Test Apparatus
6. To determine the compressibility parameters of soil by consolidation test
7. To determine the permeability of soil by constant and falling head methods.
8. To determine the CBR of soil.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-355C	Hydraulic Engineering Lab	0-0-2	1

List of Experiments:

1. Viscous flow analogy (Hele-Shaw apparatus) for flow net.
2. Electrical analogy for flow net.
3. Study of development of boundary layer over a flat plate.
4. Study of Magnus effect using wind tunnel
5. Study of fluid flow around a cylinder.
6. Study of fluid flow around a sphere.
7. Study of hydraulic jump in open channel flow.
8. Specific energy studies in an open channel flow.
9. Study of flow profile over a spillway.
10. Study of sluice gates.
    TiltingFlume/Adjustable Channel
11. Study of characteristics of Pelton Wheel
    A) Pelton Wheel Turbine Test Rig (Closed Circuit Type) 5H.P. Output
    B) Option Miniature Model (1 H.P. output)
12. Study of characteristics of Francis Turbine

A) Francis Turbine Test Rig (Closed Circuit Type) 5 H.P. Output
B) Option Miniature Model (1 H.P. output)
C) Study of centrifugal pump test rig.
D) Study of reciprocating pump test rig.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-357C	Highway Engineering Lab	0-0-2	1

List of Experiments:

1. To determine the impact value of aggregate sample.
2. To determine the crushing value of aggregate sample.
3. To determine the flakiness and elongation index of aggregate sample.
4. To perform Los Angeles Abrasion test on aggregate sample.
5. To determine the CBR value of a given soil sample.
6. To perform traffic survey & determine traffic volume & capacity.
7. To perform spot speed study.
8. To carry out the grain size analysis of course aggregates & fine aggregates
   (A) Sieve Shaker
   (B) Brass Sieve
   (C) G.I.Sieve
9. To perform penetration test on bitumen sample.
   A. Bitumen Penetrometer – Hand Operated
   B. Bitumen Penetrometer – Electrical - Same as above with electrical arrangement.
10. To determine the softening point of bitumen sample
   A. Hand Operated
   B. Electrically Operated
11. To determine the specific gravity and water absorption of aggregate sample
   A. Thermostatically controlled Oven
   B. Wire Basket
   C. Digital Weighing Balance, 10 kg capacity
12. To determine the ductility value of a bitumen sample.
13. To determine the striping value of coarse aggregate coated with bitumen

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
PDP-301	Leadership & Entrepreneurial Development	0-0-2	1

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/5th Semester

Course Code	Course Name	L-T-P	Credit
CE-311C	Repair & Rehabilitation of Structures	3-0-0	3

Unit I Maintenance and Repair Strategies Maintenance, Repair and Rehabilitation, Facets of Maintenance, importance of Maintenance, Various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration;

Unit II Strength and Durability Of Concrete- Quality assurance for concrete – Strength, Durability and Thermal properties, of concrete – Cracks, different types, causes – Effects due to climate, temperature, Sustained elevated temperature, Corrosion – Effects of cover thickness;

Unit III Special Concretes- Polymer concrete, Sulphur infiltrated concrete, Fibre reinforced concrete, High strength concrete, High performance concrete, Vacuum concrete, Self-compacting concrete, Geopolymer concrete, Reactive powder concrete, Concrete made with industrial wastes;

Unit IV Techniques for Repair and Protection Methods- Non-destructive Testing Techniques, Epoxy injection, Shoring, Underpinning, Corrosion protection techniques – Corrosion inhibitors, Corrosion resistant steels, Coatings to reinforcement, cathodic protection;

Unit V Repair, Rehabilitation and Retrofitting of Structures- Evaluation of root causes; Underpinning & shoring; some simple systems of rehabilitation of structures; Guniting, shotcreting; Non-Destructive testing systems; Use of external plates, carbon fibre wrapping and carbon composites in repairs.

Strengthening of Structural elements, Repair of structures distressed due to corrosion, fire, Leakage, earthquake – Demolition Techniques – Engineered demolition methods – Case studies.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/5th Semester

Course Code	Course Name	L-T-P	Credit
CE-313C	Construction Equipment's & Automation	3-0-0	3

Unit I

Conventional construction methods Vs Mechanized methods and advantages of latter.

Unit II

Equipment for Earthmoving, Dewatering; Concrete mixing, transporting & placing; plastering machines.

Unit III

Prestressing jacks and grouting equipment; Cranes, Hoists and other equipment for lifting.

Unit IV

Equipment for transportation of materials.

Unit V

Equipment Productivities; Use of Drones for spread out sites; Use of robots for repetitive activities.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/5th Semester

Course Code	Course Name	L-T-P	Credit
CE-315C	Building Construction Practice	3-0-0	3

Unit I

Specifications, details and sequence of activities and construction co-ordination – Site Clearance – Marking – Earthwork. Masonry – stone masonry – Bond in masonry - concrete hollow block masonry.

Unit II

Flooring – damp proof courses – construction joints – movement and expansion joints – pre-cast pavements.

Unit III

Building foundations – basements – temporary shed – centering and shuttering – slip forms – scaffoldings

– de-shuttering forms – Fabrication and erection of steel trusses – frames – braced domes – laying brick –

– weather and water proof – roof finishes – acoustic and fire protection;

Unit IV

Sub Structure Construction- Techniques of Box jacking – Pipe Jacking -under water construction of diaphragm walls and basement-Tunnelling techniques – Piling techniques - well and caisson - sinking cofferdam - cable anchoring and grouting-driving diaphragm walls, sheet piles - shoring for deep cutting -well points -Dewatering and stand by Plant equipment for underground open excavation;

Unit V

Super Structure Construction- Launching girders, bridge decks, off shore platforms – special forms for shells - techniques for heavy decks – in-situ pre-stressing in high rise structures, Material handling - erecting light weight components on tall structures - Support structure for heavy Equipment and conveyors -Erection of articulated structures, braced domes and space decks.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-302C	Specification Estimation & Costing	3-1-0	4

Unit I

ESTIMATE: Methods of estimating, Deductions for openings, Building estimate by long wall-short wall method and centre line method, Arch masonry calculations

Unit II

ESTIMATE OF BUILDINGS: Estimate of single room with varandah, estimate of double room with varandah, estimate of masonry platform, estimate of masonry tank, estimate of hexagonal room, estimate of septic tank, estimate of roads and canals

Unit III

SPECIFICATIONS: Specification of roads, Specification of various building parameters, Specification of industries, Specification of earthwork

Unit IV

R.C.C WORKS AND STRUCTURES: R.C.C works, Standard hooks and cranks of reinforcement bars, Estimate of R.C.C slab, Estimate of R.C.C column, Estimate of R.C.C beam, Estimate of R.C.C footing, Estimate of R.C.C retaining wall

Unit V

RATE ANALYSIS: Preparing analysis of rates, Analysis of rates for cement concrete foundation, Analysis of rates for Earthwork in excavation with a concept of lead and lift, Analysis of rates for RCC in roof slab, Analysis of rates for Terrazzo and marble Flooring, Analysis of rates for Brick masonry in cement mortar

Text Books:

1. ESTIMATING AND COSTING IN CIVIL ENGINEERING by B.N .DUTTA, UBS PUBLISHERS' DISTRIBUTORS (P) LTD.-NEW DELHI, 26th Edition, (2013)

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-304C	Structural Analysis – I	3-1-0	4

Unit I: Basic Introductory Concepts

Structural Systems - Equilibrium and compatibility - Stability and Indeterminateness - Types of Loadings

-Free body diagram.

Analysis of Forces in Statically Determines Structures

Analysis Trusses (Including compound trusses), Beams and Frames (Including internal hinges) – Analysis of Beams and Frames (Including internal hinges)

Unit II: Analysis of Space Trusses Using Tension Coefficient Method.

Introduction to Force (Flexibility) And Displacement (Stiffness) Method of Analysis

Unit III: Analysis for Moving Loads

Influence lines for determinate beams and trusses - Criteria for maxima of internal forces for beams andtrusses.

Unit IV: Displacement of Statically Determine Structures

Determination of slope and deflections of beams using successive integration and conjugate Beam methods – Determination of deflection of trusses using virtual work method – Williot Mohr Diagram

Unit V: ANALYSIS OF INDETERMINATE TRUSSES

Statically indeterminate structures –Force and Displacement method of analysis - Analysis by superposition – Selection of redundant restraints – Method of consistent deformations

BOOKS RECOMMENDED

1. Gupta S P and Pandit G S, " Theory of Structures" Volume 1 and 2, Tata Mc Graw Hill, New Delhi, 1999
2. Vaidyanatnan, R and Perumal P "Structural Analysis", Vol – I & II, 3rd edition, Laxmi Publication,New Delhi, 2007
3. Negi L S and Jangid R S, "Structural Analysis", Tata Mc Graw Hill, New Delhi, 1999
4. Utku, S, Norris, C H and Wilbur, J B "elementary Structural Analysis", Mc Gra Hill, NY, USA., 1991
5. Hibbler R C, "Structural Analysis",6th edition, Prentice Hall, NJ, USA, 2006

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-306C	Design of Steel Structures	3-1-0	4

Unit 1: Plastic Analysis:

Plastic analysis of steel structures, static and mechanism method of analysis, shape factor. Classification of Cross Sections: As per IS 800-2007 Plastic, compact, semi compact, slender sections, their characteristics including moment- rotation.

Unit 2: Connections:

Riveted Connection, Types of bolts, load transfer mechanism, Design of bolted and welded connections under axial and eccentric loadings.

Introduction of Welded Connection: Introduction, Types of welded joints, Design of welded joint subjected to axial loads, Design of welded joints subjected to eccentric loads, Design of simple, semi-rigid and rigid connections

Unit 3: Compression Member:

Column buckling curves, Design of compression member; Axially loaded built up columns, design of lacings and battens.

Beams: Design of beams: simple and compound sections, laterally supported and unsupported beam design, Web buckling, web crippling, lateral torsional buckling.

Tension Members: Design strength in gross section yielding, net section rupture and block shear. Design of axially loaded tension members

Unit 4: Design of plate girder:

Design of welded and bolted sections. Connections for flange plate to flange angles and flange angles to web, etc. Design of welded connections. Web and flange splicing. Horizontal, Intermediate and Bearing stiffeners. Design of gantry girder.

Unit 5: Column Bases:

Design of column bases, Slab base, gusseted base for axial and eccentric compressive load.

Water tanks: circular tanks with segmental bottoms, rectangular tanks, pressed steel tanks, design of staging.

Reference Books:

1-Design of Steel Structures by N. Subramanian, Oxford University Press.

2. Limit state Design of Steel Structures: S K Duggal, TMH publication 3-
Design of Steel Structures by S. Bhavikatti, I.K. International Pvt. Ltd.4-
Design of Steel Structures by V.L. Shah, Structures Publications.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-308C	Open Channel Flow	3-0-0	3

Unit I

Analyze for unsteady flows in open channels; Derivation of 1-D and 2-D shallow water flow equations.

Unit II

Consideration for nonhydrostatic pressure distribution; Basics of numerical methods: Finite-Differenceand Finite Element Methods.

Unit III

Latest shock capturing Finite Volume methods for solving 1-D and 2-D shallow water flow equations; Dambreak flow.

Unit IV

Flood routing in large channel networks, Flood routing in compound channels; Flood routing in channelswith flood plains.

Unit V

Surface irrigation flow modelling.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-352C	Structural Analysis – I Lab	0-0-2	1

List of Experiments:

1. Determination of Shear force for simply supported beams.
2. Determination of Bending Moment for simply supported beams
3. Determination of Slope of continuation beams.
4. Determination of Deflection of continuous beams.
5. Determination of deflection of pin-jointed trusses.
6. Determination of reaction of portal frames
7. Determination of deflected shape of portal frames.
8. Determination of influence line determinate beams.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-354C	Major Project – I	0-0-4	2

To set the objectives, deliverables, work plan, logistics planning and milestones with discernible outputsand then to demonstrate the feasibility through some initial work.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

Course Code	Course Name	L-T-P	Credit
PDP-302	Problem Solving Skills	0-0-2	1

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/6th Semester

Course Code	Course Name	L-T-P	Credit
CE-310C	Construction Project Management	3-0-0	3

Unit I

Construction: Agencies involved and their methods of execution, Introduction to construction management, Unique features of Construction management, Stages in Construction, Description of Contract, Contract document, Contractual relationships, Bid and award process, Types of construction contracts, Phases of a project, Construction project planning- Stages of project planning, Pre-tender, post tender planning, Scheduling and Controlling

Unit II

Techniques of planning: Introduction and development of bar charts, Shortcomings of bar charts, Development of pert network, Development of network, Numbering the events, Modes of network construction, Steps in network development, Work Breakdown structure, Hierarchies

Unit III

PERT: Determining three-time estimates, Slack computations, Use of PERT, Time estimates, Frequency distribution, Mean, variance and standard deviation, Probability distribution, Beta distribution

CPM: Calendaring Networks, Activity time estimate, Computation of Te and Tl, Float, Critical path, Project cost, Optimum duration, Cost optimization.

Unit IV

Resource Scheduling: Process Updating, Data required for updating, Steps in the process of updating, Resource Allocation, Resource Smoothing and Levelling

Unit V

Construction Equipment and Safety: Excavators, Backhoe loaders, Cranes, Other construction equipment's, Quality assurance and Quality Control, Quality and Contractor selection, Safety Program Development, Accident/ incident investigation, Safety and health training, Need of training

Books:

1. PROJECT PLANNING AND CONTROL WITH PERT AND CPM by B.C.PUNMIA AND K. K. KHANDELWAL, LAKSHMI PUBLICATIONS, 4th Edition, (2012)
2. CONSTRUCTION MANAGEMENT FUNDAMENTALS by Y KRAG KNUTSON, CLIFFORD J. SCHEXNAYDER, CHRISTINE FIORI, RICHARD E. MAYO, TATA MCGRAW HILL, 2ND EDITION (2011), MCGRAW HILL EDUCATION, 2nd Edition, (2011)

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/6th Semester

Course Code	Course Name	L-T-P	Credit
CE-314C	Construction Productivity	3-0-0	3

Unit I

Definition of Productivity, Impact of productivities on construction duration and costs; Measuring productivities of construction equipment.

Unit II

Staff and Labour and typical benchmarks for the same; Productivity analysis from Daily Progress Reports.

Unit III

Lean Construction concepts of Value Adding activities, Non-Value Adding Activities and Non-Value Adding but Necessary Activities.

Unit IV

Productivity measurements by special Lean Construction-oriented field methods such as Work Sampling,Takt time analysis, Foreman Delay Surveys.

Unit V

Productivity improvement measures such as Value Stream Mapping, Location-Based management Systems, 5S, good Housekeeping, etc.; use of specialist software such as Vico for productivity studies.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/6th Semester

Course Code	Course Name	L-T-P	Credit
CE-318C	Construction Project Planning & System	3-0-0	3

Unit I

Definition of Projects; Stages of project planning: pretender planning, pre-construction planning, detailed construction planning, role of client and contractor, level of detail, work break-down structure, estimating durations, sequence of activities, activity utility data.

Techniques of planning- Bar charts, Gantt Charts. Networks: basic terminology, types of precedence relationships, preparation of CPM networks: activity on link and activity on node representation, computation of float values, critical and semi critical paths, calendaring networks.

Unit II

PERT- Assumptions underlying PERT analysis, determining three time estimates, analysis, slack computations, calculation of probability of completion.

Allocation of Resources- materials, equipment, staff, labour and finance; resource levelling and optimal schedules; Project organisation, documentation and reporting systems. Control & monitoring; Temporary Structures in Construction; Construction Methods for various types of Structures.

Unit III

Importance of Contracts Management; Planning and organizing construction site and resources- Site: site layout including enabling structures, developing site organization, Documentation at site; Manpower: planning, organizing, staffing, motivation; Materials: concepts of planning, procurement and inventory control.

Unit IV

Project Monitoring & Control- Supervision, record keeping, periodic progress reports, periodical progress meetings. Updating of plans: purpose, frequency and methods of updating. Common causes of

time and cost overruns and corrective measures. Basics of Modern Project management systems such as Lean Construction; Use of Building Information Modelling (BIM) in project management.

Unit V

Quality control: concept of quality, quality of constructed structure, use of manuals and checklists for quality control, role of inspection, basics of statistical quality control. Safety, Health and Environment on project sites: accidents; their causes, effects and preventive measures, costs of accidents, occupational health problems in construction, organizing for safety and health.

Text Book:

1. Project Planning & Control with PERT & CPM by B. C. Punmia.

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/6th Semester

Course Code	Course Name	L-T-P	Credit
CE-312C	Traffic Planning & Management	3-0-0	3

Unit I

Transport planning process systems : Approach to transport planning, Stages in transport planning survey and analysis of existing conditions, Forecast analysis of future conditions and plan synthesis difficulties in the transport planning process, Transportation survey, Type of surveys, Inventory of transport facilities, Inventory of land use and economic activities, Expansion of data from samples

Unit II

Trip generation : Trip purpose, Factors governing trip generation and attraction rates, Multiple linear regression analysis, Category analysis

Trip distribution : Methods of trip distribution, Uniform constant factor method, Average factor method, Fratar method, Furness method, Gravity model, Tanners model, Opportunity model

Unit III

Traffic Assignment : Assignment technique, Capacity restraint assignment, Diversion curves

Modal split : Factors affecting modal split, Modal split in the transport planning process, Recent developments in modal split analysis

Unit IV

Evaluation : Need for Evaluation, Several plans to be formulated, Consideration in evaluation, Economic evaluation

Land use Transport models : Selection of land use transport models, Lowry Derivative Models, Garin–Lowry Model

Unit V

Transport planning for small, medium and large cities : Difficulties in transport planning for small and medium cities, Quick response techniques, Public transport in cities, Planning for public transport, Fares and subsidies

Intermediate public transport in Indian cities : Type of IPT vehicles in India, Characteristics of IPT modes

Unit VI

Computer application in transport planning : Transport planning and computer applications, Computer applications in public transport systems simulation, Programme packages, Use of information technology in transportation

Text Books:

1. TRAFFIC ENGINEERING AND TRANSPORT PLANNING by L.R. KADIYALI, KHANNA PUBLISHERS, 1st Edition, (2007)

2. HIGHWAY ENGINEERING by S,K, KHANNA AND C,E,J JUSTO, NEM CHAND BROTHERS, 1st Edition,

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/6th Semester

Course Code	Course Name	L-T-P	Credit
CE-316C	Transportation Economics	3-0-0	3

Unit I

Introductory Concepts in Transportation Decision Making: Overall transportation project development, budgeting, financial planning, the process of transportation project development, models associated with transportation impact evaluation.

Unit II

Transportation costs - Classification of transportation costs, transportation agency costs, transportation user costs, general structure and behavior of cost functions and road pricing.

Unit III

Estimating Transportation Demand and Supply - supply equilibration, dynamics of transportation demand and supply, elasticity of travel demand and supply, classification of elasticity; Vehicle operating costs: Fuel costs - Maintenance and spares, Depreciation - Crew costs - Value of travel time savings - Accident costs.

Unit IV

Economics of traffic congestion - Pricing policy; Economic analysis of projects - Methods of evaluation - Costbenefit ratio, first year rate of return, net present value, and internal-rate of return methods; Indirect costs and benefits of transport projects.

Unit V

Financing of road projects - methods – Private Public Partnership (PPP) - Toll collection - Economic viability of Design-Build-Operate-Transfer Schemes – Risk Analysis – Value for Money analysis - Case Studies.

Course Code	Course Name	L-T-P	Credit
CE-320C	Traffic Engineering	3-0-0	3

Unit I: Traffic engineering administration and functions.: Traffic engineering., Functions., Organisation of traffic engineering department., Human factors governing road user behaviour., Other vehicle characteristics., Characteristics of slow moving traffic in India.

Unit II: Analysis and Interpretations of traffic studies. : Statistical methods for traffic engineering., General trends in speed data., Time mean speed and space mean speed., Traffic forecasting., Limitations of traffic forecasting., Types of traffic., Forecasts and mathematical models., Period for forecasting.

Unit III: Traffic surveys. : Speed, Journey time and delay surveys., Methods of measuring spot speeds., Presentation of travel time and journey speed data., Vehicle volume count., Types of counts., Methods available for traffic counts., Origin-destination survey., Checking the accuracy of survey data., Parking surveys.

Geometric design. : Highway classification., Horizontal alignment., Vertical

alignment., Sight distance., Intersections., Grade separated intersections., Design for pedestrian facilities., Design criteria for separate cycle tracks., Traffic and parking problems., Design standards for on street parking facilities., Off street parking facilities.

Unit IV: Traffic control. : Importance of traffic sign., Need for international standardisation., General principles of traffic signing., Types of traffic signs., Road markings & types, Traffic signals & types, Advantages and disadvantages of traffic signals., Coordinated control of signals., Traffic control aids and street furnitures.

Traffic regulations and traffic safety. : Traffic regulations and traffic safety., Basic principles of traffic regulation., Regulation of speed, vehicles and driver., Road accidents., Cause and prevention., Road accidents and traffic engineering., Accident situation in India., Statistical methods for analysis of accidentdata., Roads and its effect on accidents., Cost of road accidents.

Unit V: Street lighting. : Need for street lighting, Some laws of illumination, Appearance of lighted pavement., Types of lamps., Illumination of traffic rotaries., Lighting at bends, dual carriageways & bridges., Tunnel lighting., Maintenance off lighting installations.

Text Books:

1. TRAFFIC ENGINEERING. by MATSON T.M. SMITH, W.S AND HURD F.W., M. G.HILLS

References:

1. TRAFFIC ENGINEERING HAND BOOK by EVANS, H.K, INSTITUTE OF TOWN PLANNERS,INDIA, 1st Edition,
2. AN INTRODUCTION TO HIGHWAY TRANSPORTATION ENGINEERING. by CAPOLLE

Course Code	Course Name	L-T-P	Credit
CE-356C	Construction Project Management Lab	0-0-2	1

Course Objectives:

• Student will get complete knowledge about applications of CPM and PERT.
• Student will learn about how to bring the project to completion on time.
• Syllabus emphasizes on managing the project cost and contingencies.

List of Practicals:

1. Practical 1: Introduction (Introduction to Primavera- Primavera modules)

   Introduction (To Generate the Enterprise project structure and Organizational Breakdown Structure for an organisation having different projects)

2. Practical 2: Introduction (To create a new project with the help of primavera)
3. Practical 3: Calendars and Scheduling (To Add Activity to the project and Relationships to activities)

   Calenders and Scheduling (How to create a project calender and editing of relationships in Ganttchart and Deleting Relationship)

   Calenders and Scheduling (To add Predecessors and Successors for different activities and formation of activity network for a construction project)

4. Practical 4: Introduction (To Create work breakdown structure for a project)
5. Practical 5: Activity, Resource and Project Codes (To Generate of activities and activity codes for a construction project)
6. Practical 6: Activity, Resource and Project Codes (To add and assign resources for a project and generation of resource curve)
7. Practical 7: Resource Analysis and Levelling (How to prepare resource histogram and spreadsheet, resource levelling)
8. Practical 8: Updating (How to set and restore a Base line and Activity in Progress) Practical
9. Updating (How to Display progress line in Gantt Chart and updating Resources and costs)

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/6th Semester

Course Code	Course Name	L-T-P	Credit
CE-358C	Building Drawing Lab	0-0-2	1

Course Objectives:

• Student will get complete knowledge about applications of building drawing using advanced design software's such as AutoCad 3D, Revit, etc.

List of Practical's:

1. Study Exercise – Principles of Planning, Orientation and Complete Joinery Details (Paneled And Glazed Doors and Windows)
2. A Reading Room With R.C.C Flat Roof
3. A Residential Building with Single Bed Room
4. Library Building With R.C.C Flat Roof
5. Residential Building with Load Bearing Walls and Flat Roof
6. Fully Tiled Gabled House
7. Residential Building with Load Bearing Walls and Pitched Roof
8. RCC Framed Building with RCC Roof
9. Primary Health Centre
10. School Building
11. Workshop Building

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 3rd Year/6th Semester

Course Code	Course Name	L-T-P	Credit
CE-360C	Structural Drawing Lab	0-0-2	1

Course Objectives:

• Student will get complete knowledge about applications of structural drawing using Staad Pro software.

List of Practical's:

1. Introduction to geometric, material.
2. Introduction to modeling of boundary condition and application of loads.
3. Analysis and Design of simple and Continuous RCC beams.
4. Analysis of results and preparation of working drawing showing general arrangement for CAD design for RCC beams.
5. Analysis and Design of single and multiple bay frame of RCC.
6. Analysis of results and preparation of working drawing showing general arrangement for CAD design for single and multiple bay frame of RCC.
7. Analysis of framed RCC structure for DL, LL and earthquake load.
8. Analysis of results and preparation of working drawing showing general arrangement.
9. Analysis and Design of a framed Steel structure.
10. Analysis of results and preparation of working drawing showing general arrangement of framedsteel structure.
11. Analysis and Design of Steel Truss subjected to Concentrated load, UDL and moving load.

Course Code	Course Name	L-T-P	Credit
CE-401C	Earthquake Resistant Design of Structures	3-1-0	4

Unit I

Earthquake Basics: Interior of Earth, plate tectonics, faults, consequences of earthquake, Basic parameters of earthquake, magnitude & intensity, scales, Seismic zones of India, damages caused during past earthquakes (worldwide).

Unit II

Fundamentals of Earthquake Vibrations of buildings: Static load v/s Dynamic load (force control and displacement control), simplified single degree of freedom system, mathematical modelling of buildings, natural frequency, resonance v/s increased response, responses of buildings to different types of vibrations like free and forced, damped and un-damped vibration, response of building to earthquake ground motion, Response to multi degree (maximum three) of freedom systems up to mode shapes

Unit III

Design Philosophy: Philosophy of earthquake resistant design, earthquake proof v/s earthquake resistant design, four virtues of earthquake resistant structures (strength, stiffness, ductility and configuration), seismic structural configuration, Introduction to IS: 1893 (Part I), IS: 875 (Part V). Seismic load: Seismic Coefficient Method – base shear and its distribution along height. Introduction to Response spectrum, IS code provisions.

Unit IV

Lateral Loads on Buildings: Lateral Load Distribution (SDOF): Rigid diaphragm effect, centers of mass and stiffness, torsionally coupled and uncoupled system, Lateral Load Analysis: Analysis of frames using approximate methods like portal & cantilever methods

Unit V

Ductile Detailing: Concepts of Detailing of various structural components as per IS: 13920 provisions, Introduction to Earthquake Resistant Features of un-reinforced & reinforced masonry Structure, Confined Masonry, Soil liquefaction, Structural controls, Seismic strengthening.

Reference Books:

1. Manish Shrikhande & Pankaj Agrawal; Earthquake resistant design of structures, PHI Publication, New Delhi

2. S.K.Duggal; Earthquake resistance design of structures; Oxford University Press, New Delhi.

3. A.K.Chopra; Dynamics of structures, Pearson, New Delhi

Course Code	Course Name	L-T-P	Credit
CE-403C	Channel Hydraulics	3-0-0	4

Unit I:

Introduction to Open Channel Flow: Difference between Open Channel Flow and Pipe Flow, Types of Channel, Geometric parameters of a channel, Classification of Open Channel Flow, Continuity and Momentum equation.

Unit II:

Uniform flow: Resistance flow formula, Velocity distribution, Equivalent roughness coefficient, Velocity coefficients, Uniform flow in rigid boundary channel, Uniform flow in mobile boundary channel

Unit III:

Energy and Momentum Principle: Concept of Specific Energy, Critical Depth, Alternate depth, Specific Force, Sequent depth. Non-Uniform Flow: Governing equation of GVF, Classification of Gradually Varied Flow, Computation of GVF profile, Rapidly Varied Flow, hydraulic Jump, Flow over a Hump, Flow in Channel Transition

Unit IV:

Canal Design: Concept of best hydraulic section, Design of rigid boundary canal, design of channel in alluvial formation- Kennedy's theory, Lacy's theory, Method of Tractive force, Free-board in canal. Unsteady Flow: Wave and their classification, Celerity of wave, Surges, Characteristic equation.

Pipe Flow: Losses in pipes, Pipe in series and parallel, Pipe network analysis, Water hammer, Surge tank

Hydraulic Model Study: Important dimensionless flow parameters, Similitude: Geometric, Kinematic and Dynamic Similarity, Model scales

Course Code	Course Name	L-T-P	Credit
CE-405C	Traffic Engineering	3-0-0	3

Unit I: Traffic engineering administration and functions.: Traffic engineering., Functions., Organisation of traffic engineering department., Human factors governing road user behaviour., Other vehicle characteristics., Characteristics of slow moving traffic in India.

Unit II: Analysis and Interpretations of traffic studies. : Statistical methods for traffic engineering., General trends in speed data., Time mean speed and space mean speed., Traffic forecasting., Limitations of traffic forecasting., Types of traffic., Forecasts and mathematical models., Period for forecasting.

Unit III: Traffic surveys. : Speed, Journey time and delay surveys., Methods of measuring spot speeds., Presentation of travel time and journey speed data., Vehicle volume count., Types of counts., Methods available for traffic counts., Origin-destination survey., Checking the accuracy of survey data., Parking surveys.

Geometric design. : Highway classification., Horizontal alignment., Vertical

alignment., Sight distance., Intersections., Grade separated intersections., Design for pedestrian facilities., Design criteria for separate cycle tracks., Traffic and parking problems., Design standards for on street parking facilities., Off street parking facilities.

Unit IV: Traffic control. : Importance of traffic sign., Need for international standardisation., General principles of traffic signing., Types of traffic signs., Road markings & types, Traffic signals & types, Advantages and disadvantages of traffic signals., Coordinated control of signals., Traffic control aids and street furnitures.

Traffic regulations and traffic safety. : Traffic regulations and traffic safety., Basic principles of traffic regulation., Regulation of speed, vehicles and driver., Road accidents., Cause and prevention., Road accidents and traffic engineering., Accident situation in India., Statistical methods for analysis of accidentdata., Roads and its effect on accidents., Cost of road accidents.

Unit V: Street lighting. : Need for street lighting, Some laws of illumination, Appearance of lighted pavement., Types of lamps., Illumination of traffic rotaries., Lighting at bends, dual carriageways & bridges., Tunnel lighting., Maintenance off lighting installations.

Text Books:

1. TRAFFIC ENGINEERING. by MATSON T.M. SMITH, W.S AND HURD F.W., M. G.HILLS

References:

3. TRAFFIC ENGINEERING HAND BOOK by EVANS, H.K, INSTITUTE OF TOWN PLANNERS,INDIA, 1st Edition,

Course Code	Course Name	L-T-P	Credit
CE-407C	Waste Management	3-0-0	3

Unit 1

Relevant Regulations Municipal solid waste (management and handling) rules; hazardous waste (management and handling) rules; biomedical waste handling rules; flyashrules;recycled plastics usage rules; batteries (management and handling) rules

Unit 2

Municipal Solid Waste Management – Fundamentals Sources; composition; generation rates; collection of waste; separation, transfer and transport of waste; treatment and disposal options

Unit 3

Hazardous Waste Management – Fundamentals Characterization of waste; compatibility and flammability of chemicals; fate and transport of chemicals; health effects

Unit 4

Radioactive Waste Management – Fundamentals Sources, measures and health effects; nuclear power plants and fuel production; waste generation from nuclear power plants; disposal options

Unit 5

Environmental Risk Assessment Defining risk and environmental risk; methods of risk assessment; case studies**Physicochemical Treatment of Solid and Hazardous Waste** Chemical treatment processes for MSW (combustion, stabilization and solidification of hazardous wastes); physicochemical processes for hazardous wastes (soil vapour extraction, air stripping, chemical oxidation); ground water contamination and remediation

References:

1. John Pichtel Waste Management Practices CRC Press, Taylor and Francis Group 2005.

2. LaGrega, M.D.Buckingham,P.L. and Evans, J.C. Hazardous Waste Management, McGraw Hill International Editions, New York, 1994.

3. Richard J. Watts, Hazardous Wastes - Sources, Pathways, Receptors John Wiley and Sons, New York, 1997.

Course Code	Course Name	L-T-P	Credit
CE-409C	Foundation Engineering	3-1-0	4

Unit 1

Soil Exploration and Geophysical Investigation Introduction 1.10 Planning for subsurface exploration 1.11 Methods of exploration 1.12 Geophysical exploration 1.13 Soil sampling and samplers 1.14 In-situ tests 1.15 Common soil tests 1.16 Soil investigation report

Unit 2

Theory of Lateral Earth Pressure Introduction 2.11 Types of earth pressures 2.12 Different theories of earth pressures 2.13 Displacement-related earth pressure 2.14 Rankine and Coulomb theory 2.15 Friction circle method 2.16 Terzaghi's analysis 2.17 Development of bearing capacity theory 2.18 Development of uplift capacity theory

Unit 3

Methods of Analyses Introduction 3.8 Different methods of analysis 3.9 Limit equilibrium 3.10 Limit analysis 3.11 Method of characteristics 3.12 Finite element method

Unit 4

Design of Shallow Foundations Introduction 4.9 Different types of foundations 4.10 Calculation of bearing capacity 4.11 Stresses in soil 4.12 Concept of contact pressure 4.13 Calculation of settlements 4.14 Codal provision

Unit 5

Design of Deep Foundations Introduction 5.11 Different types of foundations 5.12 Design methodology for piles 5.13 Calculation of pile capacity 5.14 Stresses in pile 5.15 Analysis of pile group 5.16 Settlement of pile group 5.17 Concept of negative skin friction 5.18 Piles subjected to lateral loads 5.19 Pile load test 5.20 Design and construction of well foundation, piers etcDesign of Retaining Structures Introduction 6.10 Different types of retaining structures 6.11 Stability analysis of rigid walls 6.12 Design of cantilever sheet piles 6.13 Design of anchored sheet piles 6.14 Bracing system for underground construction 6.15 Failure analysis for bracing system

Course Code	Course Name	L-T-P	Credit
CE-451C	Traffic and Transportation Engineering Lab	0-0-2	1

1. Determination of specific gravity and water absorption of coarse aggregate.
2. Determination of particle size distribution.
3. Determination of aggregate impact value.
4. Determination of aggregate crushing value.
5. Determination of Los Angeles abrasion value of aggregates.
6. Determination of flakiness index and elongation index of coarse aggregate.
7. Determination of penetration value of bitumen.
8. Determination of softening point value of bitumen.
9. Determination of ductility value of bitumen.

Course Code	Course Name	L-T-P	Credit
CE-453C	Seminar	0-0-4	2

Presentation by each student on any other topics specified by the course coordinator.

Course Code	Course Name	L-T-P	Credit
PDP-401	Campus to Corporate	0-0-2	1

UNIT 1 –Employability Quotient - Resume Writing, Types of Resume, Profile Building
Resume Writing Practice

UNIT 2 – Group Discussion – Definition of GD, Difference between GD and debate, Do's and don'ts of GD. Mock GD sessions

UNIT 3 – Interview Skills – Facing Personal, Technical & HR, FAQ and their answers
Mock interviews

UNIT 4 – Organizational Skills at Work place – focus & productivity, delegation, resource management & management skills

UNIT 5 – Corporate Policies, Corporate Life, Corporate Etiquette Corporate Truths for every Fresher

UNIT 6 – Presentation Skills – how to prepare an effective Presentation Skills, do and don'ts of presentation. Mock presentations

SCHEME & SYLLABUS FROM-2019 BATCH
SCHOOL OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering
Year/Semester: 4th Year/7th Semester

Course Code	Course Name	L-T-P	Credit
CE-423C	Hydropower Engineering	3-0-0	3

Unit I: Introduction: Common building material, Mechanical properties of material, Comparison of various mechanical properties. **Stones**: Common building stones, Requirement of a good building stones, Dressing and preservation of stones. **Bricks**: Manufacture of clay bricks, Classification and testing of claybricks, Problems of efflorescence.

Unit II: Lime: Manufacture, Classification of lime. **Timber**: Classification and wood based products of timber, Defects and their prevention, Factors effecting the strength of timber., Seasoning and preservationof timber. **Asphalt, Bitumen and Tar**: Terminology, Bituminous materials, Specification and usage **Cement**: Properties, Uses and types; manufacturing and materials, Plastering and Form Work.

Unit III: Introduction of Buildings and Foundations: General Introduction of Buildings, Types of Buildings, Components of Buildings, Design Loads, Introduction of Foundation, Types of Foundation, Function of Foundation, Essential Requirements of a good Foundation, Site Investigation and Sub-Soil Exploration, Method of Site Exploration, Settlement of Foundation, Causes of Failures **of** Foundations and Remedial Measures

Unit IV: Bricks Masonry and Composite Masonry: Introduction of Brick Masonry, Types of bricks, Bonds in brick work, Supervision of brick work, Defects in brick masonry, Strengths of brick masonry, Introduction of Composite Masonry, Reinforced brick masonry, Stone composite masonry, Brick-stone composite masonry, Concrete block masonry, Hollow clay block masonry, Damp Proofing, Termite proofing and Fire Protection of Buildings.

Unit V: Walls: Types of walls, Introduction of cavity walls, General features of cavity walls, Construction of cavity walls, Introduction of partition walls, Brick partitions, Clay block partition walls, Concrete partitions, Glass partitions.

Floors and Roofs: Introduction of a Floor, Components of a Floor, Materials for Construction, Selection of Flooring Material, Cement Concrete Flooring, Brick Flooring, Marble flooring, Asphalt Flooring, Introduction of Roofs, Types of Roofs, Trussed Roofs, Steel Roof Trusses

Books:

Building Construction, B. C. Punmia

Construction Materials, S. C. Rangwala

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School of Civil Engineering

Course Code	Course Name	L-T-P	Credit
CE-425C	Transportation Engineering & Systems	3-0-0	3

UNIT 1:

Transportation Systems and their classification and description. Role of Roads, Road Transport and Planning in India. Road User and the Vehicle.

Highway Planning: Highway Planning Process, specifically in India, Transport or Highway related Agencies in India, Classification of Roads and Road Development Plans

UNIT 2:

Highway Geometric Design: Cross Sectional Elements, camber, Sight Distances – definition and analysis of SSD and OSD.

Highway Project Preparation: Surveys and Investigations. Controlling Factors and Surveys for Highway Alignment. Road Patterns

UNIT 3:

Pavements: Types of Pavements, Road Construction Materials. Highway Maintenance.

Traffic Engineering: Traffic Characteristics, Functions, PIEV theory, Traffic Survey, PCU, Parkings & survey, Traffic signs, Road Markings, Traffic Signals, Traffic Safety.

UNIT 4:

Introduction to Railway Engineering

Permanent Way Components: Types and Selection of Gauges, Permanent way & its requirements, functions of rail, requirements of an ideal rail, types of rails, markings & length of rails, Drainage, Salient Features and types of Components viz. Rails, Sleepers, Ballast, Rail Fastenings, Coning of Wheels, Wear Rail Joints, Length of Rail, Sleeper Density and Spacing, Stations, Yards.

Tunneling: Introduction, advantages, disadvantages.

UNIT 5:

Airport Engineering: -Introduction: Requirements to Airport Planning, Airport Classifications, Factors in Airport Site Selection, Airport Size, Obstructions, Zoning.

Planning and Design of Airport: Requirements of Airport, Planning of Terminal Area, and different Layouts, Location of Gates, Types of Runway patterns, Runway Layout, Runway Length, Layout of Taxiways, Exit or Turnaround Taxiways, Apron and Hangers, Wind-rose diagram.

List of Recommended Books:

4. Transportation Engg by S.K Sharma
5. Highway Engg by L.R Khadiyali
6. Highway Engg by Justo and Khanna
7. Railway Engineering by S. C. Saxena
8. Airport Planning & Design by S. K. Khanna, Nem Chand & Bros. Publication

Course Code	Course Name	L-T-P	Credit
CE-402C	Metro Systems & Engineering	3-0-0	3

Unit I

GENERAL: Overview of Metro Systems; Need for Metros; Routing studies; Basic Planning and Financials

Unit II

CIVIL ENGINEERING-Overview and construction methods for: Elevated and underground Stations; Viaduct spans and bridges; Underground tunnels; Depots; Commercial and Service buildings. Initial Surveys & Investigations.

Unit III

CIVIL ENGINEERING- Basics of Construction Planning & Management, Construction Quality & Safety Systems. Traffic integration, multimodal transfers and pedestrian facilities; Environmental and social safeguards; Track systems-permanent way. Facilities Management

Unit IV

ELECTRONICS AND COMMUNICATION ENGINEERING- Signaling systems; Automatic fare collection; Operation Control Centre (OCC and BCC); SCADA and other control systems; Platform Screen Doors.

Unit V

MECHANICAL & TV + AC: Rolling stock, vehicle dynamics and structure; Tunnel Ventilation systems; Air conditioning for stations and buildings; Fire control systems; Lifts and Escalators ELECTRICAL: OHE, Traction Power; Substations-TSS and ASS; Power SCADA; Standby and Back-up systems; Green buildings, Carbon credits and clear air mechanics.

Course Code	Course Name	L-T-P	Credit
CE-452C	Internship	0-0-32	16

Presentation by each student on his/her practical training and other topics specified by the course coordinator

Course Code	Course Name	L-T-P	Credit
CE-454C	Seminar on Internship	0-0-32	16

SCHEME FOR BACHELOROF EDUCATION

B. ED			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BED-110	Childhood And Growing Up	4	0	0	4
2	BED-111	Philosophical Foundations Of Education	4	0	0	4
3	BED-112	Language Across The Curriculum	2	0	0	2
4	BED-113	Understanding Discipline And Subjects	2	0	0	2
5	BED-200	Critical Understanding Of ICT	2	0	4	4
6	BED-114	School Organization And Management	2	0	0	2
7	BED-155	Understanding The Self	0	0	4	2
8	BED-199	Drama And Art In Education	0	0	4	2
9	BED-157	PSE (Preliminary School Engagement)	0	0	4	2
		Total	**16**	**0**	**16**	**24**

B. ED	**B. ED**	**Semester**	**II**			
SN	**SN**	**Course Code**	**Course Name**	**Periods**	**Credits**	
S.NO	Course Code	Course Title	L	T	P	Credits
1	BED-115	Learning and Teaching	4	0	0	4
2	BED-120	Historical and sociological foundations of education	4	0	0	4
3	BED-117	Assessment for learning	4	0	0	4
4						
4.1	BED-121	Teaching of Hindi	4	0	0	4
4.2	BED-122	Teaching of English				
4.3	BED-123	Teaching of Math's				
4.5	BED-129	Teaching of Life Science				
4.7	BED-126	Teaching of Home Science				
4.8	BED-134	Teaching of Sanskrit				
4.9	BED-136	Teaching of Business studies				
5.0	BED-124	Teaching of Social Science	4	0	0	4
5.1	BED-125	Teaching of Integrated Science				
5.2	BED-127	Teaching of Accountancy				
5.3	BED-130	Teaching of Economics				
5.4	BED-133	Teaching of Computer Science				
6	BED-231	Reading and reflecting on text	0	0	4	2
7	BED-160	PSE (Preliminary School Engagement) –II	0	0	4	2
		Total	**20**	**0**	**8**	**24**

SCHEME FOR BACHELOR OF EDUCATION

B. ED			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BED - 201	Internship – I	0	0	0	10
2	BED - 202	Internship - II	0	0	0	10
		Total	20	0	0	20

B. ED			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BED-203	Gender school and Society	4	0	0	4
2	BED-238	Knowledge and curriculum	4	0	0	4
3	BED-205	Creating and Inclusive School	2	0	0	2
4	BED-216	Guidance & Counselling	4	0	0	4
5	BED-219	Environmental Education	4	0	0	4
6	BED-217	Value Education	**4**	**0**	**0**	**4**
7	BED-218	Peace Education	**4**	**0**	**0**	**0**
8	BED-232	Health & Physical Education				
9	BED-233	Adult & Population Education				
1	BED-234	Work Education				
	BED-235	Education of Marginalized group				
	BED-236	Life skills Education				
	BED-237	School leadership				
	BED-230	Reflection on School Experience	**0**	**0**	**4**	
		TOTAL	**26**	**0**	**4**	**24**

SEMESTER I

Course Title: Childhood and Growing Up **Credits: 4**

Course Code: BED 110 **MM: 100**

Course Objectives:

- To reflect on the role of socio-cultural context in shaping human development, especiallywith respect to theIndian context
- To be able to apply the critical understanding regarding different Social, Educational andCultural contexts at thecore of the exploration of childhood.
- To develop theoretical perspectives and an understanding of dimensions and stages of humandevelopment
- To be able to analyze the implications of understanding human development forteachers

Course Outcome:

At the end of the course, the students are expected to:

- Understand the growth and development of the learner and its importance in the teachinglearning process withspecial reference to adolescent stage.
- To value individual differences among learners and identify theeducational needs of diverse learners.
- Get acquainted with the new (contemporary) theories of learning and Political, Social and Cultural dimensionsalong with their implications on childhood andgrowing up.
- Understand issues related to childhood and parenting and design remedies to coping up.

Unit-I: Growth and Development

Meaning of Growth and Development

- Stage of Growth and development with special emphasis on the Development stages of

  Childhood and Adolescence
  Principles of Development

- Theories of Growth and Development (with reference to the influence of childhoodexperiences on laterpersonality)
  (a) Freud's Theory of Psycho-sexual development
  (b) Jean Piaget's theory of Cognitive Development
  (c) Erickson's theory of Psycho Social Development
  (d) Kohlberg's Theory of Moral Development

Unit-II: **Childhood and Development**

Physical- Motor Development

(a) Growth and Maturation
(b) Development of Gross and Fine Motor Skills
(c) Role of Parents and Teachers in providing opportunities of Physical – MotorDevelopment e.g., play

Social and Emotional Development:

(a) Basic understanding of Emotions (How differential Gender Socialization is seen happening inthe Indian context?)
(b) Development of Emotions: Functions of Emotions
(c) Meaning of Gender roles, influences on Gender roles, Gender Stereotypesexperienced inHome, School, Neighborhood (Including playground)

Unit- III: **Socialization Agencies and the Child**

- The 21-century child and childhood in the context of Poverty, Globalization and Adult culture.
- Childhood – similarities and Diversities within the stage and the factors leading to theconstruction ofmultiple childhoods with particular reference to the Indian context.
- Concept of Socialization

(a) Family, Parenting, Child Rearing practices and its agencies
(b) Peers- Friendships and Gender competition, cooperation and conflict; Aggression and bullyingfrom Early childhood to Adolescence, Peer Influences
(c) School – Relationship with peers, Teachers and Staff, Teacher Expectation and schoolachievement, overage learners and peer relationships.

Social, Economic and Cultural Differences in Socialization: Implications for Inclusion.

Unit-IV: **Childhood: Issues and Concerns**.

- Social Issues: Counselling of Children for coping with stress in the follow Conditions:-

(a) Separation of Parents
(b) Loss of Parents in Armed Conflict etc.
(c) Survivors of Child Abuse

Health Concerns:

Child Abuse: Issues and Problems and Awareness about Rights of the Child

Child Obesity: Causes and Remedies, Prevention through sports activities and yoga

- Equity Issues and Inclusion: Inclusion of the Differently Able Street Children and other marginalized groups in thecontext of India: Problems and strategies to achieve EFA (SSA,RMSA in particular)
  Schemes and programmes of GOI for Gender Equity and Equality in Education
- Protection of Child Rights: Role and Contribution of UNICEF, WHO, National Commissionfor the Protection ofChild Rights, National Human Rights Commission, Child Help lines and NGOs

Practical Assignments/Field Engagement (any one):

- Student's teachers to collate about ten newspaper articles that involve issues of parenting andchildhood analyze theseand hold discussions.
- Hands-on Experience of Studying Children and varying contexts in Childhood by undertaking adetailed Case Study of achild.
- The students can identify any child to understand 5–14-year-old children in diverse contextsand use case profilemethod to study her.
- The teacher educator could organize the class in such a manner that different students" profile children from varied socio- economic backgrounds. This would allow for a wide range of data, which could be subsequently analyzed in groups. The task could be helpful in understanding and supporting developmental and educational needs of the marginalized learner; first - generation learners, street children and slum children; children with special needs.

Suggested Readings:

- Aries, P. (1965). *Centuries of Childhood-A social history of the family life.* Random HouseInc. Chapter 1: TheAges of Life, Chapter 2: The Discovery of Childhood,
- Cole, M., Cole, S. R. and Lightfoot, C. (2004). *The Development of Children.* New York:Worth Publishers.Chapter 1: The study of Human Development.
- Harris, M. and Butterworth, G (2002) The two concepts of childhood, *Developmental Psychology: a student's handbook.*
  New York: Taylor & Francis. Chapter 1: A Brief History of DevelopmentalPsychology.
- Newman, B. M. and Newman, P.H. (2007). *Theories of Human Development.*
  London: Lawrence Erlbaum Associates, publishers. Chapter 1: Introduction.
- Papalia, D. E. and Olds, S. W. (2003). Human Development. New York: McGraw-Hill
  Higher Education. Chapter 1: The Study of Human Development, Chapter 2: Theory andResearch, Chapter 4: Physical Development During the First Three Years, Chapter 7: Physical Development in Early Childhood, Chapter9: Physical Development in Middle Childhood.
- Saraswathi, T.S. (Ed.) (1999). Culture, Socialization and Human Development: Theory,Research andApplications in India. Sage publications.

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	1	-	-
CO2	-	-	-	2	-	-	-	-	-
CO3	-	-	3	-	-	-	-	3	-
CO4	-	-	-	-	3	-	-	-	2

SEMESTER I

Course Title: Philosophical Foundations of Education **Credits: 4**

Course Code: B.ED. 111 **MM: 100**

Course Objectives:

- To gain an understanding of the concept, meaning and aims of education and theater-relation of educationand philosophy.
- To reflect upon the thoughts of Indian and Western thinkers on education and explorethe implications of theconcepts involved in educational practices.
- To develop a conceptual understanding of culture and its relevance to education
- To build up their capacity to be able to formulate their response to the concerns in education
- Appreciate the role of family, school and media as agencies of socialization

Course outcomes

At the end of the course, the students are expected to:

- Acquire the ability to understand the nature and functions of philosophy.
- Conceptualize the relationship between sociology and education.
- Understand various perspective of prominent educational thinkers ofEast and West.
- Distinguish various trends of social changes, cultural changes and their impacton education.

Unit I: Education and Philosophy: Meaning and Functions

- Concept, Meaning and Aims of Education
- Philosophy and its relation to Education
- Education as a liberal discipline and its Interdisciplinary nature
- Basic concepts in philosophy of education: Teaching, Training, Learning, Inquiry,Indoctrination w.r.t.child.

Unit II: Methodological Options in Education

- Assumptions about human nature
- Various Schools of Thoughts in Philosophy of Education and their relevance ineducation: Idealism, Realism, Naturalism, Pragmatism, Existentialism
- Nature and place of Dialogue, Activity, Discovery in the process of education

Unit III: Epistemological Basis of Education

- Meaning of Knowledge, Reason, Belief
- Sources of Knowledge: Empirical knowledge, Rational Knowledge, Authentication ofKnowledge, Experience, Values and Ideals
- Relationship of School, Education, Knowledge, Subjects
- Constructivism, Scientific Methods, Reflective Judgements

Unit IV: Analytical study of major thinkers on education and their practice

- Relevance of educational thoughts of Indian and Western thinkers to the present Education system. To deliberate upon Aims and Functions of Education, Pedagogy, Pedagogical practicesin the classroom, Teacher-Student Relationship and Essential Values and Qualities needed in a Teacher to prepare a child for life}
- Indian Thinkers: M.K. Gandhi, Rabindranath Tagore, Jiddu Krishnamurti, B.R. Ambedkar
- Western Thinkers: Plato, J.J. Rousseau, John Dewey, Paulo Freire

Practical Assignments/ Field Engagement:

- Reflecting on the Readings on any two thinkers on Education and Maintaining a diary of the sameafter discussions andbrainstorming on key ideas on Education and their contemporary relevance.

Suggested Readings:

Brubacher, J.S. [1969] McGraw Hill Book Co.Modern Philosophies of Education

- Carr, David. [2003] Making Sense of Education; Routledge Falmer
- Cenkener, William: [1976] Manohar Publishers Hindu Personality in Education
- Dewey, John [1966] Democracy and Education; New York, Macmillan
- Israel, Scheffler [1966] Philosophy and Education; Allyn Bacon Inc. 2nd ed.
- Kneller, George F. [1971]: Introduction to the Philosophy of Education; John Wiley and Sons,Inc.
- Krishnamurti, J.; [1953] Education and the Significance of Life.; Krishnamurti

  Foundation India.

- Mani, R.S. [1964]; Educational ideals of Gandhi and Tagore.
- O'Connor, D.J. [1973] An Introduction to Philosophy of Education. Universal Bookstall.
- Ozmon, Howard A. and Craver, Samuel M.: [1976] Philosophical Foundations of Education2nd ed. Charles, Merrill Publishing Co.
- Peters, R.S. The concept of Education series Part 2 and 3 Edited by R.F. Dearden, P.H. Hirst and R.S. Peters; Routledge and Kegan Paul, London and Boston.
- Schofield, Harry; [1982] The Philosophy of Education—An Introduction; UnwinEducationBooks, London
- Siegel, Harvey [2009] The Oxford Handbook of Philosophy of Education; OxfordUniversityPress.
- Seetharamu, A.S.; [1989] Philosophies of Education. Ashish Publishing House.
- Snook, I.A. [1967] Indoctrination and Education; Routledge and Kegan Paul'

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	3	-	-
CO2	-	-	-	2	-	-	-	-	-
CO3	-	2		-	-	-	-		1
CO4	-	-	-	2	-	-	-	3	

SEMESTER I

Course Title: **Language Across the Curriculum** **Credits: 2**

Course Code: Code: BED 112 **MM: 100**

Course Objectives:

- To enable student teachers to understand the nature and structure of language.
- To help them appreciate the relationship between language, mind and society
- To acquaint them with the process of language acquisition and learning.
- To support them in the understanding of different language skills and development of the same.
- To develop sensitivity and competency towards catering to a multilingual audience in Schools.

Course outcomes

At the end of the course the students are expected to:

- Use language creatively and imaginatively in text transaction and performance ofactivities.
- Employ her communicative skills, with a range of styles, and engage in a discussionin an analytical and creative manner.
- Become comprehend in socio-cultural variations in languages.
- Acquired the ability to apply the language skills in all domains in each learningactivity in school.

Unit I Language and Communication

- Language as a tool of Communication
  (a) Features of Language
  (b) Structure of Language
  (c) Language and Power
- Language Diversity in the context of India
  (a) Multilingualism: Nature and Scope
  (b) Multilingualism: As a Resource and a strategy
- Socio-cultural Variations in Languages: Accents and Linguistic Variations.

Unit II Acquisition of Language skills

- Acquisition of the Four Language Skills
  (a) Listening Skills: Developing Pronunciation by Phonic Drills, Developing Vocabulary by listening to theusage of new words in different contexts and meaning

  making.

(b) Reading and Writing

- Relationship between Reading and Writing.
- Oral and silent Reading of Expository Texts: Strategic; Comprehension-Reading and PostReading activities.

- Characteristics of a Good Handwriting; Developing the skill of writing effective compositions: Creative Writing, Letter Writing: Formal, Informal (emphasis on the letters which the teachers writein schools)
- Developing Effective Presentations by integration of the four language skills effectively: Principles and Procedure
- Emergent Literacy: Meaning and Implications

Unit-III Development of Language

- Human and Animal Communication
- Perspectives in Language Development (with reference to how children acquirelanguage at earlyage): Skinner, Bandura, Walters, and Nativist Chomskian Perspective.
- Relationship of Language and Society: Identity, Power andDiscrimination

Unit-IV Language and Curriculum Transaction

- Bilingual or Trilingual Children: Implications for teachers
- Multilingual Classroom: Challenges and Strategies to Cater to Diversity
- Nature of Multilingualism:
  a) Differences in Communication,
  b) Hierarchical status of Indian Languages and its effect onclassroomdynamics
  c) Qualities and Competences of a Teacher to cater to amultilingualclassroom.

Practical Assignments/Field Engagement (any one):

- The students to be actively engaged in drill and practice exercises with respect to honing their proficiency inSpeaking, Reading and Writing in English and Hindi with the supportof assistive devices in the Language Laboratory under the guidance of Faculty Mentors.

- Participation in two Extempore Presentations, one Debate, one Paragraph writing and One ApplicationWriting. (To be the basis of Evaluation after exhaustive sessions to improve Communication Skills.)

Students to maintain a record of observation on the communication of children (both

verbal and non-verbal) within the peer group and with teachers and to find the patterns with respect to thethemes of conversations formally-Informal Communication and thechallenges they face in Communicating

Suggested Readings:

- Agnihotri, R.K. & Khanna, A.L. (eds.) (1994). *Second language acquisition*. NewDelhi: SagePublications.
- Agnihotri, R.K. (1999). Bachchon ki bhashaa seekhne ki kshamata, bhag 1 or2.*ShakshikSandarbh*. Bhopal: Eklavya (p.p.)
- Agnihotri, R.K. (2007). *Hindi: An essential grammar.* London: Routledge
- Agnihotri, R.K. (2007). *Towards a pedagogical paradigm rooted in multiliguality*.International Multilingual Research Journal, Vol. (2) 1-10
- Agnihotri, R.K. and Bandyopadhyay, P.K. (ed.) (2000). *Bhasha, bhubhashita or hindi:Ekanth samvaad*, New Delhi: Shilalekh
- Butler, A. and Turbill, J. (1984). Towards Reading-Writing Classroom. NewYork:Primary EnglishTeaching Association Cornell University.
- Krashen, S. (1982). *Principles and practice in second language acquisition*.Pergamon PressInc.
- Kumar, K. (2000). *Child's language and the teacher*. New Delhi: National Book Trust.
- Mason, J. M. and Sinha, S. (1992). Emerging Literacy in the Early Childhood Years.
- Applying a Vygotskian Model of Learning and Development in B. Spodek (Ed.)Handbook ofResearch on the Education of Young Children, New York: Macmillan.137-150.
- NCERT (2005). National Curriculum Framework (NCF). New Delhi: NCERT.
- Reading Development Cell, NCERT (2008). *Reading for meaning.* New Delhi:NCERT.
- Rosenblatt, Louise M. (1980). What Fact Does This Poem Teach? Language Arts.57(4).
- Yule, G. (2006). *The study of language*. Delhi: Cambridge University Press

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1		-	-	-	3	-		-	-
CO2	-	-	-	2	-	-	2	-	-
CO3	-	-		-	2	-		2	-
CO4	-	2	-	-		-	-	-	3

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SEMESTER I

Course Title: Understanding Discipline and Subjects **Credits: 2**

Course Code: BED 113 **MM: 100**

Course Objectives:

- To cross-examine existing terminology, constructs and notions of pedagogic practice, such aschild-centered learning,discovery learning, activity-based learning.
- To involve student teachers with epistemological questions of subject matter and how they unfoldin the study ofpedagogical approaches.
- To acquaint student teacher about different form of misconceptions about the disciplinaryknowledge.

Course outcome

At the end of the course, the students are expected to:

- Explore existing new and appropriate pedagogy kinds, such as project-based learning, child-centered learning,discovery learning and activity-oriented learning.
- Capable to deal with the student inquiries about the subject matter and its use in the pedagogicalperspective.
- Acquired with the knowledge to develop the thematic base curriculum.
- Analyze the school text books to discuss the nature and types of pedagogical elements.

Unit I: Knowledge and Methods of Enquiry

- Disciplinary Knowledge: Nature and Scope,
- Interdisciplinary Knowledge: Nature, Scope and Need
- Knowledge as Construction of Experience; Case examples from School Subjects
- Knowledge as distinct from Information; Case examples from School Subjects
- Methods of Inquiry, Scientific Thinking, Social Scientific Thinking, Mathematical Thinking,Critical Thinking
- Language, Social Relations, Power, Identity and Thinking (Relationship and Inter- face withKnowledge)

Unit II: Learner and their Contexts

- Interface between Knowledge, Subjects, Curriculum, Textbooks, Linguistic background oflearners
- Alternative Frameworks of Children's Thinking
- Child and Adult Misconceptions: Meaning, Scope in a Classroom, Processes to be used toDispelMisconceptions.
- Everyday Concepts and Situated Cognition
- Pedagogical Perspective and Concerns of Inclusive Education in School.

Unit III: Pedagogic Practice and the Process of Learning

- Critical Examination of Terminology and Notions associated with Child-centered Education
- Critical understanding of standardized pedagogic methods: concept-formation; enquiry-basedlearning; project-basedlearning etc.
- Interrogating disciplinary practices and creating non-threatening learning environments:Relevance, Scope andProcess

Unit IV: Critical Study of ICTs and Developing Capacities

- Critical examination of the role of ICT in Effective Curriculum Transaction and Evaluation
- Capacity development of teachers and Students in the use of ICTs
- ICT – based teaching-learning approaches in schools
- Role of Open and Distance Learning in Catering to Diversity in Learners and Learning Styles.

Practical Assignments/Field Engagement (Any one: Records to be maintained)

- Critical readings of specific texts to develop conceptual clarity
- Analysis of school text books to construct and discuss nature and types of knowledge and pedagogicelements
- Collating and analyzing child and adult conceptions of social and natural phenomena
- Developing concept maps to design subject-based and thematic-based curriculum materials
- Observing, documenting and interpreting classroom discourse (teaching-learning episodes)
- Investigating perspectives in children's literature and other teaching-learning materials

Suggested Readings:

- Batra, P. (Ed.) (2010). *Social Science Learning in Schools: Perspective andChallenges.* NewDelhi: Sage.
- Bruner, J. (1996). In *The Culture of Education.* Cambridge: Harvard University Press,2: FolkPedagogy, 44-65.
- Dewey, J. (1897). *My Pedagogic Creed.* School Journal, Vol. 54.
- Driver, R. (1981). Pupils' Alternative Frameworks in Science. *European Journal of ScienceEducation.* 3(1), 93-101.
- Holt, J. (1990). *Learning All the Time.* New York: Addison-Wesley Publishing Co.

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1		3	-	-	-	-	3	-	-
CO2	-	-	-	2	-	-	-	-	-
CO3	2	-		-	-	-	-		2
CO4	-	1	-	-		-	-	-	

SEMESTER I

Course Title: Critical Understanding of ICT **Credits: 4**

Course Code: BED 200 **MM: 100**

Course Objectives:

- Appreciate the historical development of various educational media
- To equip student – teachers in the effective use of ICT tools, software applications and digitalresources.
- To familiarize them with the understanding and skills of integration of ICT in teachinglearning, evaluationand management of an institution.
- To acquire the skill of organizing and creating her/his own digital resources.
- To inform them to practice safe, ethical and legal ways of using ICT.
- To able them to use ICT for making classroom processes more inclusive and supportivein addressing multiple learning abilities.

Course outcome

At the end of the course, students are expected to:

- Equip student – teachers with skill for effective use of ICT tools, software applications anddigitalresources
- Use digital technologies (hardware and software) for creating resources and providinglearning experiencesand explain the role of ICT in alternative assessment.
- Understand the social, economic and ethical issues associated with the use of ICT
- Develop educational material using advanced pedagogical strategies and ICT tools

Unit-I: ICT: Connecting with World

- National Policy on ICT in School Education.
- Accessing the Web-Introduction to the Browser, Browsing and Web.
- Search and Retrieval: Strategies and Techniques
- Internet as a Learning Resource: Using Websites, Web based Learning objects, Simulations, Tutorials.
- Computing in Indian Languages – Fonts and Keyboard
- Using ICT to Create-Text, Data, Media
- Combining text, Graphics and Audiovisuals to create a Communication.
- Web as a space for continuous learning.

Unit-II: ICT for Teaching-Learning: Possibilities and Concerns

(a) ICT for Supporting Teaching-Learning and Inclusive Education

- Exploration of ICT resources for Teaching – Learning**,** Appropriate ICT Infusion indeveloping of a lessonplan on a given topic using ICT resources.
- Critiquing and Curation of ICT resources: Need, Relevance, Validity,Appropriatenessand Use
- ICT – based teaching-learning approaches in schools
- Educational Applications of ICT using appropriate hardware and software:Hardware:(CD/DVD, Projectors, Interactive boards etc.
  Software: (Single and multiple media, animations and simulations.
- Gaming Environments for Education – Range and Scope.
- Infusing games into Teaching –Learning and Creating appropriate Classroomenvironments,Evaluating Games and Gaming Environments
- Role of ICT in fostering the Creation of an Inclusive School and ClassroomEnvironment
- Assistive Technologies and Devices to foster Inclusion
- Computing in Indian Languages to foster Inclusion

(b) Social, Ethical and Legal aspects

- Impact of ICT on Work, Socializing and Other Areas
- Cyber Crimes: Concerns and Implications, Software Piracy and Legal Remedies,Plagiarism and FairUse
- Proprietary and Open-Source Software;
- Licensing of Software and Content, OER
- Intellectual Property and Copyright and Related Issues of Plagiarism and Fair Use.
- Indian Initiatives in Open-Source Software and Sharing of Digital Content

Unit-III: ICT for Evaluation, Documentation and Communication

(a) ICT for Evaluation

- ICT: Scope and Techniques for Evaluation
- Exploring and using appropriate Software tools for Evaluation
- Constructing and Implementing ICT based Tests / Quizzes using ICT Resources
- Managing Data, Analysis of results and tracking student achievement using ICTSoftware tools.

(b) Documentation and Communication

- Documenting and Communicating events and processes using ICT:Tools andTechniques
- Digital Story Telling and Storyboarding
- Publishing on the Web: Possibilities and Scope; Evaluating Choices

Unit-IV: ICT for Building Communities, Collectivizing and Administration&Management of anInstitution:

(a) Building Communities and Collectives

- Online Communities and Collectivizing: Participating, Analyzing Interaction andEvaluating SocialNetworking Forums.
- Sharing thoughts and Ideas: Blogs, Social networking Websites, Discussion forumsand Mailing lists
- Virtual Communities: Educational Applications

(b) ICT for Educational Administration and Management

- Role of information management, process and tools in Educational Administrationand Management
- Tools and Techniques for Automation of Data Sources in Schools: Collection, Analysis andInterpretation
- UDISE: State and National Level Databases in Education

Practicals (Entailing Hands on Experience Individually)

- Explore different sources of Data, read and make meaning using MS Excel.
- Combining text graphic and audio visuals in developing a digital story.
- Analyzing a Lesson, Identifying the need for ICT; Selecting Appropriate resources
- Preparing and transacting a lesson infusing ICT resource (using appropriate hardware and software) andevaluating it
- Creating a discussion forum around an uploaded content in teaching learning.
- Creating a Peer Network using Social Networking Platforms
- Creating a blog for building an online community to share resources such as texts, audiovisuals, animations andsimulations
- Creating a portfolio based on the above practicals and engaging in peer evaluation of thesame before onlinesubmission to the faculty mentor.

Suggested Readings:

- *Guide to measuring Information and Communication Technologies in Education.* (2009). Canada: UNESCO Institute for Statistics. Retrieved from: http://www.uis.unesco.org
- Lowther, D. L., Grant, M. M., Marvin, E. D., Iman, F., Cheon, J., & Clark, F. (2005). *Teacher'stechnology handbook: A resource to support effective technology integration*. Appalachian Technology in Education Consortium and the University of Memphis, Memphis, TN.
- Mayer, R.E. (2002). Cognitive Theory and the Design of Multimedia Instruction: An Exampleof the Two - Way Street between Cognition and Instruction. *New Directions for Teaching andLearning.* Number 89. 55-71.
- Morrison, G.R., Lowther, D.L. & Demeulle L. (1999). *Integrating Computer Technology intothe Classroom.* United States of America: Merrill (Prentice Hall)
- Moursund, D. (2005). *Introduction to Information and Communication Technology in*

Education. Retrieved from website of University of Oregon: www.uoregon.edu

- National Policy on ICT in School Education. (2010). New Delhi: Department of SchoolEducation and Literacy. Ministry of HRD, GOI. Retrieved from: http://mhrd.gov.in/ict_school
- Rajasekar, S. (2010). *Computers in Education.* ND: Neelkamal Publications Pvt. Ltd.
- Roblyer, M.D. (2008). *Integrating Educational Technology into Teaching*. New Delhi: PearsonEducation, South Asia, India.

Shiksha Mein Computer (2001). Available on website of Indira Gandhi National Open University,Delhi: http://www.ignou.ac.in

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	2		-	-	-	-	2	-	-
CO2	-	3	-		-	-	-	-	2
CO3	-	-			1	-	-	3	-
CO4	-	3	-			-	-	-	

SEMESTER I

Course Title: School Organization and Management **Credits: 2**

Course Code: BED 114 **MM: 100**

Course Objectives:

- To be able to understand the student teachers, the meaning, nature, scope, functions andprinciples ofEducational Administration of a School.
- To develop an understanding about various apparatuses of school Administration
- To develop a thoughtful understanding of leadership qualities and accountability to bemaintained by thedifferent school personnel like headmaster, teacher etc.
- To orient students with the concept of supervision and decision making
- To acquire knowledge regarding the concept and process of Human Resource Management in school.

Course outcome

At the end of the course students are expected to:

- Understand school as a conducive learning environment and explore the role of teacher and theprincipal in ensuring a vibrant school climate.
- Acquire the concept of Quality Enhancement and Management in school.
- Equip with the concept and importance of supervision.
- Develop sensitivity towards the issue of juvenile delinquency and its effectivity in schoolsystem

Unit I: Administration of Schools

- Meaning, Concept, Scope and Functions of Educational Administration
- Principles of Educational Administration
- Educational Administration and their Advantages and Disadvantages
- Role of a Head in a School as a Transformative Leader: Analysis of Need and Relevance of anyChange beforeinstitutionalizing the same, Taking the Team On-board
- Organizational Culture in a School to foster a Stress-free Work Environment for the Head, Teachers,Staff and Students

Unit II: School as an Organization

- The school – its functions and relationship with the society
- School building: Design and Components (including Hostels)
- School Personnel-Roles and Responsibilities: Headmaster, Teachers, Non-Teaching Staff
- School finance – Sources of Income and Items of Expenditure, School Budget

Unit III: Dynamics of Supervision

- Supervision: Concept, Need, Functions and Scope
- Role of the Head and Teachers of the Institution in Supervision.
- Role of School Management Committees (SMCs), Mother Teacher Associations (MTAs), ParentTeacher Associations (PTAs) in School Development
- Democratic Decision Making: Concept and Procedure with respect to functioning of a School

Unit IV: Elements of School Management

- School Climate: Meaning and Types
- Timetable – Principles and Techniques of Time -table preparation
- Preparation of a Calendar of Activities of Co-curricular Activities
- School Discipline: Concept and Approaches, Self-Discipline: Concept and Relevance in a School
- Problems Faced in School Management: Issues of Security and Disaster Management
- Juvenile Delinquency: Concept and Steps to Deal Effectively in a School

Practical Assignments/Field Engagement (Any one):

- The students to be thoroughly acquainted with the nuances of different types of registers/recordsa teacher maintains in a school: Attendance Registers, Marks Registers, Cumulative Records of CCE (Continuous Comprehensive Evaluation) in particular. (Also, to include the role of ICT as anAssistive Technology in the same)
- A meeting of student –teachers with the Head of the School and other Supervisory cadre to be arranged to make them understand the expectations of a school from them and the responsibilitiesthey may shoulder apart from regular classroom teaching.

- The students to be given hands on experience in the construction of the Time Table using ICT ofa School by the Faculty Mentors keeping in mind all principles of Time Table preparation.

Suggested Readings:

- Owens, Robert G (1970): Organizational Behavior in Schools, Prentice Hall Inc., EnglewoodCliffs, N.J.,
- Kimbrough, R.B. and Nunnery, M.Y. (1983): Educational Administration: AnIntroduction, MacMillan Publishing Co. Inc., N.Y.
- Bhatnagar, R.P. and I.B. Verma (2000): Educational Administration. Loyal Book Depot, Meerut,
- Safaya, R.N. and Shaida, B.D. (2000): School Administration and Organization. DhanpatRai and Sons, Delhi
- Agarwal, J.C. (2006): School Administration, Arya Book Depot, Delhi,

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	2	-	-
CO2		3	-		-	-	-	1	-
CO3	-	-	2	-	-	-	-		-
CO4	-	-	-	1		-	-	3	

SEMESTER I PRACTICALS

Course Title: Understanding the Self **Credits: 2**

Course Code: BED 155 **MM: 100**

Course Objectives:

To be able to sensitize, communicative in a way that establish peace and harmony.

- To be capable to facilitate personal growth and social skills in their own students
- To enable student-teachers to recall and reflect on their own educational journeys and becomeconscious of factors thathave shaped their aspirations and expectations
- To synthesize their experiences and learning over a period of time
- To enable student teachers to become more conscious of their responses to experiences, observations of life situations, asalso of ideas and issues that arise in their minds, and to thus develop their capacity for reflection.

Course outcome

At the end of the course, the students are expected to:

- Discover and develop open-mindedness, the attitude of a self- motivatedlearner, having self-knowledge and self-restraint.
- To help student to develop the capacity for sensitivity, sound communication skills and ways toestablish peace and harmony.
- Develop the capacity to facilitate personal growth and social skills in self and in students..
- Develop reflective practices in real life and able to balance personal and social life harmoniously.

Unit I: Journal Writing

- Each student-teacher will be asked to maintain a regular Journal, in which he/she may write:
  a) short reflective accounts of significant life experiences
  b) observations of life situations that evoke questions and responses
  c) questions on education, learning and teaching that he/she is facing
- The Journal should be periodically shared (once may be undertaken in a week) with a facultymentor, who will readthrough it and offer brief comments, suggestions, or further questions for

  the student-teacher to reflect on.

Unit II: Writing Tasks

- Writing an 'Educational autobiography' with respect to their experience as a learner till now
- Writing a reflective statement of aspirations and expectations, based on one's learning so far inthe course (after 4months in the course).

Unit III

Workshop 1: ***A significant event or experience in life***

Suggested workshop themes

- Representing key events and experiences – as timeline, mind-map, pictorial poster, digital storyusing audiovisual toolsof Media.
- Sharing and assimilating a range of experiences on the event / experience in the form of findinganswers to what thatexperience meant to me. How did I feel going through experience?

Workshop 2: ***Learning to Observe (and to Listen)***

Suggested workshop themes

- Observation of nature; observation of people around you; observation of (and listening to)situations around you.
- Exercises in observation and listening to uncover one's judgments and interpretations (and slowthese down, to allow forricher perceptions) (one to one communication, one to many)
- Multiple views on a variety of situations: classroom situations, and human situations in a schoolcontext

Workshop 3: ***Mindfulness in the classroom***

Suggested workshop themes

- Sitting quietly and inviting mindfulness by focusing and concentrating energies on a singletask (Meditation and Yoga may be used for the purpose)
- Individual breathing exercises and self-awareness of body and mind
- Exploring group exercises for mindfulness
- Mindfulness through the day, in classrooms, in stressful contexts
- Mindfulness and Emotional Well-being
- Mindfulness and Decision-Making
- Mindfulness in Cognitive Learning

Unit IV

Workshop 4: *Understanding working in groups*

Suggested workshop themes

- Exploring structural situations that promote competition or cooperation such as participationin games
- Exploring hierarchies and role-taking in group situations
- Exploring Gender Stereotypes in groups
- Facilitation of group working – everyone has a part to play
- Exercises for learning to work in groups (*Modes of Transaction would include 'role-plays'and 'enactments'followed by discussions)*

Workshop 5: *Viewing and analyzing film(s)*

Suggested workshop themes

- Purposive film viewing
- Ways of analyzing themes
- Detailed observation of a key scene and discussion
- Ways of seeing situations in the film
- Writing a film review

Workshop 6: *Celebration of an iconic cultural figure (any three)*

(e.g., Kabir/Tagore/ Veer Savarkar/ Saadat Hasan Manto/Begum Akhtar/Habib Tanvir /NarayanGuru/Meerabai/AkkaMahadevi/ Jnaneswar/Basava/Teejan Bai

Suggested workshop themes

- Authentic performance by a practitioner who is continuing the Legacy
- Participation in learning and celebrating (in appropriate media) Documentary Film
- Discussion of cultural world-view and contemporary relevance of the Icon
- Writing based on the above

Seminar 1: *Glimpses of different childhoods in India*

Format: Student-teachers present, via different media-narrative, photographs, audio-visual presentation,illustrated poster etc. - stories ofIndian children growing up in vastly differing circumstances; sharing to be followed by discussion.

Preparation: Resource books and films to be gathered; each student teacher picks a particular type ofchildhood and researches the lifesituation.

- Student -Teachers to develop then, own digital stories on the theme of Journey towardsunderstanding self-integrating text, graphics and audio-visuals.

****The activities undertaken to be documented in the form of an e portfolio for external evaluation.***

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	2	-	-
CO2			-	3	-	-	-		3
CO3	-	-		-	3	-	-	1	-
CO4	-	-	1		2	-	-		

SEMESTER I

PRACTICAL

Course Title: Drama and Art in Education **Credits: 2**

Course Code: BED 199 **MM: 100**

Course Objectives:

- To develop creative and aesthetic sense of different Art forms and its appreciation.
- To Prepare effective teaching aids and have basic knowledge about color scheme
- To develop skills for integrating different Art forms across school curriculum at secondary level
- To use drama processes to examine their present and to generate new knowledge, understandingand perceptions of theworld and themselves in it
- To create awareness of the rich cultural heritage, artists and artisans

Course outcome

At the end of the course students are expected to:

- Develop an understanding of drama and arts as the basis of education.
- Organize drama and art as a pedagogy for self -expression
- Appreciate the significance of performing arts in transaction of curriculum
- Create o visual arts for transaction of curriculum.

Unit I: Visual Arts and Crafts

- Experimentation with different materials of Visual Art, such as pastel, poster, pen and ink,rangoli materials, clay,etc.
- Exploration and experimentation with different methods of Visual Arts like Painting, blockprinting, collage, claymodelling, paper cutting and folding, etc.
- Paper framing and display of Art works.

Unit II: Performing Arts: Dance, Music, Theatre and Puppetry

- Listening/viewing and exploring Regional Art forms of Music, Dance, Theatre andPuppetry.
- Viewing/listening to live and recorded performances of Classical and Regional Artforms
- Participation and performance in any one of the Regional Arts forms keeping in mind the integrated approach
- Planning a stage setting for a performance/presentation by the student teacher.

Unit III: Appreciation of Arts

- Meaning and concepts of Arts and Aesthetics and its significance at secondary level of School Education.
- Difference between Education in Arts and Arts in Education.
- Identification of different performing Art forms and artists; Dance, Music and Musical Instruments, Theatre, Puppetry(based on a set of slides, videos, documentaries selected for the purpose)
- Knowledge of Indian Craft Traditions and its relevance in education (based on a set of slides, Videos Films,Documentaries selected for the purpose)
- Knowledge of Indian Contemporary Arts and Artists; Visual Arts based on the videos, Films and Documentaries selectedfor the purpose
- Indian festivals and its Artistic significance.

Unit IV: Engagement in Analysis and Activities:

- Initiation into the craft of Drama and related activities for engagement in schools withlearners
- Theme-based projects from any one of the curricular areas covering its social, economic, culturaland scientific aspectsintegrating various Arts and Craft forms.

Practical Engagement

Workshops:

Two workshops of half a day each, of one week duration for working with artists/artisans to learn basics of Arts and Crafts and understand its pedagogical significance. The Arts forms learnt during the course should be relevant to the student teachers in their profession. Activities, such as drawing,

posters and painting, rangoli, clay modelling, pottery, mixed collage, woodcraft, theatre, puppetry, dance, music, etc. region specific should be given more importance for making arts learner-centered. The focus of the workshops should be on how art forms can be used as tool/method of teaching learning of Languages, Social Sciences, Mathematics and Sciences.

Approach for Teaching–learning Process in Institutions:

- Every student teacher must participate and practice different Art forms. They need to be encouragedto visit places of Arts/See performances/Exhibitions/Art and Craft fairs/Local craft bazaars, etc. Artists and artisans may be invited for demonstrations and interactions from the community. Student teachers should be encouraged to maintain their diary on art interactions to enhance their knowledge

  and awareness in this area. Student teachers may can also be motivated to interpret art works/eventsetc. to enhance theiraesthetic sensibility.

- Resource Centre for Arts and Crafts should house materials, including books, CDs, audio and videocassettes, films, software, props, art works of Regional and National level, books and journals whichmust be displayed for the purpose of reference and continuous motivation. Application of Arts and Aesthetics in day-to-day life, in the institute and in the community are some of the practical aspects,which needs to be taken care too. Student- teachers must organize and participate in the celebrationsof festivals, functions, special days, etc.

- Students to be assessed externally based on the e portfolio they submit to their faculty mentors individually, documentingall the activities they undertake in this practical course.

- The e portfolio will include the video clips, photographs and reference material of the field visitsand documentation of the activities undertaken in workshops while the student –teachers engage in the same including their reflection on the experience.

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	2	-	-
CO2	-	-	-		3	-	1	-	-
CO3	-	2		-	-	-	-		-
CO4	-	1	-	-		-	-	-	2

SEMESTER I

Course Title: Preliminary School Engagement (PSE-1) (Two Weeks) **Credits:**

2Course Code: BED 157

M.M: 100

Course outcome

At the end of the course students are expected to:

- Understand role and responsibility as a teacher in school
- Understand real life teaching practices and able to absorb skill required to tackle day to day issues activity.
- Develop knowledge of various facilities required to run organization smoothly.

1. Writing a reflective journal on observation of regular class room teaching with respect to pedagogical practices and class room management techniques used by the teachers

2. Reflection on roles and responsibilities of different school staff and Critical study of the infrastructural facilities, namely Library, Laboratories, Playground, Canteen, Sports facilities, Seminar Halls, Auditorium etc. which are available in the school.

3. The student teacher shall also undertake the field activities pertaining to the practicals during thisperiod.

SEMESTER II

Course Title: Learning and Teaching **Credits: 4**

Course Code: BED 115 **MM: 100**

Course Objectives:

- To make understand the concept of behavioristic and cognitive perspective to learning
- To acquaint with the different methods of studying behavior • Appreciate the role of a teacherin a classroom
- To enable them to reflect on their own implicit understanding of the nature and kinds oflearning.
- To develop an understanding of different theoretical perspectives of learning with a focus oncognitive views oflearning.
- To familiarize them with the concept and nature of Intelligence, Personality andAdjustment.

Course Outcome

At the end of the course, students are expected to:

- Understand the concept of learning and the theories of learning
- Comprehend various aspects of teaching and recognize the relationship between teaching and learning
- Analyze the complex process of teaching and acquaint themselves with different approaches of teachingthat support learning □
- Realize the significance of the context in which the teaching learning process occurs andgain insight intovarious models of teaching

Unit I: Development and Learning

- Learning and Teaching – Nature, Relevance and Relationship.
- Nurture, Growth and Maturation.
- Relationship between Development and Learning
- Developmental Influences: Development as a resultant of interactions between individual andthe external environment(physical, Socio-cultural, Economic, Ecological and Technological) Key Cognitive Processes: Perception, Attention, Memory, Language, Thinking, Problem Solving, Emotions and Motivation.

Unit II Cognition and Learning

- Approaches to Learning:

(a) Behaviorist, Cognitivist, Information-Processing, Humanist, Social Constructivist.
(b) Theories of Learning (Concepts, Principles and applicability is different learningsituations): -Thorndike, Pavlov, Skinner, Kohler, Rogers, Bandura, Vygotsky

- Distinction between learning as 'Construction of Knowledge' and learning as'Transmission andReception of Knowledge'
- Meaning of 'Cognition' and its role in learning.
- Socio-Cultural factors influencing Cognition and Learning
- Understanding processes that facilitate 'Construction of Knowledge':
  (i) Experiential Learning and Reflection
  (ii) Social Mediation
  (iii) Negotiability
  (iv) Situated Learning and Cognitive Apprenticeship
  (v) Meta-cognition
- Role of a teacher in a teaching-learning context:
  (a) Transmitter of knowledge
  (b) Model
  (c) Facilitator
  (d) Negotiator
  (e) Learner

Unit-III Intelligence and Motivation

- Defining Intelligence (Definitions given by different Psychologists)
- Nature of Intelligence and the role of Heredity and Environment
- Theories of Intelligence
  (a) Spearman's Two Factor theory
  (b) Guilford's Factor Analytical Theory
  (c) Cattell and Horn's Theory of Intelligence
  (d) Sternberg's Information Processing Theory
  (e) Howard Gardner's Theory of Multiple Intelligence
- Assessment of Intelligence
  (a) Individual Tests – Verbal Tests
  (b) Group Tests: Verbal/Non-Verbal
- Use, Misuse and Abuse of Intelligence Testing
- Motivation Meaning and Need, Difference between Needs and Drives, Motives and

Incentives, Role of a teacher in motivating students: Need and Strategies.

Unit – IV Personality and Adjustment

- Meaning and Nature of Personality
- Theories of Personality
    (a) Type Approach – Hippocrates, Kretschmar, Sheldon, Jung
    (b) Trait Approach – Cattell
    (c) Type cum Trait Approach – Eysenck
    (d) Psychoanalytic Approach – Adler
- Meaning and nature of Adjustment – (in the context of teaching and learning)
- Methods of Adjustment – Direct methods/Indirect methods
- Characteristics of a Well-Adjusted Person

Practical Assignments/Field Engagements (Any one):

- The student teacher does observation of children at play and maintain diaries to acquaint themselves with the different strategies of children employ in Learning and Cognition - 2 hours each across 4 observations; observations can be carried out in the schools. The students could identify different games that children play; Individual and Group behavior in play; friendships andsocial relationships. (The analysis could include the following aspects: Motor Skills, Language used during Play, Group Structure and Interactions, arriving at rules and following them, Gender Behavior, Patterns of Negotiation and Resolving Conflict, Folk Songs and Games, Popular Culture). The above field engagement is to be followed by post- assignment discussions during contact hours to arrive at linkages between play social, emotional, cognitive, language and motordevelopment of children.
- Student teachers shall conduct Individual and Group Intelligence Testing through appropriate culture fair Tests chosen by Faculty Mentors and prepare an e-portfolio of the entire project.

Suggested Readings:

- Bettelheim, B. (1987). The Importance of Play. *The Atlantic Monthly,* March.
- Bodrova, E. and Deborath J. Leong (1996). *Tools of the Mind.* New Jersey: MerrillChapter 3: The VygotskianFramework and other Theories of Child Development, Chapter 10: Playas a leading activity.
- Bodrova, E. and Leong, D. (1996). *Tools of the Mind.* New Jersey: Merrill. Chapter 1: Introduction to the Vygotskian Approach. Chapter 2: Acquiring Mental Tools and Higher Mental Functions, Chapter 3: The Vygotskian Framework and Other Theories of Developmentand Learning, Chapter 4: The Zone of Proximal Development.
- Cox M. (2005). *The Pictorial World of the Child.* New York: Cambridge University Press.
- Crain, W. (1992). *Theories of Development: Concepts and Applications.* (3rdEdition). New Jersey:Prentice Hall. Chapter 7: Kohlberg's Stages of Moral and Development, Chapter 8: Learning Theory: Pavlov, Watson, and Skinner, Chapter 9: Bandura's Social Learning Theory, Chapter 11: Freud's Psychoanalytic Theory, Chapter 12: Erikson and the Eight Stages of Life.

- Elkind, D. (1976). *Child Development and Education.* Oxford University Press.
- Erikson, Eric, H. (1972). *Play and Development.* New York: W.W. Norton.
- Gardner, H. (1985). *Frames of Mind: The Theory of Multiple Intelligences.* London: PaladinBooks.
- Garvey, C. (1990). *Play.* Cambridge: Harvard University Press.
- Gilligan, C. (1977). In a Different Voice: Women's Conception of Self and Morality. *Harvard Educational Review*, 47 (4), 481-517.
- Harris, M. and Butterworth, G. (2002). *Developmental Psychology: a student's handbook.* New York: Taylor & Francis. Chapter 7: The beginnings of Language Development, Chapter 10: Social Development in Pre-school Years, Chapter 14: Social Development in the School Years.
- Hergerhahn, B.R. (1976). An Introduction to Theories of Learning, Englewood Cliffs,NJ: Prentice Hall.
- Holt, J. (1967). *How Children Learn.* London: Penguin.
- Francois, G. (1991). *Psychology for Teaching.* Wadsworth Publishing Co. Chapter 1: Psychology for teaching, Chapter 5: Thinking and remembering, Chapter 8: Intelligence and creativity.
- Mukunda, Kamala, V. (2009). *What Did You Ask in School Today? A Handbook on Child Learning.* Noida: Harper Collins. Chapter 2: Learning, 22-50; Chapter 6: Moral Development, 117-146; Chapter 10: Emotions, Learning and Emotional Health, 222- 253.
- Mangal, S.K (1997) Advanced Educational Psychology; New Delhi: Prentice Hall of India
- Piaget J. (1997). Development and Learning. In Gauvian, M. and M. Cole. (eds.) *Readings on the Development of Children.* New York: W. H. Freeman

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-		-	-
CO2	-	2	-			-		-	-
CO3	-		1	-	-	-	2		-
CO4	-		-	2		-	-	-	3

SEMESTER II

Course Title: Historical & Sociological Foundations of Education **Credits: 4**

CourseCode: BED 120 **MM:**

100

Course Objectives:

- To familiar student teachers about the importance of policies & programs during pre & post-independence era.
- To be able to understand the system of Indian education and the forces affecting the education system.
- To critically examine the issues and concerns of education in the socio-cultural context in Indiaand brief with the cause& effects of social evils.
- To inculcate the sensitivity, values and vision for the future of Indian education.

Course Outcome:

At the end of the course, students are expected to:

- Develop understanding of policy frameworks for public education and educational structure incontemporary India.
- Gain Insight into Educational Opportunities and understand the classroom ethos with reference todiversity exist in India.
- Develop understanding of classroom in social context and constitutional provisions
- Acquainted with the issues of Indian society and gain insight into universalization of education

Unit-I: Historical development of Indian Education

- Pre-Independence Development in Indian education
  - Pre-British Period (Vedic, Buddhist, Muslim)
- Prominent Characteristics of Education in India During Colonial Period (special referenceto Anglicist- OrientalControversy, Downward Filtration Theory & Basic Education)
- Post- Independence Developments in Indian Education
  - Constitutional provisions Of Education
  - Kothari Commission (1964-66)
  - NPE 86 & POA 92
  - Yashpal Committee
  - Knowledge Commission
  - RTE 2009

Unit-II: Contemporary development of Indian Education

- System Of Indian Education
  - UEE
  - USE (RMSA)
  - Higher Education (RUSA)
- Issues of Indian Education
  - Vocationalisation of Education (Skill Development)
  - Decentralization of Educational Administration (Administrative Hierarchy)
  - Autonomy & Accountability in Higher Education
  - Student Unrest (Special reference to Lingdoh Committee Report)
- Agencies Of Indian Education
  - UGC
  - NCERT
  - NCTE
  - NAAC
  - CBSE
  - RCI (Rehabilitation Council of India)

Unit-III: Education & Socio-Cultural Context

- Relationship between Society & Education
- Social Process: Socialization, Social Stratification, Social Change, Social mobility
- Education as an instrument of social Change, Influence of education on Society, Family& theirpractices.
- Education & Culture: Analysis of the concepts of Cultural Lag, Cultural Conflict, culturalPluralism, Ambivalence, Cultural Tolerance, Acculturation & Enculturation
- Socio-Cultural influences on the aims & organization of education (in context ofSanskritization, Industrialization & Modernization)

Unit-IV: Social Issues in Education

- Values in Education: Causes of Value Degeneration. Methods & Techniques of valueinculcation(Classroom Context)
- Democracy, Socialism & Secularism: Concept & Practices in Schools.
- Role of Education in reproducing dominance & challenges of Marginalization withreference to Class, Caste, Gender & Religion.
- Sensitization towards Social Evils (Inequality and Social Exclusion on basis of Class,Caste,Gender & Religion).
- Teacher & Society: A Critical Appraisal of the status of a Teacher in Indian Society.

Practical Assignments / Field Engagements

- The students will be engaged in community work wherein they would study the role of educationin schools in reproducing dominance & challenges Marginalization with reference to Class, Caste,Gender & Religion and look at the prevailing in equality and social exclusion. They are expectedto prepare a report on the same.

Suggested Readings:

- Anand, C L and et al (1993) Teacher and Education in the Emerging Indian Society, NCERT, NewDelhi.
- Aggarwal (2002) - Landmarks in the history of Modern Indian Education, Vikas Publishing HousePvt. Ltd., New Delhi. -Aggarwal, J.C. (2002) – Development of Modern Indian education, Vikas Publishing House Pvt. Ltd., New Delhi.
- Biswas Ranjan Purkait (2001) - Milestones in Modern Indian Education, New Central Book Agency,Calcutta –
- Chandra, B. (2005). Modern India. New Delhi. NCERT
- Dash, M. (2000). Education in India: Problems and Perspectives. New Delhi: Atlantic
- Government of India (GoI) (1966). National Education Commission (1964-66), Ministry ofEducation: New Delhi. Government of India (GoI) (1986/92).
- New Education Policy, MHRD: New Delhi.
- Gore M.S. (1994). Indian Education – Structure and Process. Macmillan: Delhi. New Delhi: RawatPub.
- Humayun Kabir (1951). Education in New India. London: George Allen and Unwin Ltd. Jagannath Mohanty (1998).Jayapalan, N. Modern Trends in Indian Education. Hyderabad: Neelkamal Publication. New Delhi: Deep and Deep
- Delors, Jacques (1996) Learning the Treasure Within, Report to UNESCO of the
- International Commission on Education for Twenty-first Century, UNESCO.
- Dewey, John. (1952). The School and the Child, New York: The Macmillan Company,
- (Also available in Hindi School aur Bachche Translation: RRCEE)
- Gandhi M K (1956) Basic Education, Ahmedabad, Navjivan.
- Govt. of India (1952) Report of the Secondary Education Commission, New Delhi
- Govt. of India, MHRD (1986, Revised 1992) National Policy of Education, New Delhi
- Govt. of India, MHRD (1992) Programme of Action (Draft) New Delhi, Aravali Printers andPublishers.
- Mani R S (1964) Educational Ideas and Ideals of Gandhi and Tagore,
- Saraswathi T S (1999) Culture, Socialization and Human Development, Sage Publication.
- ·Kumar (Eds.) (1985). Sociological Perspectives in Education: A Reader. Delhi: Chanakyapublications.
- Kumar, Krishna (1988). What is Worth Teaching? New Delhi: Orient Longman.
- Listening to Gandhi (Also Available in Hindi Shaekshik Gyan aur Varchasav. New Delhi:Granthshilpi.)
- Nurullah S. & Naik J.P. (1981)- Student history of Education in India, Macmillan, Bombay

- Lal & Palod (2008) Educational thoughts and Practices, Meerut: Vinay Rakheja Mathur S.S. (1988). Sociological approach to Indian Education. Agra: Vinod Pustak Mandir.
- National Curriculum Framework for School Education (2005). NCERT NCTE (1998). Gandhion Education. New Delhi.
- Taneja. V.R. (2003). Educational Thoughts and Practice. New Delhi: Sterling Publishers.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-		-	-
CO2	-		2			-		3	-
CO3	-			-	2	-			-
CO4	-		-			-	-	-	1

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SEMESTER II

Course Title: Assessment for Learning **Credits: 4Course**

Code: BED 117 **MM: 100**

Course Objectives:

- Get acquainted with basic concepts and practices of assessment and evaluation in teachinglearning.
- Explain the requirement of assessment of learning and need of recording the assessment.Examine different dimensions of learning and related assessment procedures, tools and techniques.
- Develop different tools and task to assess learners' performance.
- Analyze the issues and concerns of evaluation practices in schools.
- Enhance technology-based assessment practices to have quick and global results.

Course Outcome

At the end of the course, students are expected to:

- Gain a critical understanding of issues in assessment and evaluation.
- Become cognizant of key concepts, such as formative and summative assessment, evaluation andmeasurement, test,examination
- Become the use of a wide range of assessment tools, and learn to select and construct theseappropriately; and
- Evolve realistic, comprehensive and dynamic assessment procedures that are able to keep the wholestudent in consideration.

Unit I – Concept of Evaluation

- Concept of Measurement, Assessment and Evaluation
- Need and Scope of Evaluation
- Distinction between the following: Measurement, Examination, Assessment and Evaluation
- Evaluation
  Approaches:
  Formative -
  Summative
- Continuous Comprehensive Evaluation: Need, Relevance, Implementation Procedure,Problems

Unit - II Tools and Techniques of Evaluation

- Characteristics of good measuring instruments and factors affectingthem.
- Reliability and Validity of Tools
- Tools of evaluation: -
  Quantitative – Written, Oral and Practical (Types of Questions: Short, Long, MCQs coveringall three domains ofLearning-Cognitive, Affective and Psychomotor)
- Qualitative – Observation, Introspection, Projection and Sociometry
- Use of these tools for internal assessment & maintainingcumulativerecords of learners in School
- Planning and Preparation of test (including blue print)

Unit- III Statistical Methods and Interpretation of scores

- Need & Importance of Statistics in Evaluation
- Graphical Representation
  Histogram, Frequency Polygon, Pie Charts,
- Measures of Central Tendency: - Mean, Median, Mode. (Meaning, Characteristics, use only)
- Measures of Variability:(Meaning, Characteristics, Use only) Range, Quartile deviation, Standarddeviation
- Normal Probability Curve: -Properties and Uses. (Skewness and Kurtosis (Meaning &Reasons)
- Coefficient of Correlation-Spearman's Rank Rule Method
- Percentile & Percentile rank (Meaning & Uses)

Unit IV New Trends in Evaluation (Need and Use)

- Question bank
- Grading system
- Online Examination
- Open Book Examination
- Credit System
- Exam on Demand (meaning & uses only)

Practical Assignments/Field Engagement (Any one):

- Develop a Power Point Presentation on the current practices of Assessment and Evaluation atthe Upper PrimaryStage
- Analyze the question papers of the subject of your choice (Previous-3 Years)

Classes X and XII (any board) in the light of new approach

- Develop a question paper for upper primary and secondary stage to assess all the aspects oflanguage learningusing ICT as a tool
- Analyze answers given by the learners for one particular question
- Select any ten questions from the Class VI textbook of the subject of your choice which lendscope to the creativityof the learners
- Study the key points of the Ist Term assessment of any student of Class VI
- Devise a strategy to incorporate the suggestions given in the Ist CCE report for the progressof the learner.

Suggested Readings:

- Cohen, Louis; Manion, Lawrence and Morrison, Keith (2004); A Guide to Teaching Practice-Fifth Edition;Routledge Falmer-Taylor and Francis Group; London.
- Ebel Robert L., (1991). Essentials of Educational Measurement, Prentice Hall of India.
- Gunter, Mary Alice et.al (2007). Instruction: A Model's Approach- Fifth Edition; PearsonEducation Inc.;Boston.
  Kubiszyn Tom. (2003). Educational Testing and Measurement, John Wiley.
- Linn, Robert L. and Gronlund, Norman E. (2000). Measurement and Assessment inTeaching; PearsonEducation Inc.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1		-	-	3	-	-	1	-	-
CO2	2					-			-
CO3		1		-		-			-
CO4	-		2			-	-	-	2

SEMESTER II

PRACTICAL

Paper: Reading and Reflecting on Texts **Credits: 2**

Paper Code: BED 231 **MM: 100**

Course Outcomes:

- To enable student-teachers to read and respond to a variety of texts in different ways and also learn to think together critically and creatively.
- To develop meta-cognitive awareness in student teachers to become conscious of their own thinking processes.
- To enhance their capacities as readers and writers by becoming participants in the process of reading.

Course Content:

Readings for Discussion, Analysis and Reflection (In depth Reading of any Five of the following):

- Delpit, Lisa D. (1988). The Silenced Dialogue: Power and Pedagogy in Educating OtherPeople Children. *Harvard Educational Review* 58(3), 280-298.
- Donovan, M. S. And Bransford, J. D. (Ed.) (2005). *How students learn.* Washington DC: TheNational Academies Press, Chapter 1: Introduction 1-26, Chapter 13: Pulling Threads 569- 590.
- Gilligan, C. (1977). In a Different Voice: Women's Conception of Self and Morality. *Harvard Educational Review,* 47 (4), 481-517

- llich, I. (1970). *DE schooling Society,* London, UK: Marion Boyars.
- Vasanta, D. (2004). Childhood, Work and Schooling: Some Reflections. *Contemporary Education Dialogue,* Vol. 2(1), 5-29.

- Mukunda, K. V. (2009). *What Did You Ask in School Today? A Handbook on ChildLearning.* Noida: Harper Collins. Chapter 4: Child Development, 79-96.
- Wood, D. (2000). Narrating Professional Development: Teacher's stories as texts forimproving practice. *Anthropology and Education Quarterly,* 31(4), 426-448.

Audio-visual Resources:) Any Three of the following to be screened for the student-teachers anddiscussion to be followed)

- *A New Education for a New India* (CD ROM) (By Gnostic Centre/NCTE)
- *Had-Anhad: Journeys with Ram and Kabir* by Shabnam Virmanihttp://www.kabirproject.org/
- *Teacher's Journey:* An observational film on teaching methodologies of a primary schoolteacher in a single-teacher school in MP, India. Director- Deepak Verma,
- Azim Premji Foundation. For copies contact – *madhumita@azimpremjifoundation.org*
- *Where Knowledge is Free:* A documentary film about children branded by Caste and excluded from education. Director Binitesh Baruri. Available at Indian Institute of Dalit Studies, Q-3, Green Park Ext., New Delhi-16, Ph. 91- 11-41643981 http://www.dalitstudies.org.in.

Note:

- Based on the discussions held on the reading of the above texts' students in the practical time the student teachers shall maintain a detailed account of their reflection on the readings in the light oftheir own experiences in the form a diary. The Internal Assessment shall be on the extent of participation in a reading exercise in the class individually and in a Groupand reflection on the same simultaneously. External Assessment shall be in the form of a Viva Voce Examination.

Semester-II

Course Title: Preliminary School Engagement PSE-2 (2weeks) **Credits: 2Course**

Code:BED 160 **MM: 100**

Course Outcomes:

1. Students will be able develop the organizing skills for the Co-curricular activities.
2. Students will be able to find out the problems faced by teachers in assessment through the scheme of Continuous and ComprehensiveEvaluation. Students will be able develop the organizing skills for the Co-curricular activities.
3. Students will be able to tackle the field activities pertaining to the practicals.

Students will be able to tackle the field activities pertaining to the practicals.

1. Organization of Co-curricular activities by pupil teachers by assisting and participating in the organization of the same and recording experiences of the same in a reflective journal.
2. Writing a reflective journal on the problems faced by teachers in assessment through the scheme of Continuous and Comprehensive Evaluation by observing the teachers' evaluating students and engaging with them to know their problems with respect to implementation of the scheme in theirschool.
3. The student teacher shall also undertake the field activities pertaining to the practicals during thisperiod.

SEMESTER III

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INTERNSHIP

BED251& BED253, BED255 & BED257

Credits: 20M.M:400

Rationale and Aim

The school-based activities are designed to enable the student teachers to connect theory to practice and to help them acquire a perspective regarding the aims of education within which their previously acquiredknowledge and practices can be systematized and structured to enable them to teach effectively. The purpose of the internship programme is to provide the student (intern) with the opportunity of undergoinga meaningful experience as a practitioner. As conceived, the programme should be structured so that it isa partnership between the school and the teacher education institutions. The intern must function as a regular teacher and therefore be immersed in all aspects of the school but with the provision that the internis enabled to be creative in her role as a practitioner. This can be accomplished by providing her the necessary physical space as well as pedagogical freedom to innovate. For this, it is necessary to negotiatewith the school focusing on the benefit that will accrue to the school by the proposed partnership model. The programme will be largely field-based so that the intern will get to experience the real problems thata practitioner has to deal with. To achieve the aim of the programme the intern will need to integrate her knowledge base, her understanding of children and classroom processes, theoretical pedagogical considerations, the strategies and skills she has developed in order for her to become a reflective practitioner.

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Objectives of the Course:

- To observe children and the teaching learning process in a systematic manner.
- To learn to relate to and communicate with children.
- To learn the nuances of the practice of teaching in a School using appropriate methods,materials and skills
- To evaluate school textbooks and other resource material critically in the context ofChildren'sdevelopment and pedagogic approach used.
- To develop a repertoire of resources which can be used by the intern later in his/her teaching – textbooks, children's literature, activities and games, planning excursions
- To reflect critically on practice by visiting a learning center.

Course Outcome

At the end of the course, students are expected to:

- Develop various teaching skills
- To be able to apply theoretical knowledge in real life situation.
- Evaluate students achievement and various resource material critically in context of child development.

School Experience Details during Internship I:

- During the school-internship, the student teacher is expected to observe classroom teaching of mentors/ peers, to getinsights into student behavior, instructional practices, student learning, learning environments and classroom management.

  The student-teacher is expected to critically reflect and discuss these practices and engage in activities like maintenance ofrecords and registers, preparation of lesson and unit plans using different artefacts and technology, classroom management, activities related to school- community- parent interface, and reflections on self-development and professionalizationof teaching practice.

- The other component of school-based activities to be carried out during internship is delivering the lessons/units ofpedagogic courses in the first and second year as specified.

- The activities undertaken during the internship period will be presented in e-Portfolios and Reflective Journals. The student-teachers are expected to record their experiences observations and conclusions regarding all the activities undertaken.

- The entries of Reflective Journals will be analytical answering ‘what’ is new and different from their previous understandings, ‘why’ certain observations made by them with regard to instruction,classroom management, PTAs, etc., are different / same and ‘how’ these observations might leadto a criticism and change in their practice. The students will be assessed on the basis of entries made in e-Portfolios and Reflective Journals.

School Internship Part I (BED 251 & BED 253)

School Internship Part I shall include the undertaking of the following tasks and the assessment shall bebased on a Viva VoceExternal Examination, which shall be held in the college premises.

MM: (200 Marks)

10 Credits

S. No.	Components	Marks	
1	Simulated Teaching (2 in each)	10	10
2	Discussion Lessons (2 Lessons in each pedagogy course)Total 4 DiscussionLessons (10x4)	20	20
3	50 Lesson Plans (in each pedagogy course) (25x2)	25	25
4	Achievement Test Report (ATR) (In one subject)	10	10
5	Two Lessons to be Delivered in each pedagogy coursethrough theuse of Multimedia (5x4=20)	10	10
6	Text Book Review	10	10
6	Use of Teaching Learning Material in Classroom Discourse(includingteaching aids and reference material)	10	10
7	Peer Group observation	5	5
Total		**100**	**100**

School Internship Part II (BED255 & BED257)

10 Credits

M.M. 200

The School Internship Part-II shall entail the assessment of the final lesson plan at the culmination of the internship wherein the student teacher will be observed by external and internal examiners while they teach in the schools. This assessment shall be done for both the pedagogies of teaching subjects opted bythe students-teacher and each shall carry 100 marks.

SEMESTER IV

SEMESTER IV

Course Title: Gender, School and Society **Credits: 4**

Course Code: BED 203 **MM: 100**

Course Objectives

- To develop awareness about some key terms such as gender sex and sexuality relate them withtheir context inunderstanding relations with respect to education.
- To reflect on different theories of Gender and how they are corelated with real life situations.
- To examine the institutions involved in Socialization processes and see how socializationpractices impact powerrelations and identity formation

Course outcomes:

At the end of the course, students are expected to:

- Understand the basic terms, concepts used in gender studies.
- Acquainted with the idea of gender discrimination in construction and dissemination of knowledge.
- Develop an awareness and sensitivity.

Unit I: Gender Issues: Key Concepts

- Gender, Sex, Sexuality
- Third Gender, Transgender
- Patriarchy, Masculinity and Feminism
- Gender bias, Gender Stereotyping, and Empowerment
- Equity and Equality in Education w.r.t. relation with caste, class, religion, ethnicity, disabilityand region with respectto Gender: Present status in India and prospects
- Polyandrous, Matrilineal and Matriarchal Societies in India: Relevance and Status of Education

Unit II: Gender Studies: Paradigm Shift

- Paradigm shift from Women's studies to Gender studies
- Historical backdrop: Some landmarks from social reform movements
- Theories on Gender and Education and their application in the Indian context
  - Socialization theory
  - Gender difference
  - Structural theory

- Deconstructive theory

- Power Control in Patriarchal, Patrilineal, Matriarchal and Matrilineal Societies: Assessingeffect on Education of Boysand Girls

Unit III: Gender, Power and Education

- Gender Identities and Socialization Practices in Family, other formal and informal organization.
- Schooling of Girls: Inequalities and Resistances (issues of Access, Retention and Exclusion).
- Collection of folklores reflecting socialization processes.
- Changing Perspectives with Legal Provisions: Right to Inheritance etc.

Unit IV: Gender Issues in Curriculum

- Social Construction of Masculinity and Femininity
- Patriarchies in interaction with other social structures and identities
- Reproducing Gender in School: Curriculum, Text-books, Classroom Processes andStudent-Teacher interactions
- Overcoming Gender Stereotypes
- Working towards gender equality in the classroom: Need and Strategies
- Empowerment of Women: Strategies and Issues

Practical Assignments /Field Engagement (Any one):

- Discussion on theories of gender and education with its application in the Indian context
- Project on analyzing the institution of the family Marriage, reproduction Sexual division of laborand resources
- Debates and discussions on violation of rights of girls and women
- Analysis of the Films post screening of the following: Bawander, India's Daughter, Water
- Analysis of textual materials from the perspective of gender bias and stereotype
- Organizing debates on equity and equality cutting across gender, class, caste, religion, ethnicitydisability, and region.
- The above discussion / debates to be documented in the form of an e-portfolio.

Suggested Readings:

- Ambasht, et al (1971). Developmental Needs of Tribal People, NCERT
- Bhattacharjee, Nandini (1999). Through the looking-glass: Gender Socialization in a PrimarySchool in T. S.Saraswathi (ed.) *Culture, Socialization and Human*
- *Development: Theory, Research and Applications in India*. Sage: New Delhi.
- Frostig, M, and Maslow, P. (1973). *Learning Problems in the Classroom: Prevention*

andRemediation. Grune &Stratton: New York.

- Geetha, V. (2007). *Gender*. Street: Calcutta.
- Ghai, A. (2005). Inclusive education: A myth or reality In Rajni Kumar, Anil Sethi &
- Ghai, Anita (2008). Gender and Inclusive education at all levels In Ved Prakash & K. Biswal (ed.) *Perspectives on education and development: Revising Education commission and after*, National University of Educational Planning and Administration: New Delhi
- Jeffery, P. and Jeffery, R. (1994). Killing My Heart's Desire: Education and Female
- Autonomy in Rural India in Nita Kumar (ed.) *Women as Subjects: South Asian Histories.* New Delhi: Stree in association with the Book Review Literacy Trust:Kolkata pp 125- 171.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-		-	-	1	-	-
CO2						3		2	-
CO3				-	2				-
CO4	-					-	-	-	

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SEMESTER IV

Course Title: Knowledge and Curriculum Perspectives in Education **Credits: 4**

CourseCode: BED 238 **MM: 100**

Objectives of the Course:

- To able the student teachers to understand the meaning of the term Knowledge and Curriculum.
- To inform them towards the conceptual linkages and distinctions between educational aims, Curriculum framework, Curriculum development, curriculum transaction, curriculum evaluation and Pedagogy.
- To explore the role of School as an organization and its culture along with the teacher in operationalizing and developing, a contextually responsive 'Curriculum' which fosters the spirit of Critical Pedagogy.
- To familiarize student teachers with the recommendation of NCF 2005 and NCFTE2009 pertaining to Curriculum and Schooling.

Course Outcomes

At the end of the course, students are expected to:

- Develop an understanding of the concept of curriculum Development and Innovations in Curriculum
- Be familiar with Foundations of curriculum and knowledge Implementation.
- Understand how society and culture influence the planning and development of curriculum and sourcesof knowledge
- Differentiate between centralized and de-centralized curriculum in planning and the problem ofcurriculum load

Unit – I Knowledge, Curriculum and Schooling

- Curriculum: (a) Concept and principles,
  (b) Core Vs Hidden Curriculum,
  (c) Centralized Vs Decentralized
- Significance of Curriculum in School Education with reference to-
  (a) Curriculum Framework

(b) Curriculum & Syllabus
(c) Teaching & Instruction

- Interrelationship between curriculum, society and learner.
- NCF 2005: Recommendations for curriculum and schooling.
- NCFTE 2009: Impact on Teacher Education curriculum

Unit – II Construction of Knowledge

- Meaning and Nature of knowledge
- Information, knowledge, conception and perception
- Sources of knowledge: Empirical Vs Revealed knowledge
- Types of Knowledge: (a) Disciplinary Knowledge
  (b) Course content Knowledge
  (c) Indigenous Knowledge
  (d) Scientific Knowledge
- Relevance of Knowledge construction through dialogue
- Contestations to 'Knowledge'-
  (a) Dominance
  (b) Marginalization
  (c) Subversion
- Role of curriculum in challenging marginalization with reference to class, caste, gender andreligion

Unit – III Curriculum Planning, Construction and Transaction (At School Level)

- Broad determinants of Curriculum Construction-
  (a) Learner and his/her interest and developmental context
  (b) Diversity- socio- cultural- geographical- economic and political
  (c) National and international contexts
- Different Approaches to Curriculum Development-
  (a) Subject- centered
  (b) Learner centered
  (c) Constructivist
  (d) Competency based
  (e) Environmental
- Models of Curriculum Development by Ralph Tyler, Hilda Taba, Franklin Bobbit

Unit –IV School: The site of Curriculum Engagement

- Role of School Administration in creating a context for transacting the curriculumeffectively
- Role of Infrastructural support in teaching and learning
- School culture and organizational ethos as the context for Teachers' work

- Role of Teacher as a critical pedagogue in curriculum transaction
- Role of Apex bodies in providing curriculum and pedagogic supports to teachers within schools- NCERT, CBSE, NIOS, SCERT, and CIET.

Practical Assignments/Field Engagement:

- CDs/DVDs to be Screened for the Student-teachers and report to be prepared with respectto the issues touchedupon in the form of an e-portfolio (Any two):
  1. CIET/NCERT CD ROM *Four Educational Riddles* by Krishna Kumar
  2. Debrata Roy DVD *The Poet & The Mahatma*
  3. Krishnamurthy Foundation India DVD *the Brain is Always Recording*
  4. NCERT CD ROM *Battle for School* by Shanta Sinha
  5. NCERT CD ROM *Globalization and Education*

Suggested Readings:

- Apple, Michael W. (1979). Ideology and Curriculum; Routledge and K. Paul.
- Arends, Richard I.; Learning to Teach- Fifth Edition; McGraw Hill Higher Education; NewYork.
- Bawa, M.S. & Nagpal, B.M. eds (2010); Developing Teaching Competencies; VivaBooks.
- Cohen, Louis; Manion, Lawrence and Morrison, Keith (2004); A Guide to TeachingPractice- FifthEdition; Routledge Falmer-Taylor and Francis Group; London.
- Connelly, F. Michael (Editor) (2008); The Sage Handbook of Curriculum andInstruction; SagePublications India Pvt. Ltd.; New Delhi.
- Gunter, Mary Alice et.al (2000).; Instruction: A Model's Approach- Fifth Edition; PearsonEducation Inc.;Boston.
- Instructional Technology: A Systematic Approach to Education (1986), Frederick G. Knirk,Kent L. Gustafson,Holt, Rinehart and Winston, Inc.
- Instructional Technology: Foundations (1987), Robert Mills Gagne, Lawrence ErlbaumAssociates.
- Kelly, A.V.; (2006) The Curriculum: Theory and Practice- Fifth Edition; SagePublications;London
- **Kumar, Krishna (1988). What is Worth Teaching? New Delhi: Orient Longman. Chapter1: What is WorthTeaching? Chapter 2: Origins of the Textbook Culture, Chapter 9:**
- **Listening to Gandhi (Also Available in Hindi Shaekshik Gyan aur Varchasav. New Delhi:Granthshilpi.)**
- Kubiszyn Tom. (2003). Educational Testing and Measurement, John Wiley.
- Linn, Robert L. and Gronlund, Norman E. (2000). Measurement and Assessment inTeaching; PearsonEducation Inc.
- McNeil, John D. (2003); Curriculum: The Teacher's Initiative; Third Edition; Merri PrenticeHall; Ohio.

- Moore, Kenneth D. (2005); Effective Instructional Strategies: From Theory to Practice; SagePublications India Pvt. Ltd.; New Delhi.
- Muijs, Daniel and Reynolds, David (2005) Effective Teaching: Evidence and practiceSecond Edition; Sage Publication; London.
- Mukunda, Kamala V. (2009) What Did You Ask at School Today: A Handbook of ChildLearning; Harper Collins Publishers; NOIDA.
- National Curriculum Framework for School Education (2005); NCERT; New Delhi; Ornstein, Allan C. and Hunkins, Francis P. (1993). Curriculum: Foundations, Principles and Issues;Allan and Bacon;Boston.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-		-	-	1	-	-
CO2		2							-
CO3				-	2				-
CO4	-					-	-	-	

SEMESTER IV

Course Title: Guidance and Counselling

Credits - 4

Course Code: **BED216** **MM**: 100

Course Objectives

- Understanding the concepts, needs and viewpoints about guidance and counselling and the underlying principles in referenceto normal children as well as in reference to children with specialneeds.
- Get acquainted with the organizational framework and procedures of guidance services ineducational institutions.
- Knowledge and techniques required for providing guidance and counseling services to students.:
  - To familiarize the responsibilities and moral obligation of teacher as a guide and counsellor;
  - To understand the facilities at governmental and non-governmental level; and ethical and legalguidelines for differently-abled, special needs, and deprived group students.

Course outcomes

At the end of the course, students are expected to:

- Understand the meaning, nature and scope of guidance and counseling and recognize its importance.
- Develop skills of collection of Data through testing and non-testing tools.
- To enable the teacher trainees to organize guidance programs in secondary/ senior secondary schools.
- Explain the role of parents, teachers, school administrator and family to solve behavioralproblems of students and toknow about different strategies to maintain mental health of students

Unit-I: Understanding Guidance

- Guidance: Concept, aims, objectives, functions, principles and ethics
- Role of Guidance in human development and adjustment
- Need & Procedure for (Educational, Psychological and Social) guidance
- Group Guidance: Concept, Need, Significance and Principles
- Role of Teacher: in providing guidance and organization of guidance programs in schools.

Unit-II: Understanding Counselling

- Counselling: Meaning, Principles, Approaches (Directive, Non-Directive, Eclectic), Types(Individual, Group)
- Process of counselling (Initial Disclosure, In-Depth Exploration and Commitment to Action)
- Counseling Services for Students: Face to Face and Online
- Counsellor: Qualifications and Qualities (including Skills for Listening, Questioning,Responding, Communicating)
- Differences between Guidance and Counselling
- Role of Teacher as a Counsellor

Unit-III: Major Concerns in Guidance and Counselling

- Emotions: Meaning, Emotional Intelligence, Managing Emotions, Role of Teacher
- Skills: Self Discovery, Decision Making, Problem Solving
- Coping skills: Types, Integration
- Dealing with Depression and Academic Stress
- Guidance and Counselling Career Options available in India
- Special Counseling: Population, Multi-Cultural Counselling
- Values: Patience, Empathy, etc
- Ethics: Professional Ethics and Code of Conduct of Teacher Counsellor

Unit-IV: Guiding Differently-abled Students·

- Meaning, Types of Differently-abled (DA) Students
- Behavioral Problems of Children with Special Needs (CWSN) and of Deprived Groups(DG)
- Behavior Modification Techniques
- Career Development: Teacher's role in dissemination of Occupational Information, CareerPlanning. VocationalTraining and Placement Opportunities for CWSN, DG, DA students
- Persons with Disabilities Act 1995, Governmental and Non-governmental Facilities, Ethicaland Legal Guidelines

Practical Assignments/Field Engagement (Any one):

- Group Guidance - One Career Talk
- Design a Questionnaire to collect information on Students' Educational, Psychological or Socialproblems.
- Detailed study of the Guidance and Counselling Services available in a given School
- Prepare a list of the online Guidance and Counselling Services available for students and teachers in India.
- Enrichment Lectures, Seminars, Workshops, Demonstrations by Experts working as Guidance and Counsellors inSchools or Organizations working specially in the area of Adolescent Psychology.
- Self-Study and Reflective sessions: Field visits to explore the working of Guidance Institutions School Counsellors, Career Counsellors etc.

Suggested Readings:

- Aggarwal, J. C., (2000). Educational & Vocational Guidance and Counseling,Jalandhar: Doaba House.
- Asch, M. (2000). Principles of Guidance and Counseling, New Delhi: Sarup and Sons.
- Bhatia, K. K., (2002). Principles of Guidance and Counseling, Ludhiana: VinodPublications.
- Bhatnagar, R. P.; Rani. S. (2001); Guidance and Counseling in Education andPsychology.
- Gibson, R.L. and Mitchell (2008). Introduction to counseling and Guidance. New Delhi:PHI Learning Pvt.
- Goswami, M. (2016). Essentials of Guidance and Counselling, Lakshmi Publishers andDistributors.
- Indira Gandhi National Open University, (2000). Guidance and Counselling (ES-363): CareerDevelopment.
- Indira Gandhi National Open University, (2000). Guidance and Counselling (ES-363):Techniques and Procedures of Guidance.
- Indira Gandhi National Open University, (2000). Guidance and Counselling (ES-363):Introduction to Guidance and Counselling.
- Joneja G. K. (1997); Occupational Information in Guidance, NCERT publication
- Kochhar S.K. (1999) Guidance and counseling in colleges and universities
- Minocha, M. (2008). Educational and Vocational Guidance, Arya Book Depot, New Delhi.
- Nayak A.K. (2004); Guidance and Counseling
- Oberoi S.C (2000); Educational, Vocational Guidance and Counseling
- Rao S. N. (1991) Counseling and Guidance.
- Safaya, B.N., (2002). Guidance & Counseling, Chandigarh: Abhishek Publications.
- Sharma R A Fundamentals of Guidance and Counseling
- Sharma, R. N. (2004); Guidance and Counseling
- Sharma, Tara Chand, (2002). Modern Methods of Guidance and Counseling, New Delhi:Sarup and Sons.
- Shertzer, Bruce and Stone, Shelly C., (1974). Fundamentals of Counseling, London:Houghton Missli.
- Shirley, A. Harmin and Guilford, E., (1987). Guidance in the Secondary Schools, New Delhi:NCERT.
- Sidhu, H. S., Guidance and Counseling, (2005), Twenty First Century, Patiala.
- Sodhi, T.S. & Suri, S. P., (1999). Guidance and Counseling, Patiala: BawaPublication.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-		-	-	1	-	-
CO2									-
CO3				2				2	-
CO4	-	1				-	-	-	1

SEMESTER-IV

Course Title: Environmental Education **Credits:4**

Course Code: BED219 **MM:100**

Course objectives:

- To make student teachers aware of the concept, importance scope and aims of environmental education.
- To acquaint the student teacher with possible environmental, hazards enabling them to combat with thenegative effects of theprograms of environmental erosion and pollution at various stages of education.
- To orient student teachers with various components of environment for preparing a curriculum forenvironmental education.
- To enable the student teachers to develop various methods and strategies for realizing the objectives ofenvironmental education.
- To enable the student teachers to understand about various projects in the area of environmental studiesin different countries.

Course outcomes:

- Develop awareness about problems related to the environment and a perspective in which theseproblems can be framedand analyzed in a scientific manner.
- Understand the role of teacher and students regarding conservation and preservation of environment.
- Develop a sense of awareness about the environmental pollution and possible hazards and its causesand remedies.
- Acquire knowledge about disaster management.

Unit I: Nature and scope of environmental education

- Nature, need and scope of environmental education and its conservation
- Environmental education: a way of implementing the goals of environmental protection.
- Present status of environmental education at various levels
- India as a mega biodiversity Nation, Different ecosystems at national and global level.
- Role of individual in conservation of natural resources: water, energy and food
- Role of individual in prevention of pollution: air and water
- Equitable uses of resources for sustainable livelihoods
- Environmental legislation: awareness and issues involved in enforcement
- Role of information technology and media in environment awareness/consciousness

Unit II: Community Participation and Environment

- Community participation in natural resource management – water, forests, etc.
- Change in forest cover over time.
- Deforestation in the context of tribal life
- Sustainable land use management
- Traditional knowledge and biodiversity conservation
- Developmental projects, including Government initiatives and their impact on biodiversity
- conservation
- Issues involved in enforcement of environment legislations
- Role of media and ecotourism in creating environmental awareness
- Role of local bodies in environmental management
- Shifting cultivation and its impact on environment

Unit III: Environmental Issues and concerns

- Consumerism and waste generation and its management
- Genetically-modified crops and food security: Impacts positive and negative
- Water consumption pattern in rural and urban settlement
- Ethno-botany and its role in the present-day world
- Environmental degradation and its impact on the health of people
- Economic growth and sustainable consumption
- Organic farming
- Agricultural waste: Their impact and management
- Rain water harvesting and water resource management
- Biomedical waste management
- Changing patterns of energy and water consumption.

Unit IV: Initiatives by various agencies for Environment Education

- Environmental conservation in the globalized world in the context of global problem
- Alternative sources of energy
- Impact of natural-disaster/man-made disaster on environment
- Biological control for sustainable agriculture
- Heat production and greenhouse gas emission
- Impact of industry/mining/transport on environment
- Sustainable use of forest produces.
- Governmental and non-government initiatives.
- Supreme Court order implementation of Environmental Education (EE)

Practical Assignments/Field Engagement (Any one):

- A study of major initiatives taken by NCERT regarding environmental education.
- Study of Development of slum area and their inhabitants in a nearby area/institute
- A critical study of school habitat in the context of drinking water, sanitation paper, energy, garbagemanagement etc.
- Develop a road map for implementation of Environmental Education as suggested by NCF2005.
- Develop a list of investigatory environmental problems (stage specific) work on the problem in agroup of 2-3. Prepare areport.

Suggested readings:

- Falmer Press CEE (1987). Joy of Learning: Handbook of Environmental Education Activities: CEE Bhrucha E. (2004). Textbook For NCERT (2005). *National CurriculumFramework.* New Delhi: NCERT.

- NCERT (2005). *Syllabus for Elementary Classes, Volume I*. New Delhi: NCERT.
- NCERT (2007/2013). *Looking Around Us*, EVS Textbooks (3-5), New Delhi: NCERT.
- NCERT (2008). *Source Book on Assessment for Classes I–V*, Environmental Studies, New Delhi:NCERT.
- Sarabhai V.K. et al. (2007). *Tbilisi to Ahmadabad – The Journey of EnvironmentalEducation–A Sourcebook*, Centre for Environment Education, Ahmadabad.
- SCERT (2011). *Paryavaran adhyayan aur vigyan shikshan*, D.El.Ed.-ODL Course:Chhattisgarh.
- SCERT (2012/2013). *We-Our environment*, EVS Textbooks (3-5): Andhra Pradesh. SeminarProceedings (1995-96).
  Seminar on EVS, organized by Vidya Bhawan, Udaipur.

- Springer (2006). *Science Literacy in Primary Schools and Pre-Schools.*
- The Green teacher (1997). *Ideas, Experiences and Learning in Educating for theenvironment*: Centrefor Environment Education
- UNESCO (1988). *Games and Toys in Teaching of Science and Technology*: UNESCO.
- UNESCO (1990). *An Environmental Education Approach to the Training of Middle LevelTeachers*: A PrototypeProgram: UNESCO, UNEP International EE Program.
- UNICEF (2008). *Best Practice Guidelines for teaching Environmental Studies in*
  - *Maldivian Primary Schools*: UNICEF.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-		-	-	1	-	-
CO2				2				1	-
CO3		1							2
CO4	-				1	-	-	-	

SEMESTER IV

Course Title: Creating an Inclusive School **Credits:2**

Course Code: BED205 **MM:100**

Objectives of the Course:

- To acquaint student- teachers with the concept of Inclusive Education and appreciate thisphilosophy in thecontext of education for all and its status in India.
- To understand the national policies, programs and acts with respect to the disabled children.
- To realize the various issues and concerns related with creation of an inclusive culture in schools.
- To develop capacity of student- teachers for creating an inclusive School
- To appreciate various inclusive practices to promote Inclusion in the classroom

Course Outcomes:

- Realize the importance of inclusive education, programs and role of various agencies towards inclusion.
- Understand inclusive instructional strategies and train the students to cope in an Inclusive setup.
- Grasp the meaning, specific characteristics and modalities of identification of some types of exceptionaland disabled learners.
- Differentiate various types of Inclusion and explain various constrains in setting Inclusive Schools.

Unit-I: Inclusive Education

- Forms of Inclusion and Exclusion in Indian education (Marginalized sections of Society:On account ofGender, Caste, Socio-Economic status and language, Disability).
- Meaning of inclusive education, historical, development, Philosophical and social basis ofInclusiveEducation.
- Benefits of Inclusive Education to children without special needs.
- Addressing Inequality and Diversity in the India classroom: Pedagogical andcurriculum concerns

Unit –II Children with Special Needs

- Historical and contemporary perspectives to disability and inclusion
- Range of learning problems across various disabilities
- Types of Disabilities: Characteristics and Identification of the educational needs of thesespecial focus groups
- Assessment of learning problems in children with various disabilities.

- Assistive devices, equipment's and technologies for different disabilities.
- Adaptation and accommodation according to various disabilities
- Educational provision in laws on disability, policies and international instruments likeUNCRPD

Unit-III School's Preparedness for Inclusion

- School organization and management: Ideology, infrastructures
- Reproducing gender in school for achieving gender equality: Curriculum inputs,Textbooks, Student –teacher interactions
- Provision of assistive devices, equipment's and technological support to cater to differentdisabilities
- Support services available in the school to facilitate inclusion: Role and functions of thefollowing personnel:
- Special Education Teacher
- Audiologist cum Speech Therapist
- Physiotherapist
- Occupational Therapist, Counsellor

Unit-IV Inclusive Practices in the Classroom

- Making Learning more meaningful- Responding to special needs by developing strategies fordifferentiating content,curricular adaptations, lesion planning and TLM.
- Pedagogical strategies to respond to individual needs of students: Cooperative Learning strategies in the classroom, Peer tutoring, Social Learning, Buddy system, reflective teaching, Multisensoryteaching
- Provisions pertaining to appearing in examination for facilitating differently abled students(As available in CBSE and ICSE)
- CCE and its implications to facilitate inclusion

Practical Assignments/Field Engagement (Any one)- (Records to be maintained)

- The students shall undertake field work to in understanding how structuresin school createbarriers for inclusionary practices
- The student-teachers shall explore spaces for inclusion in schools
- Dialogue and discussions on creation of an inclusive teaching learning environment with different stakeholderssuch as: Administrative functionaries, teachers, parents, community

Suggested Readings:

- Baquer, A. & Sharma, A. (1997). Disability: Challenges Vs. responses, Can Pub.
- Bartlett, L. D., Weisentein, G.R. (2003) Successful inclusion for educational leaders, PrenticeHall, New Jersey.

- Bhargava, M. (1994), Introduction to exceptional Children, Sterling Publishers.
- Blackurst & Berdine (1981), Introduction to Special Education
- Chaote Joyce, S. (1991). Successful mainstreaming, Allyn & Bacon
- Daniels, Harry (1999). Inclusive Education, London: Kogan.
- Dash, M. Education of Exceptional Children. New Delhi: Atlantic Publisher and Distributors.
- Deiner, P. L. (2000). Resource for Teaching children with diverse abilities, Harcourt Brace &Company, Florida
- Dessent, T. (1987). Making ordinary school special. Jessica Kingsley Pub.
- Gargiulo, R. M. (1997). Special education in contemporary society: an introduction toexceptionality,Wadsworth, Belmont
- Gartner, A. & Lipsky, D. D. (1997) Inclusion and school reform transferring America'sclassrooms, P. H. BrookesPub. Baltimore.
- Gathoo, V. (2004). Curriculum strategies and adaptations for children with hearingimpairment (RCI),Kanishka Pub. New Delhi
- Giuliani, G. A. & Pierangelo, R. (2007) Understanding, developing and writing JEPsCorwinpress, sage Pub
- Hallahan & Kauffman (1978), Exceptional Children: Introduction to special Education PrenticeHall
- Hegarthy, S. & Alur, M. (2002) Education of children with special needs: From segregation toinclusion, Corwin press,sage Pub
- Joyce S. Choate (1997). Successful inclusive teaching, Allyn & Ba
- Karant, P. & Rozario, J. ((2003). Learning Disabilities in India. Sage Pub.
- Karten, T. J. (2007) More inclusion strategies that work. Corwin press, sage Pub
- M. C. Gore (2004). Successful Inclusion strategies for secondary and middle schoolteachers,Crowin Press, Sage Pub.
- Madan Mohan Jha (2002). School without walls: inclusive education for all, HeinemannEdu. Oxford
- Mangal, S.K., Education of Exceptional Children, PHI, New Delhi
- Mathew, S. (2004) Education of children with hearing impairment. RCI, KanishkaPub.New Delhi
- National Policy on Education (1986, 1992), MHRD, GOI, Delhi

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1		-	-		-	-	1	-	-
CO2		1							-
CO3								1	
CO4	-			1		-	-	-	

SEMESTER

IV

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Course Title: Reflection on School Experience **Credits:2**

Course Code: BED230 **MM:100**

Reflection has many facets. For example, reflecting on work enhances its meaning. Reflecting on experiences encourages insight and complex learning. We foster our own growth when we control our learning, so some reflection is best done alone. Reflection is also enhanced, however, when we ponder our learning with others.

Reflection involves linking a current experience to previous learning (a process called *scaffolding*). Reflection also involves drawing forth cognitive and emotional information from several sources: visual,auditory, kinesthetic, and tactile. To reflect, we must act upon and process the information, synthesizingand evaluating the data. In the end, reflecting also means applying what we've learned to contexts beyondthe original situations in which we learned something.

Valuing Reflection

The art of teaching is the art of assisting discovery.

—*Mark Van Doren*

Teachers who promote reflective classrooms ensure that students are fully engaged in the process of making meaning of their experiences. They organize Teaching-Learning so that students are the producers, not just the consumers, of knowledge. These teachers approach their role as that of "facilitator of meaning making by inculcating the habit of reflection in Students.

In the role of facilitator, the teacher acts as an intermediary between the learner and learning, guiding each student to approach the learning activity in a strategic way. The teacher helps each student monitor his/herown individual progress, construct meaning from the content learned *and* from the process of learning it, and apply the learning to other contexts and settings. Learning becomes a continual process of *engaging* the mind that *transforms* the individual into a self-actualized human being.

Unfortunately, educators don't often ask students to reflect on their learning. Thus, when students *are* askedto reflect on an assignment, they are caught in a dilemma: "What am I supposed to do? How do I 'reflect'?I've already completed this assignment! Why do I haveto think about it anymore?"

In response to our questions, students who are inexperienced with reflection offer simple answers such as "This was an easy assignment!" or "I really enjoyed doing this assignment." If we want students to get in the habit of reflecting deeply on their work—and if we want them to

use Habits of Mind such as applying past knowledge to new situations, thinking about thinking (meta-cognition), and remaining open to continuous learning—we must teach them strategies to derive rich meaning from their experiences.

Setting the Tone for Reflection

Most classrooms can be categorized in one of two ways: active and a bit noisy, with students engaged in hands-on work; or teacher oriented, with students paying attention to a presentation or quietly working onindividual tasks. Each of these teaching environments sets a tone and an expectation. For example, whenstudents work actively in groups, we ask them to use their "six-inch" voices. When we ask them to attendto the teacher, we also request that they turn their "eyes front." When they work individually at their desks,we ask them not to bother other learners.

Teachers must signal a shift in tone when they ask students to reflect on their learning. Reflective teachershelp students understand that the students will now look back rather than move forward. They will take abreak from what they have been doing, step away from their work, and ask themselves, "What have I (orwe) learned from doing this activity?" Some teachers use music to signal the change in thinking. Others ask for silent thinking before students write about a lesson, an assignment, or other classroom task.

In the reflective classroom, teachers invite students to make meaning from their experiences overtly in written and oral form. They take the time to invite students to reflect on their learning, to compare intendedwith actual outcomes, to evaluate their metacognitive strategies, to analyze and draw causal relationships, and to synthesize meanings and apply their learning tone and novel situations. Students know they will not "fail" or make a "mistake," as those terms are generally defined. Instead, reflective students know they can produce personal insight and learn from *all* their experiences.

The following Strategies would guide student - teachers along with their faculty mentors in engaging in reflection on their School Experience during all the three previous semesters too. (Records of the engagements in activities to be recorded in a Reflective Journal)

Guiding Student Reflection

To be reflective means to mentally wander through where we have been and to try to make some sense out of it. Most classrooms are oriented more to the present and the future than to the past. Such an orientation means that students (and teachers) find it easier to discard what has happened and to move onwithout taking stock of the seemingly isolated experiences of the past.

Course Content:

Teachers use many strategies to guide students through a period of reflection. We offer several here: discussions, interviews, questioning, and logs and journals.

- **Discussions**

Sometimes, encouraging reflection is as simple as inviting students to think about their thinking. Studentsrealize meaning making is an important goal when reflection becomes the topic of discussion. For example, conduct discussions about students' problem- solving processes. Invite students to share their meta-cognition, reveal their intentions, detail their strategies for solving a problem, describe their mental maps for monitoring their problem- solving process, and reflect on the strategy to determine its adequacy. During these kinds of rich discussions, students learn how to listen to and explore the implications of each other's metacognitive strategies. The kind of listening required during such discussions also builds the Habits of Mind related to empathy, flexibility, and persistence.

- **Interviews**

Interviews are another way to lead students to share reflections about their learning and their growth in the Habits of Mind. A teacher can interview a student, or students can interview classmates. Set aside time at the end of a learning sequence—a lesson, a unit, a school day, or a school year—to question each otherabout what has been learned. Guide students to look for ways they can apply their learning to future settings. Interviews also provide teachers and students with opportunities to model and practice a variety of habits: listening with understanding and empathy, thinking and communicating with clarity and precision, and questioning and posing problems.

- **Questioning**

Well-designed questions—supported by a classroom atmosphere grounded in trust—will invite students to reveal their insights, understandings, and applications of their learning and the Habits of Mind. Here are possible questions to pose with each student:

As you reflect on this semester's work, which of the Habits of Mind were you most aware of in your ownlearning?

What meta-cognitive strategies did you use to monitor your performance of the Habits of Mind?Which Habit of Mind willyou focus on as you begin our next project?

What insights have you gained as a result of employing these Habits of Mind?

As you think about your future, how might these Habits of Mind be used as a guide in your life?

- **Logs and Journals**

Logs and journals are another tool for student reflection. Periodically ask students to reread their journals,comparing what they knewat the beginning of a learning sequence with what they know now. Ask them to select significant learning, envision how they could apply these

learning to future situations, and commit to an action plan to consciously modify their behaviors.

- **Modelling Reflection**

Students need to encounter reflective role models. Many teachers find such models in novels in which thecharacters take a reflective stance as they consider their actions. A variety of novels and films may be used to the design the element of reflection as the way to tell a story. Teacher Educators while engagingthe learners in reflection exercises should make sure that the following three traits are inculcated while the student-teachers are involved in Reflecting on their school experience:

- *Thinking flexibly*.
- *Managing impulsivity*.
- *Remaining open to continuous learning*.

OPTIONAL COURSES (Semester-IV)

SEMESTER IV

Course Title: Value Education **Credits 4**

Course Code: BED217 **MM:100**

Objectives of the Course:

- To enable student teachers to understand the need and importance of value-education andcomprehensive role ofeducation.
- To enable the student teachers to realize the significance of peace and values in Self-development.
- To enable them to understand the process of moral personality development vis-à-vis as a means oftheir cognitive and socialdevelopment
- To orient the student teachers to draw lessons from principles of life and converting them into morallearning towards moraleducation.
- To orient the student teachers with the knowledge, attitudes and skills needed to achieve and sustain aglobal culture andnature of values

Course outcomes:

At the end of the course, students are expected to:

- Understand the need and importance of value-education as a means of helping oneself and in turn othersin society.
- Understand the nature of values, moral values, moral education and to differentiate such form religiouseducation, moral trainingor moral indoctrination as a means to identify principles of life. •
- Appreciate the importance of Value Education in personality development by applying these principlesin daily living.
- Realize the importance of self-transformation for social well-being**.**

Unit-I: Value Education in a Pluralistic World (Multi-Cultural, Multi-Religious and Multi-Ethnic)

- Value Education Concept, Nature, Source & Perspectives (Rational, them into-Cultural, Religious andPsychological).
- Fundamental Human Values-Truth, Peace, Non-violence, Righteous Conduct.
- Connected Terminology: Realism, Accountability, Duty, Virtue, Dharma, Ethics, Religion,Morality, Values,
- Typologies: Intrinsic and Extrinsic Values.

- Duty Approach to Ethics: Deontology, Justice as a Duty
- Learning through Examples:
- Indian Pluralism: Mutual Respect, Tolerance and Dialogue in Islam, Buddhism, Christianity,Jainism, Sikhism and Hinduism.
- Greco-Roman and Chinese Cultural values: Open-Mindedness, Free thinking, Co-operation,etc.
- Secular Values: Facing Challenges Positively through examples of Super-Achievers (life historyand quotes)

- Commonalities of all religious at Philosophical levels.
- Diversities of religion at politics of religion.

Unit-II: Development of the Individual

- Personality Development and Character-building education: through unilateral ethics Development of right attitude, aptitudes and interest: through higher thinking,contemplation and patience
- Yoga, meditation and self-control; introspection on one's strengths and weakness, wrong speech, habits and actions.
- Positive approach to life – in words and deeds: through positive thinking and positive living
- Self-discipline Leading to Duty-Consciousness: Politeness, Punctuality & Righteous Conduct
- The importance of Affective domain in Education in Compassion, Love and Kindness

Unit-III: Response to Value Crisis and Impact of Modern Education & Media on Values

- Value Crisis: Values Crisis Concept, Conflicts as Challenge Vs. Hindrance
- Strategies of Response: Lawrence Kohlberg and Carol Gilligan
- Arnold Toynbee's Challenge-Response Mechanism: Case Study of the Life of Dr. Abdul Kalam
- Gandhian Formula: "Be the Change you wish to see in the world"
- Positive Response: "Seek to Change Yourself; Do Not Complain about Others"

Impact of Modern Education and Media on Values:

- Role of a teacher in the preservation of tradition and culture
- Role of family, tradition & community in value development
- Build on the positive impact and navigate the negative impact of value crisis due to impactof modern life:
- Impact of Science and Technology: Build on the Positive—reasoned thinking, knowledgeexplosion, technology, universalization of learning, modern education, etc.; Navigate the Negative—modern culture should not be randomly followed
- Effects of Printed Media and Television on Values: Build on the Positive—instant news, information andentertainment; Navigate the Negative—think and avoid negative influencethrough reasoned thinking
- Effects of computer aided media on Values (Internet, e-mail, Chat etc.): Build on the Positive—knowledge explosion, information at the click of the button, interaction at our finger- tips, etc.; Navigate the Negative—avoid exposure to negative media, share personal informationwith care, accept friends' requests after due deliberation, etc

Unit- IV: Values: The ideal of Human Unity and Peace

- Human Rights, Rationale and Evolution, UDHR and its Articles (particularly 1, 3, 7, 10,18, 19)
- UDHR and Duties: Article 26, Receiving Rights subject to performing duties
- Human Rights Education: Meaning, Objectives, Strategies and Role of Education towards duty-consciousness
- National Human Rights Commission and its role
- Role of the Indian Constitution: The Right of Children to Free and Compulsory Education Act,2009 in context ofhuman Rights and Human Duties Article 51A
- Peace Education: Meaning, objectives, Role of Education in promoting Peace based onunilateral ethics of 'ingiving we receive'

- Education, Strategies for imparting Peace Education through imparting of duty-consciousness

Practical Assignments/Field Engagement (Any one):

- Application of one strategy of value inculcation among school children and its report
- Study of Golden Rule of Ethics in various religions
- Write your understanding of Arnold Toynbee's Challenge-Response Mechanism
- Study of UDHR: Human Rights through Performing Duties

Suggested Readings:

- Bhatt, S.R(1986). Knowledge, Value and Education: An Axiomatic Analysis, Delhi: Gian Pub.,
- Kar, N.N. (1996). Value Education: A Philosophical Study. Ambala: Associated Pub. .
- Khan, Wahiduddin. (2010) Family Life, Goodword Books, New Delhi,
- Kulshrestha, S.P. (1979), Emerging Value Pattern of Teachers & Value Pattern ofTeachers &New Trends, Educationin India, New Delhi: Light & Life Pub.,
- Mascarenhas, M. & Justa, H.R., (1989)., Value Education in Schools and Other Essays, DelhiKonark,
- R., King, (1969) Values & Involvement in Grammar School, London: Routledge,
- S. Abid Hussain; The Indian Culture
- Sharma, S. R, (1999)., Ed., Teaching of Moral Education, N. Delhi: Cosmos, Pub.,
- Singh, Samporn (1979) Human Values, Jodhpur: Faith Pub.,
- Source book of Human Rights - NCERT

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	2	-	-		-	-		-	-
CO2			2					2	-
CO3					2				1
CO4	-					-	-	-	

SEMESTER IV

Course Title: Health and Physical Education **Credits – 4**

Course Code: BED232 **MM: 100**

Objectives of the Course:

- To acquaint pupil teachers with the concept of holistic health in terms of various dimensions &determinants of health.
- To acquaint them to school health program and its importance.
- To enable them to understand the need & importance of Physical Education.
- To develop organization skills in organizing inter house tournaments and sports meet.
- To understand the need and relevance of Yoga and develop the skills in yogic practices.

Course outcomes:

At the end of the course, students are expected to:

- Maintain and promote good and healthy environment.
- Develop the understanding of physical education and its related fields.
- Bring the overall awareness of sports values and to inculcate among students the desired habits andattitude towards physicaleducation.

Course Content:

Unit-I: Health, Hygiene and Wellness

- Concept of Mind and Healthy Mind, Relation of Healthy Mind and Healthy Body.
- Health: Concept, definition, dimensions and determinants.
- Health Education: Definition, aims and objectives.
- School Health Program: Health Services, Health Supervision and Health Instruction.
- Hygiene Education: Definition, aims and objectives.
- Role of teacher in development of health and good hygienic habits.
- Health and Wellness.

Unit-II: Areas of Concern for Health, Hygiene and Wellness

- Communicable Diseases: Mode of Transmission, Methods of Prevention and Control.
- Nutrition: Elements of Balanced Diet, Food habits, Functions of Food and Malnutrition.
- Postures: Importance of Good Posture, Common Postural Defects and Remedial Exercises.
- Recreation: Meaning, Significance and Recreational Programs in Schools.
- Wellness common Health Problems and Preventions: Accidents, Environmental Pollution,Overpopulation, Alcoholism, Smoking, Drug Abuse.
- Sex Education and concerns for HIV/AIDS.

Unit-III: Physical Education and Integrated Personality

- Physical Education: Concept, definition, aims and objectives
- Need, scope and Importance of Physical Education Programs at different school levels
- Organization and administration: planning, budgeting, fixture (Knock out and league)
- Athletic meet – Meaning, need and importance. Process to organize athletic meet at schoollevel
- Concept of integrated personality and its realization through physical education program.
- Tournaments -Types, inter-house competitions, drawing of fixture and sports meet.
- Rules and Regulations and skills of any one of the Games/events: Hockey, Badminton, Volleyball,Basketball, Football, Tennis, Table Tennis, Kho-Kho, Track and Field Events.

Unit-IV: Yoga and Physical Fitness

- Introduction, Meaning and mis-concepts about Yoga
- Types of Yoga, Ashtang Yoga of Patanjali (Eight stages of Yoga)
- Effects of asana on our body and relation of Psychology with Yoga
- Importance's of Yogasanas, Pranayama and Shudhikriya
- Importance of Meditation in school
- Physical fitness: Meaning, importance. motor component of physical fitness (strength,flexibility, endurance, speed, Agility and neuro-muscular coordination).
- Training methods of physical fitness.

Practical Assignments/Field Engagement (Any one):

- Prepare a Project Report on: Three types of Sports Ground.
- Organize sports meet at school level.
- Participate in any two games and sports activities of your choice in your institution
- Perform Any three Yoga Asanas in supervision of your faculty mentor at an appropriate time ofthe day conducive forthe same.
- Prepare a plan of activities for three days out door camp.
- Prepare a league-cum-knockout fixture for teams (10-20) in number.

Suggested Readings:

- Atwal & Kansal. (2003). A Textbook of Health, Physical Education and Sports, Jalandhar, A. P. Publisher,
- Kamlesh, M.L. & Sangram, M.S. (1986). Methods in Physical Education, Ludhiana: PrakashBrothers.
- Kangane, Sopan & Sonawane, Sanjeev. (2007). Physical Education. Pune: Niralipublication.
- Kaur, Manjeet. (2003). Health and Physical Education, Ludhiana: Tendon Publications.
- Sharma, Anil P. (2011). Mind, Body and Divine Yoga. New Delhi: Personal Graphics &Advertiser Pvt. Ltd.
- Sharma, Anil P. & Pandey, Pradeep K. (2010). Psychology in Yoga. New Delhi: PersonalGraphics & AdvertiserPvt. Ltd.
- Singh, Ajmer. (2003). Essentials of Physical Education. Ludhiana: Kalyani publishers.
- Syedentop, Daryl (1994). Introduction to physical education, fitness and sports (2nd ed.). London:Mayfield publishingcompany.
- Uppal, A.K. & Gautam, G. P. (2004). Physical Education and Health. Delhi: Friendspublisher.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1			-			-		-	-
CO2		1						1	-
CO3					2				2
CO4						-	-	-	

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SEMESTER IV

Course Title: Adult and Population Education **Credits - 4**

Course Code: BED233 **MM:100**

Objectives of the Course:

- To enable the student teachers to develop an understanding of the meaning and concept of AdultEducation.
- To impart knowledge to student teachers about the problems and difficulties coming in the wayof achieving full literacyin the country.
- To acquaint the student teachers with chief characteristics of an adult learner, different methodsand evaluationtechniques of adult learning.
- To be aware of the population trends and spread of AIDS in the world.
- To understand that population becomes stable when there is little difference between birth anddeath rates.
- To develop among themselves a healthy, rational and scientific attitude towards the naturalphenomena of birthand death.

Course outcomes:

At the end of the course, students are expected to:

- Develop understanding about the concept, difficulties and challenges in the classroom implementation.
- Acquaint with the idea of behavioral problems of adult age and develop understanding to the methodsand techniques to deal with them
- Create a better understanding towards the issue and problems of AIDS
- Develop rational and scientific attitude towards population education and ready to participate in NGO

Unit - I: Adult and Continuing Education

- Meaning, Concept and Scope of Adult and Continuing Education.
- Need and Importance of Adult Education for the development of an Individual for Social Change.
- Adult Education in Independent India: Objectives Target, efforts, achievements and causes forslow progress.
- National Literacy Mission - Aims, objectives and strategies.

Unit - II: Teaching - Learning process in adults

- Andragogy- Nature and Scope. Basic difference between Pedagogy and Andragogy.
- Agencies and Organizations: Local, State and Central level, their problems.
- Adult Learner — Characteristics, problems and motivation.

- Adult teaching — Different methods, Role of Mass media.

- Evaluation Techniques for Adult Learning.
- Adult Education, lifelong learning and continuing Education
- Adult Education and Continuing education
- Lifelong learning- A component of adult education
- Lifelong learning in IT age- Exploring ICT as a Tool

Unit III: Population and AIDS Education

- Importance of Population Education – concept / meaning and objectives of population education – factors affecting population explosion – importance of Family Life Education, with reference to Effect of Population Growth on: Economic Development, Social Development, Educational Development, Environmental and Natural Resources, Health and Nutrition
- Symptoms of AIDS – causes, Prevention of AIDS – AIDS Education – meaning and objectives. Role of different agencies in promoting AIDS Awareness Education – [Local, National and International Agencies – 2 each]

Unit IV: Integrated Population Education

- Role of Government and Non-Govt. Agencies concerning Population Education.
- Integration of Population Concept in different School Subjects.
- Population Education through co-curricular activities.
- Role of the Teacher in Population Education Programs.

Practical Assignments/Field Engagement:

Conducting any one of the following surveys in the local area and prepare a report:

- Progress in the field of literacy
- AIDS awareness

Suggested Readings:

- Aggarwal, S. N., India's Popu1ation Problems, New Delhi, Tata McGraw Hill, Delhi, Tata, 1985.
- Ambush, N.K. (2014)., Foundations of Adult Education in adult and lifelong learning, IndianAdult Education Association, New Delhi.
- Ghosh, B.N. (1978) Population Theories and Demographic analysis, MeenakshiPrakashan, NewDelhi
- Jacobson Wellard JU, (1979) Population Education; A knowledge base, NY, Teachers CollegeColumbia University.
- Mohankumar,V.(2014), Adult and lifelong learning: Selected articles Indian Adult EducationAssociation.
- Sheshadri, C & J.L. Pandey (1991) Population Education: A national Source Book, ND, NCERT
- Shah, S.Y. (1999) Encyclopedia of Adult Education, NLM, New Delhi.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-	3	-	-
CO2		3							-
CO3				1				2	
CO4						-	-	-	2

SEMESTER-IV

Course Title: Peace Education **Credits - 4**

Course Code: BED218 **MM: 100**

Objectives of the Course:

- To understand the concept of peace and its importance in personalitydevelopment.
- To make prospective teachers aware of the scale and variety of conflicts affectingcontemporary lifeand learn to deal with them through independent ethics
- To inspire inquiry into the complex role that institutionalized education plays in the Context of differenttypes of conflicts and to learn to play the role of peace-maker inconflict situations.
- To enable students to develop personal initiative and resources for the pursuit andpromotion of peaceby inculcating change to culture of peace within themselves.
- To analyze the need for Peace Education to foster National and International
- Understanding.

Course Outcomes

At the end of the course, students are expected to:

- Appreciate the current challenges of teacher education in context with the introduction of education forpeace harmony.
- Develop skills among teacher trainees in human values, harmonious living with co-existence.
- Create awareness among student teachers for development of activities for peace and harmonyeducation. •
- Articulate and identify the activities & programs for promoting peace and harmony.

Course Content:

Unit I Peace Education: Concept and Scope

- Meaning of Peace: Umbrella term of all positive values to build a positivepersonality
- Meaning, Nature and Concepts of Peace Education
- Aims and Objectives of Peace Education
- Status of peace education in the curriculum and its relevance in present globalscenario
- Different sources of peace: Philosophical, Religious, Social, Secular andPsychological.

- Classification of Peace: Individual and social; positive and negative peace
- Method of Peace in Mind: Learning Positive Lessons from Negative Experiences
- Peace as a concomitant result of Human values.

Unit II Integrating Peace Education in the Present Curriculum

- Integrating Peace Education in Curriculum: Subject context, subject perspectives, Teaching Methods, Co-curricular activities, Staff development, class- room management, School Management
- Practical steps to build Culture of Peace in schools: Simulations Classroom Discussions, Book Clubs, Experience-Sharing Sessions
- Developing Attitude of Culture of Peace and Peace-Making: Mutual Respect, Tolerance, Patience, Seeking Spirit and Realistic, Objective Thinking through Accountability
- Educating for a Culture of Peace: Learning mutual respect, duty- consciousness, leadership skills through unilateral ethics, introspection and mutual learning through duty-consciousness.

Unit III Violence for Peace and conflict Resolution

- Peace, Violence and conflict: conflict and violence—in life, media—a normal part of life; importance of not considering it a crisis but managing them to maintain peace
- Conflict Management: Maintaining Normalcy in Conflict; Managing Conflicts through dialogue and discussion, cooperation; peace education in managing conflicts in family and student life
- Non-Violent Activism: Speech, Behavior and Action with others based on non-violence takes the justification of acting violently away from others; role of peace education in learning nonviolence
- Peace Education: Agencies Role of community, school and family in the development of values for Peaceful Co-existence

Unit IV Global Issues and Peace Movements

- Human Rights as a Duty: Learning to give human rights to others.
- Preservation of Ecology, population control, Economic Exploration: Limited Use as Duty-Conscious citizen; not indiscriminate use as rights-conscious citizens.
- Challenge Not Deprivation: Problems of life are challenging not situations of deprivation
- Role of World Organizations in Promoting Peace Education: Case Study of UNESCO's Culture of Peace Program in global scenarios and suggestions

Practical Assignments/Field Engagement (Any one):

- Hold a Peacemaking Workshop in the School to understand the use of Conflict Management techniques
- Make a Report on how problems can be taken as challenges, not deprivation. What is its importance in personality and social development?

- Develop a Personality Development Program that incorporates the Culture of Peaceand Peacemakingtechniques

Suggested Readings:

- Adans, D. (Ed). (1997). Unesco and a Culture of peace, promoting a globalmovement.
- Aggarwal, J.C. (2005) Education for values, environment and human rights. NewDelhi: Shipra Publication.
- Chadha, S.C. (2008) Education value & value education. Meerut: R. LallBooksDepot.
- Chand, J. (2007). Value education. Delhi: Anshah Publishing House.
- Civilization. London: SAGE Publications, 1996.
- Diwaar, R.R., & Agarwal, M. (Ed). (1984). Peace education. New Delhi: Gandhi peacefoundation.
- E000000000000ducation for Human Values (2003), Sathya say instructional center for Human Values:New Delhi.
- Jagannath, M. (2005). Teaching of moral values development. New Delhi: Deepand Deep Publication.
- Johan, G. (1996). Peace by peaceful means. New Delhi: Sage Publication.
- Khan, Wahiduddin (2003). Ideology of Peace, Goodword, New Delhi.
- Kumar, M. (Ed). (1994). Non-violence, Contemporary Issues and Challenges. NewDelhi: Gandhi Peace foundation.
- Morrison, M.L. (2003) Peace Education. Australia: McFarland.
- Passi, B.K., & Singh, P. (1999). Value education. Agra: Psychological Corporation.
- Ruhela, S.P. (1986). Human Values and Education. New Delhi: Sterlingpublishing.
- Salomon, G., & Nevo, B. (2002). Peace Education: The concept, principles, andpractices around theworld. London: Lawrence Erlbaum Associates.
- Singh, Y.K. (2009) Value Education. New Delhi: APH Publishing Corporation.
- Singh, Y.K., & Natha, R. (2008) Value Education. New Delhi: A.P.H.Publishing Corporation.
- Subramanian, K. (1990). Value Education. Madurai: Ravana Publication.
- UNESCO. Learning the Way of Peace: Teacher's Guide.
- UNICEF. The State of the World's Children (reports of the last five years).
- Venkataiah, (2009). Value Education. New Delhi: APH Publishing Corporation.

Online Resources:

- Peace in Minds of Men: http://www.learndev.org/dl/WarPeaceMinds.PDF
- History of Culture of Peace: http://www3.unesco.org/iycp/kits/uk_concept.pdf
- UNESCO Culture of Peace: http://www.pathwaystopeace.org/documents/idp_es saycontest.pdf
- Conflict Management Techniques: http://www.imd.org/research/publications/upload/PFM149_LR _Kohlrieser.pd f
- Nonviolence in Education: http://portal.unesco.org/education/en/file_download.php/fa99 ea234f4accb0ad 43040e1d60809cmuller_en.pdf
- Peacemaking in Schools: http://www.learningpeace.com/pages/LSP_ PSchool.htm
- Peace Education Resource: www.cpsglobal.org.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1		1	-		-	-		-	-
CO2					2			2	-
CO3								1	
CO4	1					-	-	-	

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SEMESTER IV

Course Title: Work Education **Credits:4**

Course Code
: BED234 **M.M:100**

Objectives of the Course:

- To acquire knowledge of the various aspects of vocational education in India.
- To understand the dynamics of the development of vocational programs in Indiawith respect to thosewhich play a significant role in increasing productivity.
- To develop healthy attitude towards vocational education.
- To appreciate the significant changes in the field of vocational education in India.

Course outcomes

At the end of the course, students are expected to:

- Understand the concept of vocational and work education.
- Acquire the knowledge of nature, aims and objectives of vocational and workeducation.
- Understand the historical, philosophical and sociological basis of work andvocationaleducation.
- Acquaint the students regarding SUPW.

Unit–1: Concept and Historical Perspectives:

- Meaning and Concept of Nai 0Talim/Basic Education and debates around it.
- Historical perspectives: Macaulay's Education Policy. Gandhi's philosophy of Work Education, Wardha Commission report 1938, its recommendations. Nai Talim/Basic Education and National Movement built around it. Developments related to Work Education: pre- and post-independence.
- Institutions of Teacher Training: Pre- and Post-independence based on Gandhian Philosophy, their objectives and curriculum and current status
- Commissions and Education Policies and their recommendations on Work experience/ Work Education, post- independence: Education Commission 1964, Secondary Education Commission 1958, Ishwar bhai Patel Committee report (1977), NPE 1986, POA 1990, NCF 2005 and current status.
- Concepts – Education and technical education – Need and importance. Human resources development –skilled manpower – productivity – Vocational Education –Meaning and Definition
- Work experience-concept – distinction between work experience and

vocational education.

- Basic education – concept – merits – Criticism, need and importance, scheme ofmultipurposeschools.
- S.U.P.W.: Concept and Objectives

Unit – II Psychological basis of Integrating Work in Education:

- Concept of work and Hands on activities.
- Concept of work and rationale for integration of work in Education
- Psychological basis for work in education: Dewey, Piaget, Vygotsky
- Constructivism and Work Education

Unit 3: Objectives, Methods and Evaluation for Work Education

- Essential and Elective Work Education
- Techniques/ methods of Teaching work education.
- Objectives, Need and Significance and objectives of Work Education
- Concept of reduce, recycle and reuse and its significance
- Evaluating students work (Preparing Rating scales, check list, Anecdotal records)
- ITI and polytechnic–need and importance-classification, admission process – course of study – organization and administration at state level
- ITI, Polytechnics and para professional courses – salient features co–operation withindustries and otherorganization – Apprenticeship Act 1961.

.

Unit 4: Integrating Work Education with Curricular Subjects

- Theories of integrated education and its educational implications
- Pedagogy of teaching learning of work education
- Planning lessons integrating work in education
- Significance of integrating work in Education
- Linkages of community and school

Practical Assignments/Field Engagement (Any one):

- Integrating ICT: Preparing Posters, newsletter, invitation cards, calendars, visiting cardsusing, MS publisher. Searching visuals through internet search **for** using them as learning aids.
- Preparing visual aids and Bulletin Boards related to curricular subject
- Preparing creative work for cultural activities in school.
- Visits to places of any one of the, NGOs working in the field of Education , Small scale industries / polytechnics /employment exchanges etc

Suggested Readings:

- Banerjee N P (1995) *Work Experience in General Education*, Ambala,AssociatedPublishers

- Education commission (1964-66), Report of Government of India
- Kaul ML (1983) *Gandhian Thoughts of Basic Education; Relevance andDevelopment* Journal of Indian Education 8(5) p 11-16
- Mahmood S (1996**)** *Work Experience, Its Role in Educational Process in* Co-CurricularActivities edited byFarooqui SK and Ahmad I, New Delhi Jamia Millia Islamia, ND
- Position Paper National Focus Group on Work and Education, NCF 2005, NCERT
- Report National Policy on Education 1986, Govt of India Government of India,
- M.K. Gandhi (1927) *The story of my experiments with truth*, Navjivan Trust
- Tarun Rashtriya, *Vocational Education (*2005), APH Publishing

Corporation, NewDelhi, Online Resources:

- http://www.kkhsou.in/main/education/wardha.html
- Concept Of Teacher Education, http://www.mu.ac.in/myweb_test/ma%20edu/Teacher%20 Education%20- %20IV.pdf
- NCF 2005 (focus group paper on work education) NCERT publications
- http://cp.c-ij.com/en/contents/3158/disguise-mouse001f02/index.html
- http://notesfromtheblacklagoon.files.wordpress.com/2008/03/dsc00095.jpg
- http://www.ncert.nic.in/html/pdf/schoolcurriculum/position_papers/work&edu cation.pdf

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-		-	-
CO2		2							-
CO3								1	
CO4			2			-	-	-	1

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SEMESTER-IV

Course Title: Education of the Marginalized Groups **Credits:4**

Course Code: BED235 **M.M:100**

Objectives of the Course:

- To acquaint the student-teachers of their constitutional rights and duties.
- To sensitize students towards the paradigm shift from welfare approach todevelopmentrights-based approach.
- To understand the relevance of Right to Education as a tool for socialempowerment ofthe marginalized sections of India.

Course Outcomes:

At the end of the course, students are expected to:

- Aware about the use of their rights and duties as a responsible citizen of theircountry
- Sensitize about the multi diversities exist in in Indian society.
- Develop scientific attitude towards social inclusion, marginalized group and useeducation as tool forthe creating social security, equity, equality and just society.

Unit I-Marginalization in Indian Context

- Marginalization- Concept, Definitions and Implications for education
- Types of marginalization- Social, Political, Economic, Educational,Psychological
- Marginalization vs. Social Exclusion
- Marginalization, Discrimination and Disadvantage
- Individual Exclusion vs. Community/Group Exclusion
- Reasons of Marginalization- Disadvantage, Deprivation, Economic, Political

Unit II- Educational Status of Marginalized Groups in India

- Foundation of composition of Indian Society and its multicultural multilingual nature
- Identification of Marginalized Groups- Scheduled Castes, Scheduled Tribes, OBCs, Primitive Groups,Religious and Linguistic Minorities, Women and Children, Economically Weaker Sections.
- Constitutional provisions against any kind of Discrimination, Government

Programmes, Schemes and Voluntary efforts to curb Discrimination.

- Five-year Plans and progress made towards education of marginalized groups in India- Inclusive growth and Development of all, Empowerment of marginalized communities in India.
- RTE Act 2009, RMSA and RUSA and Provisions of the 12th Five Year Plan for education of the marginalized groups.

Unit III Important International Treatise and International Laws for Protection of Human Rights

- Human rights in India, role of organizations working for it
- India's commitment at international level for protection of human rights
- India's Constitutional and legal framework for protection of fundamental rights and human rights
- Constitutional rights of women, minorities and those on Schedules (SC, ST)
- SCP and TSP plans and their achievements
- States obligations for development of women, minorities, SCs, STs others-Plans and programmes

Unit IV Issues, Concerns and Future Perspectives

- Issues- Social security, educational development, vocational courses and avenues, contextualization of education, partnership in governance and decision-making process
- Educational problems of marginalized groups- Enrolment, drop out, low achievement, assimilation, equal rights to work
- Human rights issues related with equity and equality
- Repercussions and Consequences- Health related problems, rise in crime and violence, disharmony, rise in terrorism, social conflicts.
- Coping strategies and interventions required for resolution of the consequences of Marginalization.
- Future Perspectives and Policy directives in India

Practical Assignments/Field Engagement (Any one):

- The students shall be engaged with the community through projects wherein they would look at the implementation of different aspects of RTE especially the clause on EWS.
- The students would also be engaged in conducting a bridge course for students lagging behind in academics due to any reasons.

Suggested Readings:

- Ahuja, Ram Rights of Women (1992), A Feminist Perspective, New Delhi: Rawat Publications.
- Basu, D.D. (2003) Shorter Constitution, Prentice Hall, New Delhi.
- Centre for Development and Human Rights (2004), The Right to Development –A Primer, New Delhi: Sage Publications.
- Naila Kabeer (ed), Geetha B. Nambissan, Ramya Subramanian (2003) Child-Labour and the Right to Education in South Asia, New Delhi: Sage Publications.
- UNDP Bank, Human Development Report, New Delhi, 2003.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1			-			-	1	-	-
CO2				1				1	-
CO3					2				1
CO4						-	-	-	

SEMESTER-IV

Course Title: Life Skills Education **Credits:4**

Course Code: BED236 **MM:100**

Objectives of the Course:

- To familiarize student-teachers in the theoretical foundations of Life SkillsEducation
- To prepare student-teachers in training methodologies and enable students to applyLife Skills in variousspheres
- To develop professionals in Life Skills Education and enhance the ability tocontribute as youthworkers specialized in the area of Life Skills Education.
- To foster the spirit of social responsibility in students and enhance social andemotional wellbeing

Course outcomes:

At the end of the course, students are expected to:

Develop understanding about the meaning, concept, and theoretical background of life skillseducation.

- Aware about the pedagogical analysis, teaching methodologies and innovativetechniques apply inteaching various layers of life.
- Acquaint with the professionalism and enhance the ability to work as a social workerand community leader.
- Make responsible citizen with well emotional and social stability.

Unit - I: Introduction

- Life Skills: Concept, need and importance of Life Skills for human beings.
- Life Skills Education: Concept, need and importance of Life Skills Education forteachers.
- Difference between Livelihood Skills and Life Skills.

- Core Life Skills prescribed by World Health Organization.
- Key Issues and Concerns of Adolescent students in emerging Indian context.

Unit - II: Process and Methods Enhancing the Life Skills

- Classroom Discussions
- Brainstorming and Role plays
- Demonstration and Guided Practice
- Audio and Visual activities, e.g., Arts, Music, Theatre, Dance
- Small Groups discussions followed by a presentation of group reports.
- Educational Games and Simulation
- Case Studies, Storytelling, Debates
- Decision making and mapping of using problem trees.

Unit - III: Core Life Skills (I)

- Skills of Self-awareness and Empathy: Concept, Importance for Teachers in particular, Integration with the teaching learning process, learning to live together with other living beings. acceptance of diversity in perspectives of different societies and cultures. Acceptance and importance of all living being as along ecological and psychological social structures.
- Skills of Coping with Stress and Emotion: Concept, importance for Teachers inparticular andIntegration with the teaching learning process.
- Skills of Building Interpersonal relationships: Concept, Importance for Teachers inparticular andIntegration with the teaching- learning process.

Unit - IV: Core Life Skills (II)

- Skills of Critical thinking and Creative thinking: Concept, importance forEducationists,Integration with the teaching learning process.
- Skills of Problem Solving and Decision making: Concept, importance forEducationists, Integrationwithin the teaching -learning process.
- Skill of Effective Communication: Concept, importance for Human beings andEducationists,Integration within the teaching learning process.

Practical Assignments/Field Engagement (Any one):

- The activities listed in Unit II with respect to the process and methods of Life Skills will be taken up inworkshops to initiate the student-teachers with respect to the dynamics ofthe same.
- The Core Life Skills will also be demonstrated through role plays on diverse issues in the form of workshops.
- The student-teachers shall also engage in reflection on different core Life Skills being displayed by children inschools during their field engagement.
- Human animal interface: Case of study of a domestic/institutional animal/with human being.

Suggested Readings:

- A Life Skills Program for Learners in Senior Phase. (2002). University of Pretoria.Chapter in Thesis.Retrieved from: http://www2.ed.gov/offices/OVAE/AdultEd/OCE/SuccessStories/success.pdf
- Life Skills Based Education. (2011). Wikipedia. Retrieved from:http://en.wikipedia.org/wiki/Life_skills-based_educaion
- Life Skills Based Education CCE. (2009). CBSE. Retrieved from:http://www.cbse.nic.in/cce/life_skills_cce.pdf
- Ministry of Education. (2006). Senior Secondary Phase. Republic of Namibia.Retrieved from:http://www.nied.edu.na/publications

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-			-
CO2		3						2	-
CO3				2					1
CO4					2	-	-	-	

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SEMESTER IV

Course Title: School Leadership **Credits:4Course**

Code: BED237 **MM:100**

Objectives of the Course:

- To develop a critical understanding of the notion of school organization and
- To develop a comprehensive understanding of context-specific notions of schooleffectiveness.
- To develop an understanding of school leadership and challenges to management.
- To help in making overt connections between field-based project work, educational leadership and change facilitation.
- To develop an understanding of the system of education, its relationship with school curriculum management in the context of the structures and processes of the education system and its impact on pedagogic processes inthe classroom.

Course outcomes

At the end of the course, students are expected to:

- Understand the importance of classroom organization and develop a comprehensive approach to thenotion of effectiveness ofleadership in the classroom.
- Understand the importance of classroom management and develop ability to face the problems inmanaging the classroom.
- Understand the role of leadership of a teacher undertake different action research projects to improveprofessional practices
- Demonstrate leadership skill and be able to comfortable to work in work to get better results.

Unit I: Structures and Processes of the Indian Education System

- Types of schools within different administration bodies
- Roles and responsibilities of education functionaries
- Governance rules and financial management of different types of school.
- Relationships between support organizations (Affiliating, Regulating and Financingbodies) and theschool.
- Understanding and interpreting educational policies that impact schools
- Concepts of school culture, organization, leadership and management.
- Role of school activities such as assemblies, annual days etc., in the creation ofschool culture.

Unit II: School Effectiveness and School Standards

- School effectiveness -meaning and its assessment.
- Understanding and developing standards in education

- Classroom management effective communication and motivational skills.
- Learner- centered educational and inclusive Education.

Unit III: School Leadership and Management

- Administrative and academic leadership
- Styles of leadership
- Team leadership
- Pedagogical leadership
- Leadership for motivation and change
- Desirable Change in management
- Conflict Management

Unit IChange Facilitation in Education

- Sarva Shiksha Abhiyan (SSA) experiences and RMSA
- Equity in Education · Incentives and schemes for girl child
- Issues in educational and school reform
- Preparing for and facilitating change in education through Teacher Education systemas prime mover.
- Role and functions of IASEs, DIETs, CTE · Role, functions and networking ofinstitutions likeUGC, NCERT, NCTE, NUEPA, SCERT etc.
- Accountability and Continuous Professional Development

Practical Assignments/Field Engagement (Any one):

- The students shall be required to study the role of the supervisors and principals in aschool.
- The students may look at the working of a school and prepare a school improvementplan.

Suggested Readings:

- Batra, Sunil (2003). From School Inspection to School Support.
- Early, P. and D. Weindling (2004). A changing discourse: from management toleadership.
- Fullan, M. (1993) Making schools successful, synthesis of case studies of schools inAsian countries, ANTRIEP, NUEPA (2012). Why Teachers Must Become Change Agents. In Educational Leadership, 50(6)
- Govinda, R. (2001). Capacity Building for Educational Governance at LocalLevels.Paper presented at theInternational Consultation on Educational Governance at Local Levels, Held at UNESCO, Paris 27-28 February 2001.
- Madan Mohan (2002). School without Walls Heinemann: New Delhi pp 24-40; 128-1
- Senge, P. (2000). The Industrial Age System of Education. In Schools that Learn NB: London. pp 27-58.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-	1		-
CO2				2					-
CO3					2				2
CO4						-	-	-	

Course Title: Teaching of Sanskrit

Credits: 4

Course Code: BED134

M.M:100

Objectives of the course:

- To enable student-teachers to attain efficiency and effectiveness in teachingandlearning Sanskrit Language.
- To understand the role of Sanskrit in India and its place in the schoolcurriculum.
- To be committed, inspired and interested in teaching Sanskrit.
- To facilitate the effective use of learning resources.
- To develop strategies in order to meet the learning difficulties in teachingSanskrit.
- To identify and be sensitive to the proficiency, interests and needs of learners.
- To encourage continuous professional development.

Course Outcomes:

At the end of the course, students are expected to:

- Know and understand the history & importance of Sanskrit and develop awareness of objectives ofteaching Sanskrit at the Elementary and Secondary level.
- Get acquainted and frame Behavioral Objectives for teaching poetry, prose, composition and grammarin Sanskrit.
- Develop the skills of preparing and using effectively the instructional materials for the teaching ofSanskrit o get acquainted with the various devices of language learning.

Unit - I: Fundamental of Language

- Nature, Evolution and Development of Sanskrit language.
- Importance and objectives of teaching Sanskrit.
- Aims and Objectives of teaching Sanskrit as Language at the SecondaryLevel
- Interaction of Sanskrit Language with other Indian Languages and its Structural,Lexical and Semantic relationship. Place of Sanskrit in the schoolcurriculum.
- Textbook: Selection of text books, reference books .
- Critical Appraisal of a Sanskrit text book.

Unit - II: Development of Skills

- Recitation, silent Reading, Oral Expression and Special Language teachingskills.
- Audio Visual Aids: Meaning, Classification,

- Importance and uses in Teaching Sanskrit.
- Unit planning in Sanskrit language

Unit: III Learning Resources and **Professional Growth**

- Computer Assisted Language Learning (CALL), Library,

- Professional Competencies of the teacher.
- Use of Multi Media in teaching of Sanskrit
- Micro-teaching skills in teaching Sanskrit
- Lesson Planning for Prose, Poetry, Grammar, and Composition
- Different Approaches of Lesson Planning

Unit-IV: Evaluation

- Difference between Measurement, Assessment and Evaluation,
- Criterion Referenced Testing and Norm Referenced Testing
- Types of Test Items and development of Achievement test
- Significance of Comprehensive and Continuous Evaluation
- Diagnostic and Remedial Teaching
- Action research: Concept and Identification of problems faced by the teachersin theclassroom

Practical Assignment/Field engagement(Any one):

- Critical study of any one Sanskrit textbook prescribed for secondary level.
- Develop a Multi-Media lesson using appropriate ICT resources andtransacting thesame before peers insimulated teaching exercise.
- Preparation of an Achievement Test in Sanskrit.
- Develop two games for teaching any Sanskrit Topic.
- Identifying and Evaluating ICT resources suitable for teaching Sanskrit.

Suggested Readings:

- Apte, D. G. and Dongre, P. K.: Teaching of Sanskrit in Secondary School, AcharyaBook Depot, Baroda,1980.
- Bokil, V. P. and Parasnik, N. K.: A New Approach to Sanskrit, Loka SangrahaPress,Poona.
- Joyce, B. & Weil, M: Models of Teaching. Prentice Hall Inc., New Jersey,1979.
- Pal, H.R and Pal, R.: Curriculum – Yesterday, Today and Tomorrow. Kshipra, NewDelhi, 2006.
- Pal, H.R.: Methodologies of Teaching & Training in Higher Education. Delhi:Directorate of HindiImplementation, Delhi University, 2000.
- Panday, R. S.: Sanskrit Shikshan, Vinod Pustak Mandir, Agra, 2000.
- Sansanwal, D.N. & Singh, P.: Models of Teaching. Society for EducationalResearch &Development, Baroda, 1991.
- Safaya, R. N.: Sanskrit Shikshan Vidhi, Haryana Sahitya Academy, Chandigarh. Shastri andShastri: Sanskrit Shikshan, Rajasthan Prakashan, Jaipur.
- Singh, S. D. and Sharma, Shaskhikala: Sanskrit Shikshan, Radha PrakashanMandi,Agra, 1999.

Mapping of Program Outcomes with Course Outcomes:

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	2		-			-	1	-	-
CO2		2							-
CO3					2				2
CO4						-	-	-	

Course Title: Teaching of English

Course Title: Teaching of English **Credits: 4**

Course Code: BED122 **M.M:100**

Objectives of the course:

- To be familiar with the psycho-sociolinguistics aspects of language.
- To be aware of the pedagogical practices required for teaching English as second language.
- To enable the students for effective use technology and learning resources to enrich languageteaching.
- To encourage continuous professional development and an appreciation of the role of English inboth academics and life.

Course Outcomes

At the end of the course, students are expected to:

- Get acquaintance with the skills of communication for classroom teaching and developcreativity among learners
- Understand the basics of English grammar and develop the skills of presentation ofvocabulary
- Get acquaintance with different sounds in English and use correct pronunciation in theclassroom teaching.
- Understand constructivist approach to language teaching and learning and assess andevaluate the studentskills of language learning

Course Content

Unit - I: Fundamentals of Language

- Nature and Scope of Language
- Psycholinguistic and Sociolinguistic perspectives of language
- Role of Language in Life: Intellectual, Emotional, Social and Cultural Development
- Language Acquisition vs. Language Learning
- Multilingualism as resource to Second Language Teaching-Learning
- Language across Curriculum
- Principles and Maxims of Language Teaching

Unit - II: Language Development Skills and Learning Resources

- Listening: Concept, types, Significance and Activities to develop Listening and itsevaluation
- Speaking: Concept, Significance and activities to develop speaking and its evaluation

- Reading: Concept, Methods (Phonic, Whole Word), Types (Loud, Silent, Intensive, Extensive and Supplementary), Techniques to Increase Speed of Reading (Phrasing,Skimming, Scanning, Columnar Reading, Key word Reading) and its evaluation.
- Writing: Types of Composition (Guided, Free and Creative), Evaluating Compositions, Letter Writing (Formal, Informal)
- Study Skills (Note Taking and Making), Reference Skills (Dictionary,Encyclopedia, Thesaurus)
- Learning resources: Computer Assisted Language Learning (CALL), Library, Language Laboratory e-resources.

Unit - III: English Language Pedagogy

- Micro Teaching Skills
- Approaches/Methods to English Language Teaching: Direct Method, Structural Approach, Communicative Approach, Constructivist Approach
- Planning a Lesson, Instructional Objectives and Specifications for:
  Prose: Techniques (Discussion, Narration, Questioning), Methods (StoryTelling, Dramatization)
  Poetry: Methods (Recitation, Song-action), Techniques of Appreciation
  Grammar: Types (Functional, Formal), Methods (Inductive, Deductive)

Unit - IV: Professional Growth and Learner Evaluation

- Action research: Concept and Identification of problems faced by the teachers in theclassroom.
- Critical Appraisal of an English text book.
- Professional Competencies of a teacher.
- Comprehensive and Continuous Evaluation and its use in English class.
- Different Elicitation Techniques used in English; cloze, diagnostic and achievementtest.
- Remedial Teaching, Contrastive analysis; Error analysis

Practical Assignments/Field Engagement (Any one):

- Develop a Multi-Media lesson using appropriate ICT resources and transacting thesame before peers insimulated teaching exercise.
- Preparation of an Achievement Test in English.
- Organization of inter-class contests in English
- Identifying and Evaluating ICT resources suitable for teaching English.

Suggested Readings:

- Amritavatli, R, (1999): Language as a Dynamic Text: Essays on Language, Cognitionand Communication. CIEFL Akshara series. Hyderabad: Allied Publishers
- Choudhary, N.R, (2002): English Language Teaching, Himalaya Publish House,Mumbai
- Dave, Pratima S, (2002): Communicative Approach to the Teaching of English

as ASecond Language,Himalaya Publishing House, Mumbai
- Davis, Paul and Mario Rinvolucri, (1988): Dictation: New Methods, NewPossibilities.Cambridge Handbook for Language Teachers
- Grillett, M (1983): Developing Reading Comprehension, London, CUP.

- Halbe Malati, (2005): Methodology of English Teaching, Himalaya PublishingHouse,
- Parrot, M (1993), Tasks for the Classroom Teacher, London, Pergamon
- Prabhu, N.S. (1987): Second Language Pedagogy. Oxford University Press, NY.
- Sahni Geeta (2006), Suggested Methodology of Teaching English.
- Sunwani, V.K, (2005), The English Language and Indian Culture.
- Thomson & Wyatt HG (2000), Teaching of English in India, University of London.
- Valdmen., (1987) Trends in Language Teaching, New York, London McGrawHill.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1		1	-		2	-	1	-	-
CO2									-
CO3					1				
CO4		2				-	-	-	2

Course Title: Teaching of Mathematics **Credits - 4**

Course Code: BED123 **MM: 100**

Objectives of the course:

- To understand the historical developments leading to concepts in modern Mathematics.
- To understand the learning theories and their applications in Mathematics Education.
- To understand the various instructional strategies and their appropriate use in teachingMathematics at thesecondary level.
- To understand the preparation and use of diagnostics test and organize remedialteaching.
- To apply appropriate evaluation techniques in Mathematics.

Course Outcome:

After completion of course the students are expected to:

- Understand the nature aims, objective of mathematics and appreciate the contributions of famousmathematicians inmathematics.
- Understand the value of mathematics' and relationship of mathematics with other school subjects
- Acquainted with the learning theories and their applications in mathematics education.
- Improve their competencies in secondary level mathematics**.**

Unit-I: Introduction to Mathematics

- Introduction to mathematics education
- Nature of mathematics (axioms, postulates, patterns and language of Mathematics), Needand importance ofMathematics at secondary stage.
- Developing objectives of teaching mathematics in behavioral terms
- Correlation of Mathematics with other subjects.
- **Historical developments in Mathematics**

  Historical development of Notations and Number systems

  Contributions of Indian Mathematicians (Ramanujan, Aryabhata,Bhaskar Acharya, Shakuntala Devi).

  Vedic Mathematics.

Unit-II: Place of Mathematics in secondary school curriculum

- Critical evaluation of the curriculum in use in Mathematics at the secondary stage according toNCF.
- Qualities of a good Mathematics textbook and its evaluation (Content analysis).
- Professional competencies of a Mathematics teacher.

Unit-III: Instructional strategies and methods of teaching mathematics

- Inductive, deductive approach.
- Analytic and synthetic approach.
- Heuristic and project approach.
- Problem solving method.
- Constructivist approach.
- Activity method and cooperative learning.
- Organization of teaching strategies in Mathematics
- Different models of lesson planning.
- Micro Teaching, Unit Planning and Lesson planning
- Selecting appropriate instructional strategies related to various topics included insecondary classes ofthe CBSE in the following areas:

  Teaching of Arithmetic (Commercial Maths)
  Teaching of Algebra (Polynomials, algebraic identities, Linear equations, Quadraticequations) Teaching of Geometry (Lines, Angles, Congruent Triangles and Similar triangles)Teaching of Mensuration (Surface areas and volumes of solid figures) Teaching of Statistics (Measures of centraltendency - graphical representation)
- Mathematics clubs Development and use of Mathematics club in school.
- Organizing various activities - Mathematics fairs, quiz, Olympiad, talent search examination.

Unit-IV: Technology Integration and Evaluation

- **Technology Integration**: Planning with the integrating Technology for inquiry (NTeQ)model forMathematics at secondary school level.
- Diagnostics test and remedial teaching in Mathematics
- Continuous and Comprehensive evaluation
- Achievement Test. Need and importance of class tests.
- Action research: Concept and Identification of problems faced by the teachers in theclassroom

Practical Assignments/Field engagement (Any one):

- Construction and administration of achievement test in Mathematics.
- Organizing a co-curricular activity in School.
- Identifying and Evaluating ICT resources suitable for teaching Mathematics.
- Develop a Multi-Media lesson using appropriate ICT resources and transacting the samebefore peers insimulated teaching exercise.

Suggested Readings:

- Boyer, Carl B., (1969): A History of Mathematics; Wiley, New York.
- Content cum Methodology of Teaching Mathematics for B.Ed.; NCERT New Delhi.
- Davis David R., (1960); Teaching of Mathematics Addison Wesley Publications.
- Ediger Mariow (2004); Teaching Math Successfully, Discovery Publication.
- Gupta H.N. and Shankaran V (Ed.), (1984); Content cum Methodology of TeachingMathematics, NCERTNew Delhi.
- Hudgins, Bryce B. (1966); Problem Solving in the classroom, MacMillan, New York.
- James Anice (2005); Teaching of Mathematics, Neelkamal Publication.
- Johan R.E. et.al, (1961): Modern Algebra; First Course, Addison-WesleyPublishingCompany INC. USA.
- Kapur S.K. (2005); Learn and Teach Vedic Mathematics; Lotus Publication.
- Kulshreshtha, A.K. (2012) Teaching of Mathematics, R. Lal and Sons. Meerut, U.P.
- Tyagi, S.K.(2004); Teaching of Arithmetic; Commonwealth Publications.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-	1	-	-
CO2		2							-
CO3			3						
CO4				1		-	-	-	2

Course Title: Teaching of Social Science **Credits: 4**

CourseCode: BED124 **MM: 100**

Objectives of the course:

- To develop understanding about the basic differences between Social Studies and SocialSciences.
- To understand the need for teaching Social Sciences as an integrated discipline
- To develop the ability to justify the relevance of social Sciences in terms of Contemporary events.
- To gain knowledge about the different approaches associated with the discipline
- To develop certain professional skills useful for classroom teaching.
- To develop notion of Democracy, National integration etc.

Course Outcome:

After completion of the course students are expected to:

- Understand the nature concept of social sciences keeping in view the historical background of socialscience.
- Correlate Social science with other school subjects and their significance
- Differentiate social science with other school subjects and their various approaches of teaching of socialsciences
- Know utilization of different current affairs in teaching of social science

Unit - I: Learning and Teaching Social Science

- Nature and Scope of Social Science
- Difference between Social Science and Social Studies
- Aims and objectives of teaching Social Sciences
- Social Science curriculum at School level - correlation with other subjects.
- Critical appraisal of a Social Science Text book.
- Democratic values and National objectives, Citizenship.
- Importance of Democratic inclusive class room for Social Science teaching.

Unit - II: Methods and Strategies

- Approaches / Methods of Teaching Social Sciences
- Difference between Approaches, strategies and methods
- Types of Approaches and their use in lesson planning: Inductive, deductive, constructivist,multidisciplinary &integrated approach in Social Sciences.
- Transactional Strategies
- Methods – Story telling, Problem Solving, Project Method, Observational Method, Assignment Method,Discussion method.

- Grouping students for learning, Cooperative learning, Role play and simulation
- Micro Teaching, Unit Planning and Lesson Planning.
- Social Science Laboratory - organization and management
- Organization and planning of Co-curricular Activities in Social Science – Fieldtrip/Excursion /Bulletin Board in Social Science
- Dealing with controversial Issues in Social Science. Current events

Unit - III: Integration of Technology and its Applications

- Developing Concept and Generalizations
- Concept formation and classification
- Concept Mapping in Social Science
- Instructional strategies for concept learning
- Technology Integration: Planning with the integrating Technology for inquiry (NTeQ) model for Social Sciences at secondary school level, e-technologies.
- Instructional Aids: - Preparation, improvisation and effective use - Chart, Models, Scrapbooks, Media (Print Non-print and Electronic Media), Maps, Globe.
- Social Science Teacher: Teaching skills, teacher as a reflective practitioner

Unit IV: Evaluating Student learning

- Evaluation: Concept, importance and Types of Evaluation.
- Concept of Comprehensive and Continuous Evaluation
- Type of Test items and development of Achievement test in social sciences.
- Diagnostic testing and remedial measures.
- Action research: Concept and Identification of problems faced by the teachers in the classroom

Practical Assignments/Field engagement (Any one):

- Project report on any topic of social Science.
- Develop a Multi-Media lesson using appropriate ICT resources and transacting the same before peers in simulated teaching exercise.
- Identifying and Evaluating ICT resources suitable for teaching Social Science.

Suggested Readings:

- Aggarwal, J.C. (1982), Teaching of Social Studies, New Delhi: Vikas Pub.
- Kochhar, S.K. (1983), Teaching of Social Studies, New Delhi: Sterling Publications,
- Martorella H. Peter (1994) Social Studies for elementary School Children (Developing Young Citizens)
- Mehta, D.D. (2004), Teaching of Social Studies, Ludhiana: Tandon Pub.,
- Michaels U. John (1992), Social Studies for Children
- Mittal, H.C., Teaching of Social Studies, New Delhi: Dhanpat Rai & Chandna R.N. Sons.
- Preston, Ralph C (1955)., Handbook of Social Studies, Rhinehart and Company,
- Shaida, B.D(1962)., Teaching of Social Studies, Jalandhar: Panjab Kitab Ghar,
- Teaching Social Studies in High School, Wesley Edgar Bruce
- UNESCO (1981), Handbook for teaching of Social Studies.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-	1	-	-
CO2									-
CO3		2							
CO4				1		-	-	-	1

- Wesley, Edgar Bruce, Teaching of Social Studies, Boston: D.C. Herth and Co.
- Zevin Jack (2000) – Social Studies for the Twenty first Century

Course Title: Teaching of Home Science **Credits - 4**

Course Code:
BED126

MM: 100

Objectives of the course:

- To familiarize student-teachers with the meaning and scope of Home Science andObjectives of TeachingHome Science at Higher Secondary Level.
- To sensitize them to understand the importance of Teaching Home Science in Schools.
- To enable them to know and apply various techniques and approaches of Teaching of HomeScience at HigherSecondary level.
- To plan instructions effectively for Teaching of Home Science in Schools.
- To develop the skills to evaluate student performance effectively with reliable and valid tools.

Course Outcomes:

At the end of the course, students are expected to:

- Make student teachers aware about scope of home science teaching.
- Understand various principles associated with teaching of home science.
- Abreast with various methods used for teaching of home science.
- Aware student teachers in understanding correlation of home science with the school subjects.

Unit – I: Meaning and Scope of Home Science

- The modern meaning of Home Science and its place in Secondary School
- Objectives of Teaching Home Science at Senior Secondary Level.
- Status of Home Science
- Scope of Home Science in School Curriculum
- Principles of curriculum planning and development of Home Science Syllabus
- Characteristics of a good Home Science text book.
- Correlation of Home Science with other subjects and School activities
- SUPW related to Home Science

Unit - II: Planning and Designing for Effective Instruction in Home Science

- Planning for instructional process – need, advantages and strategies
- Micro Teaching, Unit Planning and Lesson planning.
- Illustrations of Teaching Learning Process in Home Science

- Teaching of Human Development
- Teaching of Foods and Nutrition
- Teaching of Textiles and Clothing
- Teaching Community Resource Management and Extension

- Audio visual aids in teaching of Home Science
- Use and Management of Home Science Laboratory.

Unit - III: Approaches and Methods of Teaching Home Science

- Discussion method
- Demonstration method,
- Laboratory work
- Project method
- Problem solving method,
- Field trips
- ICT as a resource for Teaching-Learning
- Market survey
- Use of community resources
- Exhibition and displays.

Unit - IV: Evaluation in Home Science

- Evaluation and assessment
- Techniques for assessment in theory and practical
- Monitoring learner's Progress. Preparation of Achievement Test.
- Diagnostic and remedial measures in Home Science
- Action research: Concept and Identification of problems faced by the teachers in the classroom

Practical Assignments /Field Engagement (Any one):

- Identifying and Evaluating ICT resources suitable for teaching Home Science.
- Planning and Organization of Home Science Laboratory
- Organization of any two Co-curricular activities in Home Science
- Develop a Multi-Media lesson using appropriate ICT resources and transact the same before peers ina simulated teaching exercise.

Suggested Readings:

- Bloom, Benjamin, (Ed.) and others (1965) *Taxonomy of Educational Objectives: The Classification of Educational Goals,* Handbook 1: Cognitive Domain, New York, DavidMcKay Company Inc.
- Broudy, Harry S. and Palmer, John R. (1966) *Examples of Teaching Method,* Chicago, Second Printing, Chicago, RandMcNally & Co.
- Chandra A. (1995) *Fundamentals of Teaching Home Science,* ND: Sterling publishers.
- Dale Edgar (1962), *Audio Visual Methods in Teaching,* revised edition, Hold, RivehartandWinston, New York.
- Das, R.R. & Ray B. (1989) *Teaching of Home Science,* ND: Sterling Publishers.
- Devdas R.P.(1976). *Teaching Home Science,* AI Council for Teaching Science.
- Hall & Paolucci (1968), *Teaching Home Economics,* NY: Wiley Eastern P. Ltd.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	2		-			-	1	-	-
CO2		2						1	-
CO3				2					1
CO4						-	-	-	

Course Title: Teaching of Accountancy **Credits - 4**

Course Code: BED127 **MM: 100**

Objectives of the course:

- To student-teachers will develop the understanding of the nature of Accountancyas asubject at SeniorSecondary Stage.
- To understand the rationale of including Accountancy in the school curriculum,
- To make use of workbooks and practice sets for gaining practical knowledge of theworld ofAccountancy.
- To equip them with the essential qualities of an ideal accounting teacher,
- To familiarize them with the techniques of evaluation in Accountancy.
- To develop in them the awareness about curricular innovations in Accountancy.

Course outcomes:

At the end of the course, students are expected to:

- Understand the nature aims, objective of Accountancy teaching and rational of curriculum atsecondary school level.
- Understand the value of accountancy and relationship of it with other school subjects in gainingpractical knowledge
- Acquainted with the learning theories and their applications in accounting education.
- Improve their competencies in secondary level in accounting**.**

Unit - I: Introductory framework and Objectives

- **Nature and Need of Accounting:** Nature, need and objectives of accounting, rationale of its inclusion in the schoolcurriculum. Development of Accounting as a 'Profession'. Skills required by Contemporary Accounting Professionals.
- **Development of Accounting Curriculum:** Comparative analysis of the present accounting syllabus of CBSE & ICSE.Critical appraisal of CBSE/ICSE accounting syllabus.
- **Integration of Accountancy** with Business studies, Mathematics & Economics.

Unit - II: Planning and Objectives:

- Micro Teaching, Unit planning and Lesson Planning: Planning lessons for Theoretical aspects,Practical/numericalsessions and Projects.
- **Objectives of Teaching Accounting:** General and specific objectives of teaching Accounting.Domains of writingspecific objectives. Techniques of writing objectives.

Unit - III: Learning Resources, Methods & Techniques

- Learning Resources
- Workbooks and Practice sets
- Use of software and hardware for the teaching of Accountancy, including the use ofcomputers

Methods and Techniques of Teaching Accounting

- Lecture cum Discussion method
- Question –answer technique
- Problem solving method, G a m e s , Project method
- Case study
- Computer Assisted Instruction

New Pedagogic ideas in Accountancy

- Team Teaching, Co-operative learning, Peer learning, Blended learning, collaborative learning.
- **Co-Curricular Activities:** Different types of co-scholastic activities forstrengthening the learning of accounting. Quizzes and other group activities.

Unit - IV: Professional Requirements and Evaluation

- **Accounting Teacher:** Qualities of an ideal accounting teacher, Avenues available for professional growth
- **Text Book:** Critical appraisal of an accounting text book. Journals (Conceptual, Professional and from Industry) in relation to Accounting.
- **Professional Accounting Software:** Working knowledge about the prevalent accounting (business record maintaining)software [Tally, Busy, etc.]. Use of spread sheets in accounting.
- **Evaluation in Accounting**: Evaluating assignments, project work and giving feedback. Types of test items in accounting. Open book examination. Remedial Teaching. Practicing good qualityof questions-objective, short answer. Continuous and Comprehensive evaluation.
- Development of Achievement Test in Accountancy. Types of Test Items.
- Action research: Concept and Identification of problems faced by the teachers in the classroom

Practical Assignments/Field engagement (Any one):

- Identifying and Evaluating ICT resources suitable for teaching Accountancy.
- Prepare a workbook of any three Accountancy topics.
- Take up a project on any unit of +2 accounting and write a model report thereon.
- Maintenance and use of practice set
- Develop a Multi-Media lesson using appropriate ICT resources and transacting the same beforepeers in simulatedteaching exercise.

Suggested Readings:

- Bhatia, S.K. (2012). Teaching of Business Studies and Accountancy. New Delhi: AryaBook Depot.
- Bhatia. S.K. (1996). Methods of Teaching Accounting. Publication No. 16. CIE.Delhi.
- Binnion. John E. (1956). When you use a Book-Keeping Practice Set. Journal of BusinessEducation. Vol. 32Oct. pp. 30-33
- Boynton. Laewis.D. (1955). Methods of Teaching Book-Keeping. Cincinnati; Southwestern Publishing Co.
- Forkher Handen L., R.M. Swanson and R. J. Thompson (1960) The Teaching of Book-Keeping South Western Publishing.
- Maheswari, S.B. (1969) Teachers' Guide in Book-Keeping & Accountancy, Monograph.NCERT RegionalCollege of Education, Ajmer.
- Ments, M. (1960). Simulations, Games and Role Play. Handbook of Education Ideas andPractices, London:Routledge.
- Musselman, Vernon A and J.M. Hanna (1960). . Teaching Book-Keeping and Accounting.New York. McGrawHill Book Co.
- Sapre, P.M. (1968), Trends in Teaching Book-Keeping and Accountancy, Regional Collegeof Education, Mysore.
- Support material for PGT (Commerce) (2011). New Delhi: State Council of EducationalResearch andTraining. Retrieved from: http://delhi.gov.in/wps/wcm/connect/doit_scert/Scert+Delhi/Home/Questpaedia/Learning+Material/Commerce/
- Verma, D.P.S. (2000); Commerce Education in Rajput, J.S. (Ed.) Encyclopedia of IndianEducation, Vol. I;NCERT.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-	1	-	-
CO2		2							-
CO3			3						
CO4				1		-	-	-	2

Course Title: Teaching of Business Studies **Credits: 4**

Course Code: BED136 **MM:100**

Objectives of the course:

- To develop in the student-teachers an awareness because business studies is taught at +2level
- To instill the competence of organizing co-curricular activities for enriching the subject matterof business studies,
- To develop the tools and techniques of evaluation for appraising and enhancing students'knowledge in BusinessStudies,
- To develop awareness of curricular innovations in Business Studies.

Course outcomes:

At the end of the course, students are expected to:

- Familiarize with the concept and nature t of Business Education.
- Acquaint with the needs of Business Education from Sociological, Philosophical and Psychologicalperspectives.
- Develop the ability of teaching Business Education at various levels.
- Acquired with the structure of Business Education in different countries.

Unit - I: Introductory Framework

- **Business Studies:** Nature & Need and objectives of Business Studies, its scope and rationale of its introduction atsenior school level, recent advancements in Business Studies. Evolution ofeducation for business.
- **Curriculum of Business Studies:** Concept of curriculum and syllabus. Comparative analysis of the present syllabus ofCBSE with ICSE. Critical appraisal of present syllabus developed byCBSE/ICSE.
- **Integration of Business Studies with other subjects:** Concept, objectives and Importance of Integration. Integrationof Business Studies with other subjects –Accountancy, Economics, Social Science and English language.

Unit - II: Objectives and Planning for Business Education

- Nature of general & specific objectives, behavioral objectives, techniques of writingobjectives
- Micro Teaching.
- Unit Planning and Lesson Planning.

Unit–III: Pedagogy of Business Studies

- Lecture Method
- Discussion Method
- Group work & collaborative learning
- Project Method
- Problem Solving method
- Teaching through Games
- ICT as a Resource in Teaching-Learning
- Case Studies
- Development of Higher Order Thinking Skills (through following activities) Collaborative group activities, Problem-solving activities and questioning for development of critical thinking.

Co-curricular activities

- Business Studies based co-scholastic activities and their utility, linkage of school and outside organizations for strengthening knowledge about business.

Instructional Media

- Meaning, Types of Instructional Media, scope of using Instructional Multi Media for the teaching of Business Studies.
- Textbook: Features of a good textbook, Selection of text books, reference books and professional journals for business studies. (Educational tours to any business organization)
- Use of web quest, blogs and social media for teaching-learning Business studies.

Unit - IV: Technology Integration and Evaluation

- **Technology integration:** NTeQ model for Business Studies at senior school level**,** Blended learning
- **Evaluation:** Concepts of Evaluation, Measurement & Tests. Types of Evaluation.
- Use of portfolio
- Development of Achievement test in Business Studies. Types of test items.
- Evaluation of Assignments and Project work. Remedial Teaching.
- Continuous and Comprehensive Evaluation in Business Studies.
- Action research: Concept and Identification of problems faced by the teachers in the classroom

Practical Assignments/Field engagement (Any one):

- Develop a game for teaching some Business Studies topic (explain step by step, the process of developing this game, giving its rules of participation)
- Develop a Multi-Media lesson using appropriate ICT resources and transacting the same before peers in simulated teaching exercise.
- Identifying and Evaluating ICT resources suitable for teaching Business Studies
- Organize a co-curricular activity for strengthening the knowledge of any topic taught recently in the class.

Suggested Readings:

- Bhatia, S.K. (2012). Teaching of Business Studies and Accountancy. New Delhi: AryaBook Depot.
- Bhatia, S.K. (1979), Teaching of Principles of Commerce and Accountancy, CIEPublication, Delhi.
- Calfrey C. Alhon (1988), Managing the Learning Process in Business Education, Colonal PressUSA
- Musselman Vernon A. and Musselman Donald Lee. (1975). Methods in Teaching BasicBusiness Subjects, 3rd ed Dannirl III. The Interstate Printers and Publishers
- Nolan, C.A. (1968), Principles and Problems of Business Education, Cincinnati, SouthWestern PublishingCompany
- Schrag & Poland (1987). A System for Teaching Business Education. McGraw Hill BookCompany. New York.
- Siddique, M. Akhtar and Khan, R. S. (1995). Handbook for Business Studies Teachers,Jamia Millia Islamia, New Delhi.
- Support material for PGT (Commerce) (2011). New Delhi: State Council of EducationalResearch andTraining. Retrieved from: http://delhi.gov.in/wps/wcm/connect/doit_scert/Scert+Delhi/Home/Questpaedia/Learning Material/Commerce/
- Tonne, Herbhert & Lovis C. Nancy. (1995). Principles of Business education. McGraw Hill,New York
- Verma, D.P.S.; Commerce Education in Rajput, J.S. (Ed.) (2000) Encyclopedia of IndianEducation, Vol. I;NCERT;
- Wadhwa, Toolika (2008); Commerce Education at Senior- Secondary Level: SomeReflections: inMERI Journal of Education; New Delhi; Vol. III; No. II.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-		-	-
CO2					2				-
CO3		2						1	
CO4						-	-	-	

Course Title: Teaching of Economics **Credits :4**

Course Code: BED130 **MM: 100**

Objectives of the course:

- To familiarize the student-teachers with various strategies, methods, techniques and skills ofteaching Economics atthe senior secondary level.
- To inculcate spirit of experimentation for finding out effectiveness of alternative strategies ofteaching.
- To develop competence in designing effective instructional strategies to teach Economics.
- To develop ability to design, develop; and use various tools & techniques of evaluation.
- To develop awareness about recent advancements in teaching of Economics.

Course Content

By the end of the course, students are expected to:

- Provide understanding of growing concept, principles and theories of economics.
- Enable the pupil-teachers to develop an understanding of aims and objectives of teaching of economics.
- Acquaint them with various economic problems which our country is facing.
- Aware about the knowledge of different methods of teaching and develop interest in teaching ofeconomics.

Unit- I: Introduction to teaching of Economics

Nature of Economics as a Discipline: Study of economic thought as reflected in economic theories, major turning points, classical Economics and its linkages Keynesian and contemporary models and their relevance. Economics study as a social reality and its linkage with social economics.

Economics as a part of social science programme in Indian schools.

- The perspectives presented by NCF's (1975,1986,2000,2005)
- The Curricular linkages with regard to contemporary issues in social science
- Economics for the beginners: when to teach and what to teach?
- Aims and objectives of teaching Economics at secondary and senior secondary school level.Instructional objectivesof teaching Economics.
- Integration of Economics with other school subjects
- Comparative analysis of prescribed syllabus of CBSE & ICSE.

Unit- II: Methods & Skills of teaching Economics

- Lecture, Discussion, Debate, Inquiry, Problem solving, Survey, Project method as discovery

modes of transaction and Problem-solving routes to learning.

- Framing meaningful and developmental Assignments for an effective teaching learning process.
- Small group and whole group activities. Class and outside class learning strategies.

- Recent advancements in teaching of Economics – Team teaching, Co-operative learning,Computers in teaching of Economics.
- Developing Critical thinking, Creative thinking and Problem solving.
- Challenges of a teaching Economics. Role of Economics teacher in teaching of SocialScience and in current affairs.
- Use of ICT in Economics. Designing resource plans for effective transaction.

Unit-III: Instructional Media & Co-curricular Activities

- Instructional Media**:** Concept, Importance and types of instructional media and their use inteaching of economics.
- Co-Curricular Activities: Type, role and significance of co-curricular activities in teaching ofEconomics
- Text Book**:** Features of a good text book. Criteria for evaluation of economics textbook
- Micro Teaching, Unit Planning and Lesson Planning

Unit - IV: Evaluation in Learning outcomes

- Evaluation: - Nature of educational evaluation, its need, role in education process. Methodsof Assessment: Formative, Summative, Diagnostic.
- Preparation of test items and portfolios in Economics.
- Evaluation procedure for appraising learners' performance.
- Planning & preparation of achievement test in Economics.
- Informal assessment techniques. Observation recording. Performance assessment-preparationof performance standards. Evaluation of group projects and skills.
- Diagnostic and Remedial teaching,
- Continuous and Comprehensive evaluation (CCE)
- Action research: Concept and Identification of problems faced by the teachers in theclassroom

Practical Assignments/Field engagement (Any one):

- Development and organization of co-curricular activities
- Identifying and Evaluating ICT resources suitable for teaching Economics
- Develop a Multi-Media lesson using appropriate ICT resources and transacting the same beforepeers in simulated teaching exercise.

Suggested Readings:

- Arora, P.N. (1985). Evaluation in Economics. New Delhi: NCERT.
- Arora, P.N. And Shorie, J.P. (1986), Open Book Examination Question in Economics, NewDelhi, NCERT.
- Assistant Masters Association (1974), The Teaching of Secondary SchoolExaminations, London Cambridge University Press.

- Bawa M. S. (ed.) (1998), Source Book on Strategies of Teaching Social Sciences, IASE, Dept. of Education, Delhi University.
- Bawa, M. S. (ed.) (1995), Tendering of Economics: Contemporary Methods and Strategies forSecondary and Senior Secondary levels, IASE, Dept. of Education, Delhi University.
- Bawa, M. S. (ed.) (1996), Evaluation in Economics, IASE, Dept. of Education, Delhi University.
- Chakravorty, S. (1987), Teaching of Economics in India, Bombay, Himalaya Publishing.
- Hicks, J.R. (1960), The Social Framework- An introduction to Economics, London: OxfordUniversity Press.
- Hodkinson, Steve, Whitehead and David J. (ed) (1986), Economics Education: Research andDevelopment Issues,London, New York: Longman.
- Kanwar, B.S. (1973), Teaching of Economics, Ludhiana; Prakash Brothers.
- Khan, R.S., Teaching Economics (In Hindi), Kota Open University, BE-13.
- Lee, N. (ed) (1975), Teaching Economics, London: Heinemann Educational Books, PrenticeHall.
- NCERT (1974), Teaching Units in Economics for High and Higher secondary Stage, NewDelhi.
- Oliver, J. M. (1977), The principles of Teaching Economics within the curriculum, LondonRoutledge & Kegan Paul.
- Sachs, I, (ed.) (1971), Main trends in Economics Project and Role-Playing Economics, London,Macmillan.
- Siddiqi, M.H. (1998) Teaching of Economics: New Delhi; Ashish Publishing House.
- Srivastava, H.S. (1976), Unit Tests in Economics, New Delhi, NCERT.
- Tyagi, S.D. (1973), Teaching of Economics (In Hindi), Agra: Vinod Pustak Bhandar.
- Whitehead, D. J. (ed.) (1974), Curriculum Development in Economics, London, HeinemannEducation Books.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-	2	-	-
CO2		3							-
CO3				2				1	
CO4				1		-	-	-	1

Course Title: Teaching of Integrated Science **Credits:4**

Course Code: BED125 **MM:100**

Objectives of the Course:

- To develop in student-teachers an understanding of the nature of integrated science and itsinterface with society.
- Appreciate the significance of integrated science at various levels of school curriculum.
- Acquire a conceptual understanding of the Pedagogy of Science.
- To Acquire and learn specific laboratory skills to conduct practical work in science.
- Develop and use the techniques for evaluation of student's performance.
- To critically analyze the Curriculum and textbooks from the dimension of integration

Course outcomes:

After completion of the course students will be able to

- Acquire the knowledge of aims, values & objectives of teaching Science
- Develop an understanding of pedagogical analysis of various concepts in science and use ofevaluation techniques.
- Develop an understanding of the approaches and methods of teaching Science and acquire theknowledge of sciencelaboratory.
- Develop an understanding of global perspectives in science teaching.
- Acquire mastery over the development and use of evaluation

Unit-I: Science in School Curriculum

- Nature of Science, Scientific inquiry and Integrated Science
- General Science Vs Integrated Science: Basic Assumptions of Integrated Science
- Scope of Science and Rationale of Teaching Science as a Compulsory Subject up to class X.
- Correlation of Integrated Science with other Subjects.
- Aims & Objective of Teaching of Science with special reference to integratedScience.
- Integrated Science Books: Qualities of good Integrated Science books, Effective use; Criteriafor evaluation ofintegrated science textbook.

Unit-II: Planning, Designing and Transaction

- Development of Unit plan, Lesson Plan, Concept Maps using variety of approaches.
- Teaching Learning process with a focus on:
- Inquiry Approach
- Problem Solving Approach
- Constructivist Approach

121

- Teaching Methods: Lecture Method, Lecture cum Demonstration, Laboratory Method, ProjectMethod, Heuristic Method.
- Peer Learning/Group Learning, Team Teaching
- Science Laboratory: Organization & Management.
- Instructional Aids (Teaching Learning Material): Preparation, Improvisation and Effective use.
- Planning and execution of Extended Experiences: - Excursions, Science Exhibition, Science Fair,Science Quizzes, Science Club

Unit-III: Assessment in Science

- Evaluation: Concept, Need and Importance, Scope
- Techniques of Evaluation for Theory & Practical.
- Diagnostic tests, remedial/enrichment measures & monitoring learner's progress.
- Achievement test-its construction & administration.
- Assessment through Creative Expression: Essays, Posters, Drama, Poetry, Riddles etc

Unit-IV: Professional Development of an Integrated Science Teacher

- Need for professional development at Individual level, Organizational level and Governmentlevel.
- Need and Relevance of Participation in Seminars, Workshops, Conferences, Symposia etc well as membership of Professional Organizations in Professional development of teachers.
- Field Visits to Institutions / Organizations such as Other Schools, Museums, Parks, ResearchOrganizations etc.:Need and Relevance for Professional development
- Preparing the Teacher for Technology Integration: Planning with integrating Technology forinquiry (NTeQ) inscience at secondary school level.
- Teacher as a Researcher: Need and Competencies
- Action research: Concept and Identification of problems faced by the teachers in theclassroom

Practical Assignments /Field Engagement (Records to be maintained)

- Identifying and conducting at least 5 experiments/demonstrations from classes 6-10syllabusindividually or in smallgroups

Suggested Readings:

- Chauhan. S.S (1985), Innovation in teaching-Learning Process, Delhi, Vikas Publishing House.
- Das. R.C (1985), Science Teaching in school, Sterling Publishers Pvt. Ltd., New Delhi.
- Dass R.C., Parsi.B. K & Singh, L.C. (1975), Effective of Microteaching in Training ofTeachers, NCERT, Delhi.
- Gupta, S.K. (1983), Technology of Science Education Vikas Publishing House Pvt. Ltd., NewDelhi.
- Jangira. N.K & Ajit Singh (1982), Core Teaching Skills, The Micro-teaching Approach, NewDelhi: NCERT.
- Mangal, S.K. (1995). Teaching of physical and life science, AVG Book Depot, Karol Bagh.
- Radha Mohan (2004), Innovative Science Teaching for Physical Science- Prentice Hall of IndiaPvt. Ltd., New Delhi.
- Siddiqui N.N. and Siddiqui M.N. (2000). Teaching of science today tomorrow, DoabaHouse,Nai

Sarak, Delhi.

- Sood J.K (1987), Teaching of life science, Kohli Publishers Chandigarh.
- Vaidya N (1997), The impact of Science Teaching Oxford & IBH Publication Co, New Delhi.

POS/COS	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3		-			-		-	-
CO2		3					2		-
CO3				2					
CO4					1	-	-	-	1

SCHEME FOR MASTER OF EDUCATION

M. ED			**Semester**			**I**
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	MED-101	Historical & Political Perspectives of Education	4	3	1	0
2	MED-102	Educational Psychology	4	3	1	0
3	MED-103	Research Methodology in Education	4	3	1	0
Specialization Courses-I (Any One of the following)						
4	MED-104	**Educational Study**	**4**	**3**	**1**	**0**
5	MED-109	**Educational Measurement and Evaluation**				
6	MED-192	**Communication & Expository writing**	**2**	**0**	**0**	**4**
7	MED-193	**Self-Development**	**2**	**0**	**0**	**4**
		Total	**20**	**12**	**4**	**20**

M. ED			**Semester**			**II**
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	**MED-105**	**Philosophical foundations of Education**	**4**	**0**	**0**	**4**
2	**MED-106**	**Sociology of Education**	**4**	**0**	**0**	**4**

3	MED-107	Curriculum Study of Education	4	0	0	4
4	MED-108	Teacher Education	4	0	0	4
PRACTICAL						
1	MED-194	Dissertation	0	0	4	2
2	MED-195	Internship In TEI	0	0	4	2
		Total	16	0	8	20

SCHEME FOR MASTER OF EDUCATION

M. ED			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MED-209	Advance Research Methodology	4	0	0	4
2	MED-210	In Service Teacher Education in India	4	0	0	4
3		Specialization Courses-I(Any One of the following	4	0	0	4
4	MED-211	Elementary Education In India: Administration & Management	4	3	1	0
5	MED-212	Planning & Management at Secondary Level				
6		Specialization Courses-II(Any One of the following				
7	MED-213	Issue and Curricular Concerns at Elementary level				
8	MED-214	Issues and Curricular Concerns at Secondary Level	4	3	1	0
PRACTICAL						
1	MED-296	Internship In School	0	0	8	2
2	MED-297	Dissertation (Progress Report)	2	0	4	2
3	MED-298	Academic writing	2	0	4	2
		Total	24	6	18	24

SCHEME FOR MASTER OF EDUCATION

M. ED			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MED-216	Advance Curriculum Theory	4	3	1	0
2		Specialization Courses-III(Any One of the following				
3	MED-217	Policy, Planning and Financing of Education	4	3	1	0
4	MED-218	Educational Technology				
5	MED-219	Issues, Planning and Policies of Elementary Education				
6		Specialization Courses-IV(Any One of the following				
7	MED-220	Peace Education	4	3	1	0
8	MED-221	Educational, Vocational Guidance				

9	**MED-222**	**Inclusive Education**				
10	**MED-223**	**Environmental Education**				
1	**MED-299**	**Dissertation**	**0**			
		Total	**16**	**9**	**3**	**24**

SYLLABUS FOR MASTER OF EDUCATION

Course Title: Educational Psychology

Course Code:MED-102

Credits: 3

Objectives: The students will be able to

- Understand the relevance of psychological perspective of education.
- Get acquainted with the process of assessment of personality.
- Understand the dynamics of intelligence and learning.

Unit I: Psychological perspective of education

-Nature, meaning and scope of educational psychology, methods of psychology,experimental, clinical and differential.

-Human Development: Concept, principles, sequential stages of developmentwith special reference to Adolescence, factors influencing development and theirrelative roles, general characteristics.

-Problems of Indian Adolescent including Delinquency: theories and remedialsteps.

Unit II: Relevance of Psychological Principles to Pedagogical Interventions

-Concept and nature of personality.

-Role of heredity and environment in the development of Personality.

-Theories of personality with special references to developmental and factoranalyticalapproaches.

-Assessment of Personality: subjective, objective, and projective methods.

-Personality Inventories.

-Psychology of Adjustment: integrative and disintegrative adjustment; causes ofdisintegration and their control.

Unit III: Psychology of Learning and Intelligence

- Learner and Learning:

(a) Nature, meaning and scope

(b) Approaches to learning: Behaviouristic, Cognitive, Humanistic andNeuropsychological.

(c) Constructivism and Learning, learning styles and their relevance to learning.

(d) Role and Function of Educational Technology for effective learning.

Unit IV:

-Salient features of Pavlov's, Skinner's, Gestalt and Hebb's theories of learning.

-Detailed study of:

(a) The Social Cognitive Theory with special reference to Bandura, Dollard and Miller.

(b) The Information Processing Theory with special reference to Norman,Ausubel and Bruner.

(c) Piaget's Genetic Epistemological Approach to Cognitive Development.

(d) Gardner's Multiple Intelligence Theory.

-The role of environment-related factors in the development of intelligence.

-Measurement of Intelligence.

-Implications of Intelligence Testing.

-Ethical issues in psychological testing.

References:

• Ausubel. & Robinson F.G. (1969).School learning-An Introduction toEducational Psychology, New York, Holt, Rinehart & Winston Inc.

• Bany and Johnson (1964). Classroom Group Behavior, New York, theMacMillan Co.

• Bernard, H.W. (1972). Psychology of learning & Teaching, New York,McGraw-Hill Company Third Edition.

• Bigge, M.L. Hunt M.P. (1962). Psychological Foundations of Education, New York, Harper & Brothers, Publish.

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• Fontane, David (1981). Psychology for Teachers, London, McMillan PressLtd.

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• Hayes, J.R. (1978). Cognitive Psychology: Thinking and creating. Homewood,Illinis: The Dorsey Press.

• Henson K.T. & Eller B.F. (1999). Educational Psychology for EffectiveTeaching.Wadsworth, Publishing Co. Belmont (U.S.A.).

• Lahey B.B. (1998). Psychology: An Introduction. Tata McGraw-Hill PublishingCo.Ltd. New Delhi.

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• Pringle, M.K. Verma V.P. (1974). Advances in Educational Psychology,LONDON,Press Ltd. University of Lon.

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•Santrock John W. (2001). Educational Psychology, McGraw Hill (InternationalEdition) Boston.

• Travers Robert M.W. (1973). Educational Psychology, New York, theMcMillan Co.

• Wads Worth B.J. (1989). Piaget's Theory of Cognitive and AffectiveDevelopment, New York, Longman Incorporated Fourth Edition.

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Course Title: Educational Psychology

Course Code: MED-102 **Credit: 1**

Practicum (any one of the following):

• Administration & interpretation of an individual (performance) & group test ofintelligence.

• Administration and interpretation of a personality or adjustment inventory andan anxiety scale.

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Course Title: Historical and Political Perspectives of Education

Course Code: MED-101 **Credits: 3**

Objectives: The students will be able to:

• Understand the pre-independence and post-independence development ofeducation in India.

• Understand the factors from historical perspective that contributed to presenteducation system.

• Explain the important features of various reports, commissions and policies ofeducation during pre and post-independence development of Education - in India.

• Understand that development of Education is influenced by political forces of thetime.

•Acquire knowledge of characteristics features of ancient, medieval and Britishsystem of education in India and of their strengths and limitations.

Unit I: Historical perspectives of education in India till 1854

-A brief study of the main characteristics of the Vedic, Brahmanic, Buddhist and Islamic systems of education with reference to their aims, features, curricula, methods, practices and agencies of education.

-Education under the East India Company up to 1854, with special reference to the motives of the Company.

-Development of Education from 1813 (Charter Act), 1835 Lord Macaulay's minutes and 1854 Woods Despatch, 1882 Hunter Commission to the end of the19th Century, with reference to important landmarks in education, bringing out the political designs of the British rulers; and the impact of education on political, social, economic and the cultural life of the people and vice-versa.

Unit II: Indian Education in 20th Century

The growth of Education from 1901 to 1947, with reference to important land marks(educational policies, Saddler Commission, Sargent Plan-their features, implications and impact on political, social and economic life) highlighting the British designs and bringing out the inter-relationship between education and political, social and economic life of the people.

-The growth of Education from 1947 onwards, with special reference to their ports of the University Education Commission, the Secondary Education Commission, the Education Commission: 1964-66, and the National Policy on Education 1986 and its review Committees.

-A critical study of the problems related to the following:

i. Vocational Education

ii. Adult Education

iii. Professional Education

iv. Women Education

v. Education for Marginalized

Unit III: Political Perspectives of Education:

- Colonial concept of Education & its implications for Current Educational Studies.
- State and Education.
- Provision of Equal Opportunity of Education to woman, Scheduled Castes, Scheduled Tribes & other disadvantaged sections including disabled children.
- Recent political developments and its impact on Indian Education System.
- International agencies such as UNESCO, World Bank, funding bodies etc. and their role in education.

Unit IV: Constitutional provisions regarding education

- The Preamble to the Indian Constitution with its implications for education**.**
- Implications of Justice, Liberty & Equality in Education.
- Directive Principles of State Policies & Education (Part IV of Indian Constitution).
- Fundamental Rights with special emphasis on Right to Education, Article 21A along with impediments in the path of implementation of RTE.

References:

• Aggarwal, J.C. (2004) Development of Education System in India. New Delhi: Shipra.
• Aggarwal, J.C. (2004) Modern Indian Education. New Delhi: Shipra.
• Sharma, R L. (2006) Comprehensive History of Modern Education. New Delhi: Cyber Tech Publications.
• Report of the Education Commission (1964-66) Education and National Development. New Delhi: NCERT.
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• Report of the University Education Commission (1948-49) Ministry of EducationGovernment of India.
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• Mukherjee, S.N. (1966) History of Education in India (Modern Period) Baroda:Acharya Book Depot.
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1961) Revised Fourth Edition. Bombay:MacMillan and Co. Ltd.
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• Sharma,S. (2005) History and Development of Higher Education in free India.Jaipur; ABD Publishers.
• Shrimali, K.L. (1961) Problems of Education in India. New Delhi: PublicationsDivision Govt. of India.
• Shrimali, K.L. (1965) Education in Changing India. Bombay:Asia Publishing House.
• Singh, B.P. (1990). Aims of Education in India. New Delhi: Ajanta Publication.

Course Title: Historical and Political Perspectives of Education

Course Code: MED-101 **Credit:1**

Practicum (any one of the following):

• Review of related literature to justify the role of Historical/Political foundations ofeducation in shaping of education.

• Writing an analytical paper on one topic to perform one activity on the topics/activities decided by the concerned teacher. The student teacher will present theirport in class.

• Writing an assignment on educational development in ancient India after classroomdiscussion.

• Research on two or three educational policies/ approaches/practices used in othercountries but not in India with special focus on the problems in their implementation.

Course Title: Educational Studies

Course Code: MED-104 **Credits: 3**

Objectives:*The students will be able to:*

• understand the meaning, functions and aims of education

• Comprehend the nature of education studies and map the fields in presentscenario.

• Introduce certain selected seminal educational texts representing thefoundational perspectives.

• Get oriented to the institutions, systems and structures of education and flagthe contemporary concerns of education policy and practice.

• Analyse educational issues systematically and logically.

Evaluate education policy vis-a-vis causes in education and find scope toaccommodate new principles, knowledge and values.

Unit I: Meaning of Education

- Derivation of the term education- Indian & Western views.

- Meaning of Education- as a process and product.

- Education as a continuous reconstruction of experiences

- Education as acquisition of knowledge & skills.

-Education as a disciplinary, inter disciplinary and multi-disciplinary field.

Unit II: Aims of Education

-Conservative and creative functions of education, education as methodicalsocialization, education as a means of socialization, education as a means of socialchange.

- Aim of Education- social & individual aims of education.

- Moral & Character building as aims of education.

- Views of some eminent educators such as Mahatma Gandhi, Vivekananda,Aurbindo, John Dewey, Paulo Freire etc. on moral & Character Building.

- Aims of Education as recommended by Indian education commission (1964-66),NPE (1986),& NCF (2005).

Unit III: Factors influencing aims of Education

- Factors determining aims of Education- religion &*dharma understanding theconcept and relevance of the purusharthas: (i) Dharma, (ii) Artha, (iii) Kama& (iv) Moksha*

-Islamic/Christian concept of education.

- Factors influencing aims of education.

- Influence of schools of philosophies on aims of education.

- Influence of Pragmatism on aims of education.

Unit IV: Functions of Education

- Functions of Education towards (i) The individual, (ii) Society (iii) Nation(iv) & Global.

-Achieving Social & National Integration- social & National services, internationalunderstanding.

-Development of appropriate language policies, ascertaining the process ofmodernization.

-cultivating social, moral & spiritual values.

References:

• Mookerji, R.K. (1969) Ancient Indian Education. New Delhi: MotilalBanarsidas.

• Hughes, J.M. (1962) Education in America. New York: Harper and RowPublishers.

• Ulich, R. (1971) three thousand years educational wisdom. United States ofAmerica: Harvard University.

• Sharma, R.S. (2006) Comprehensive history of Modern Education. New Delhi:

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• Singh, V. (2005) Development of Education in India. New Delhi: AkanshaPublication House.

• Vaidya, (2005) Educational Reforms. New Delhi: Deep and DeepPublications.

• Nigam, B.K. (1993) History and Problems of Indian Education. New Delhi:Kanishka Publications.

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Course Title: Educational Studies

Course Code: MED-104

Credit:1

Practicum (any one of the following):

• To compile articles from newspapers, magazines, and the internet on educationalissues. Prepare a report with suggestion for solutions.

• Comparative study of educational contribution of Indian and western educationists

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Course Title: Research Methodology in Education

Course Code: MED-103

Credits: 3

Objectives: The students will be able to

□□Get familiarized with the basic terms of research methodology.

□□Develop understanding of concept of research in general and educational research in particular.

□□Develop understanding of distinctive features of qualitative and quantitative research paradigms.

□□Acquaint the students with respect to different techniques of research.

□□Enable students to understand the dynamics of different research methods

□□Understand the application of statistical techniques in Educational Research.

Unit I: Elements of Research

Nature of research: fundamental, applied and action.

-Educational Research; Meaning, Nature, Types, Scope and limitations.

-Scientific Inquiry: concept and assumptions and their role, scope and limitations, the scientific method

-Positivist and Non-positivist paradigms, Qualitative Vs Quantitative

-Major orientations in educational research: Philosophical, Historical, Sociological and Psychological.

-Types of Educational Research: Descriptive, Evaluative, Historical, Philosophical, Developmental, Co relational research, Ethnographic Research, Experimental research, Ex-Post Facto Research, Action research etc.

Unit II: Research Methods

-Sampling and Research Tool, Survey, Case Study, Experimental method etc.

-Use of technology in conducting research.

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Skills required for conducting research.

-Sources of research data: primary and secondary sources (interdisciplinary approach).

-Sampling techniques: concept, random sampling, random tables, purposive sampling, stratified random sampling, need, probability and non-probability samples, sampling errors and their control.

-Population and sample: concept and need, probability and non-probability sampling, sampling error.

-Tools and techniques of data collection: observation, interview, questionnaire, rating scale, inventory, check list, content analysis. Reliability and validity of tools.

-Case study method: advantages and limitations.

-Anecdotal method/research.

-Participatory research.

Unit III: Research Process

-Formulating research proposal: identification of a research problem

-Review of related research, research questions, objectives and literature

-Formulation of hypotheses

-Research design and procedure

-Data analysis techniques

-Time scheduling

-Cauterization, Writing, Evaluating and Reviewing research reports and papers.

Unit IV: Analysis and interpretation (elementary statistical methods) of data

-Tabulation and graphical representation of data; Measures of Central Tendency and

Variability; Percentiles and Percentile Ranks.

-Normal probability curve- its important properties and simple applications.

Correlation and regression: product moments and rank difference co-efficient of correlation, regression equations.

-Inferential statistics: sampling distributions, hypotheses testing.

-Significance of sample statics: mean and coefficient of co- relation.

-Frequency comparison: chi-square test, t test, F test and ANOVA (one way analysis only).

-Analysis and interpretation of data, computer application (use of computer in statistical analysis).

References:

• Best, John W. & James Kahn Research in Education (1986) 5th Edition New York,Prentice Hall,

• Borg, Walter R. (1981) Applying Educational Research: A practical guide forteachers, New York Longman.

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• Sukhia, S.P., P.V.Mehrotra& R.N. Mehrotra (1974) Elements of EducationalResearch, 3rd Revised Edition, New Delhi, Allied Publishers Pvt. Ltd.

• Travers, Robert M.W. (1958) an Introduction to Educational Research New York,Macmillan &Co.

• Turney, B.L. & George Robb (1971) Research in Education, Replinois, Dryde

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Course Title: ResearchMethodology in Education

Course Code: MED-103 **Credit: 1**

Practicum (Any one of the following):

• Reviewing a research paper, an M.Ed./M.Phil. Dissertation and a chapter froma research textbook.
• Formulating a research proposal as part of the course requirements.
• Selecting and/ or developing a need-based research tool or schedule for atechnique.
• Writing and presenting assignments and papers and participation indiscussion.

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Course Title: Communication and Expository Writing

Course Code: MED-192 **Credit: 2**

Objectives: The students will be able to:
• Listen, converse, speak, present and explain ideas in groups and beforean audience.
• Use ICT in effective communication.
• Understand about writing skills and enhance their expository writing skills.
• Implement their knowledge of communication in classroom discussion andin daily life.
• Use virtual spaces for e-learning/blended learning.

Communication skills: Meaning, concept and components of effectivecommunication.
• Strategies of effective communication.
• Role and usage of ICT in effective communication.
• Development of pre-academic skills (pre-reading, pre-writing and pre-presentation)

Expository writing: Meaning, concept, Types and indicators for effective expositorywriting. Listening skills: meaning, concept and importance of listening skills.Academic listening-(lecturing) listening to talk and presentation. Asking for andgiving information, giving instruction, listening and observing tone/mood and attitudeat the other end, handling the situations especially trouble shooting, teleconferencing,tele- interviews handling.

Practicum (any one of the following):
• Workshop on establishing Language lab.
• Workshop on Development of Expository Writing skills.
• Workshop on Communication skills.

Note: - Mode of transaction of this course will be workshop.

References:

• www.ugc.ac.in
• www.ncte-india.org
• www.ngu.ac.in

• www.education.nic.in
• www.scribid.com
• HNGU Handbook-I
• HNGU Handbook-II

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Course Title: Self-Development

Course Code: MED-193 **Credits: 2**

Objectives: The students will be able to:

• Understand what they are and what they want to be?

• Take responsibility for self- development, self-exploration and self-evolution.

• know oneself and through that knowing surroundings(including human andother living

• Beings.

• Recognize one's relation with every individual unit in existence and fulfillingthe expectations and needs.

• Know human conduct, human character and to live accordingly.

• Develop skills essential for self-appraisal.

• Appreciate relations, co-existence and harmony.

Course Content:-

-Themes such as gender, society and education, differently challenged abilities,psycho-social dimensions of exclusion and inclusive education.

-Concept of integrated personality and processes of its harmonious development.

-Mental and physical well-being (through modalities such as Yoga workshops for at least once in a week), Life skills in our daily life.

-Happiness, harmony: within me and with, others: society, nature, existence.

Realization, understanding, desiring, thinking, *Shanti, Santosh, Anand.*Prosperity.

- Human Values:

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Swatantrata

- *Swarajya*

- *Moksha*

- Concept *of self: Self-concept and self-esteem*

- Understanding and analysis of your own Strength, Scope fordevelopment,weakness,threats: constructive utilization towards self-development.

-Concept of intelligence (multipleintelligence),emotional intelligence, spiritualintelligence.

-Prayer, Meditation (as anti-dote to stress management)& Mental Piece.

-Interaction with theatre personality/musician/artist.

-Conducting theatre workshop

-Maslow's Need Hierarchy Theory and Self-actualization.

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(SEMESTER-III)

Course Title: Advance Research Methodology

Course Code: MED 209 **Credits:3 (2L+1T)**

Objectives: The student will be able to:

- Understand concept, Characteristics & Themes of Qualitative& QuantitativeResearch.
- Examine different types of qualitative& quantitative research and theircharacteristics.
- Examine the concept of Qualitative& Quantitative Research.
- Develop a tool which allows for the evaluation and data collection ofQualitative& Quantitative Research.
- Design a framework or outline of Qualitative& Quantitative Research.
- Investigate appropriate methods of data analysis.
- Explain the processes of Qualitative& Quantitative Research
- Explain the planning the research project of Qualitative& QuantitativeResearch.

Unit I: Introduction to Qualitative Research

-Meaning, concept and types of Qualitative Research.

- Qualitative Research: Characteristics, issues, concerns & major approaches

- Relevance of Qualitative Research in education.

- Qualitative Research in education: Retrospect and prospect.

-Themes of Qualitative Research & research question.

-Ethnographic Approaches in Qualitative Research

Unit II: Qualitative Research- Approaches & Data analysis

-Qualitative research approaches-Phenomenology, Ethnography, Casestudies and Grounded theory Ethnography: Meaning, types, purpose, stepsand common terms used by Ethnographers Grounded theory: Goals,perspectives, Methods and steps of Ethnography theory. ParticipatoryResearch.

-Content & Trend analysis: Meaning, concept, assumption, and steps.

- Phenomenology& Historical Research: Meaning, concept, assumption, andsteps.

- Issues of reliability and validity of Discourse analysis.

-Coding of qualitative data – Axial coding, Selective coding

-Participant Observation, Case Study as methods of Qualitative Research

- Methods of qualitative data analysis—content analysis, logical and inductiveanalysis, illustrative method analogies, meta-analysis & Triangulation of data.

Unit III: Introduction to Quantitative Research

- Quantitative Research: Meaning, concept, steps and characteristics.
- Nature, scope and trends of quantitative research
- Relevance of Quantitative Research in education.
- Research Data: Nature, Sources, Collection and Organization.
- Sources of educational data: Individual, Institutions, Documents, Census,Journals, Books, Schools of thought etc.
- Sampling techniques: Concept, need, probability and non-probabilitysamples, sampling errors and their control.
-Variables in experimental research independent, dependent and confoundingvariables; ways to manipulate an independent variable, purpose and methodsof control of confounding variables.
- Techniques and Tools of data collection: Observation, interview,questionnaire, scale, inventory, checklist, content analysis, focus groupdiscussions.

Unit IV: Quantitative Research Designs

- Experimental Research designs: Single-Group Pre-test-Post-test Design,Pre-test-Post-test Control-Group Design, Post-test only Control-GroupDesign, and Factorial Design
- Quasi-Experimental Designs: Non-equivalent Comparison Group Design,and Time-Series Design
- Internal and external validity of research tools.
- Expost facto research-design and variables, Simple cases of Casual-Comparative and Co relational research; necessary conditions for causation.
- Techniques of control: matching, holding the extraneous variable constantand statistical control
- Classification by Time: Cross-sectional, Longitudinal (Trend and Panelstudies), and Retrospective; and classification by research objectivesDescriptive, Predictive, Explanatory and Triangulation.
- Synthesizing Qualitative and Quantitative Researches, ProgrammeEvaluation.

References:

• Best J.W. (2005) Research in Education, New Delhi: Prentice Hall of India Pvt. Ltd.
• Borg, W.R. and Gall, M.D. (1983) Educational Research – An Introduction, New York, Longman, Inc.

• Creswell, John W. (2007). Qualitative Inquiry and Research Design: ChoosingAmong Five Approaches.SAGE Publication.

• Elliott, Jane (2005).Using Narrative in Social Research: Qualitative and QuantitativeApproaches.SAGE Publication.

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• Gravetter. F.J. &Wallanau, C.B. (2002). Essentials of Statistics for the BehaviouralSciences (4th edition) Australia, Wodsworth.

•Gupta, Santosh (1983) Research Methodology and Statistical Techniques, New Delhi: Deep and Deep Publisher.

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•Srivastava, G.N.P. (1994) Advanced Research Methodology, New Delhi: RadhaPublications.

•Anfara, Vincent & Mertz Norma T. (2006). Theoretical Frameworks in QualitativeResearch.SAGE Publication.

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Course Title: Advance Research Methodology

Course Code: MED 209 **Credit: 1**

Practicum (any one of the following):

• Preparation, administration and interpretation of any one tool i.e.observation, interview, questionnaire etc.

• Identify two quantitative research problems and prepare at least fiveresearch questions for eachwith clear research title.

• Conduct a training program on the use of library especially for secondarysources and reference material, such as dictionaries and encyclopaedias.

• Identify an experimental educational research problem and prepare theirresearch designing with justification.

• Review of Quantitative research reports with regard to - Title or statement ofthe problem - Approach/Design - Research Hypothesis/Research Questions -Sampling - Tools - Statistical Techniques.

Course Title: In-Service Teacher Education in India

Course Code: MED 210 **Credits: 3(2L+1T)**

Objectives

The students will be able to:

Gain insight and reflect on the status of in-service teacher education.

Reflect on the nature and objectives and components of in-service teachereducationprogrammes

Examine the existing teacher education curricula from the view point of policy,its relevance to the demands of present day school realities.

Evaluate the existing teacher education programmes for in-service teachersfrom the view point of policy and their relevance to the demands of presentday school realities

Develop the ability to organise and evaluate in-service teacher educationprogramme.

Unit I: In-service Teacher Education in India – Policy, Structure and Concerns

- Concept and need for continuing professional development of a teacher –areas of professional development
- In-service teacher education – meaning. National and state policies on inserviceteacher education
- The structure for in-service teacher education –zonal, district, state, regionaland national level agencies and institutions.

- Purpose of an in-service teacher education programme – orientation,refresher, workshop, seminar, on line teleconferencing.

-In-service teacher education programmes in the Post-Independent India:organization and implementation.

Unit II: Organization and Evaluation of Foundation and Competency

Development Courses

- The teacher as an adult learner – characteristics, his/her content andpedagogical needs and expected role.

-Selection, organisation, transaction and evaluation of different components ofteacher education curriculum – existing practices. Need for the academiccalendar and time table.

-Transactional approaches for the reinforcement of foundation courses –Expository, Participatory, Collaborative, and Inquiry.

-Transitive approaches for the development of skills and capabilities, use ofICT – audio, video, presentation and multimedia technologies in in-serviceteacher education.

Unit III: Trends of Research and Practice in Teacher Education

-Research on effectiveness of teacher education programmes –characteristics of an effective in-service teacher education programme.

Methodological issues of research in teacher education – direct versusindirect inference, generalisability of findings, laboratory versus field research,scope and limitations of classroom observation, the role and scope of actionresearch for teachers and teacher educators.

-Networking of institutions of teacher education – University, SCERT, NCTE,NCERT, UGC, IASE and DIETs for creating and strengthen in-servicestructure and programmes at various levels.

- Issue of duration, commercialization, irrelevance and poor quality in teachereducation, curriculum renewal

Unit IV: Planning, Organizing and Evaluating an In-service Teacher Education

- Planning an in-service teacher education programme – preliminaryconsiderations of purpose, duration, resource requirements, and budget

- Designing an in-service teacher education programme – steps andguidelines assessment of training needs, formulation of training curriculum,preparation of course material

- Organizing an in-service teacher education programme – common problemsfaced by a teacher/teacher educator and guidelines for communication,arrangement, preparation, facilitating participation and collecting feedbackand evaluation.

-Redefining the characteristics of an effective in-service teacher educationprogramme.

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• Singh L. C. and Sharma P. C. Teacher Education and the Teacher. VikasPublishing House: New Delhi. 1997.

• Singh Y. K. Teaching Practice: Lesson Planning. APH Publishing Corporation: New Delhi. 2008.

• Tiwari D. Methods of Teaching Education. Crescent: New Delhi. 2006

• Web sites of NCERT, NUEPA, NCTE, SCERT, NAAC

Course Title: In-Service Teacher Education in India

Course Code: MED 210 **Credit: 1**

Practicum (any one of the following):

- An in depth study of in-service teacher education programme at any level interms of its components, weight age, duration, organization, transaction andassessment – document analysis.
- "Study of the existing practices of teacher education" – Admission, staffing,planning, organization, transaction and evaluation practices of any oneteacher education programme – Document analysis, observation, interview.
- Critical study of an in-service teacher education programme in terms of itsneed and relevance, duration, planning, organization and outcomes –document analysis.
- Case study of a teacher educator in terms of their educational andprofessional background, beliefs, insights, vision of in-service teachereducation, perceived competencies, approaches followed, significantachievements and professional linkages – interview and observation

- Interview of practicing teachers (at least three) to identify the nature of inserviceteacher education received and the felt needs.

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Specialization Courses I:

Course Title: Elementary Education in India: Administration and Management

Course Code: MED 211 **Credits: 3(2L+1T)**

Objectives of the Course

To sensitise the student teachers with the need and relevance of ElementaryEducation as a basic foundation stage.

To reflect on the various concerns of Elementary Education including Access,Enrolment, Retention & Achievement

To gain insight into factors promoting the Universalisation of ElementaryEducation

To develop a critical outlook towards measures taken for the achievement of quality at the Elementary Education stage

To appreciate the significance of policies and programmes launched forUniversalisation of Elementary Education.

Unit-I Elementary Education: Concept and Provisions

Meaning and Scope of Elementary Education

Constitutional Provisions to achieve UEE (Including RTE and its critique)

Government Policies and Steps for UEE since Independence:Recommendations of Kothari Commission, NPE 1986, PoA 1992

Relevance of MDGs (Millennium Development Goods) with respect to UEE inIndia

Unit-II Programmes and Initiatives to achieve UEE in India

District Primary Education Programme: Aim, Objectives, Strategies,Achievement

Relevance of 73 rd and 74th constitutional amendment w.r.t. empowermentof PRIs

SarvaShikshaAbhiyan: Programme, Objectives, Interventions with respect toAccess, Enrolment, Retention and Achievement

Monitoring, Research, Evaluation of specific schemes like Mid- Day Meals,Operation Black board, and Establishment of VECs in India

Recommendations of the 12th Five Year Plan on ElementaryEducation(Including the critiquing of the same with respect to allocated budgetandProgramme Interventions)

Unit- III Elementary Education in School: Issues and Concerns

Availability and Management of Resources:

- Physical Resource Management – Management of the School plan
- Human Resource Management – Management of the School Staff,Delegation of Roles and Responsibilities (Need and Relevance)Democratic Decision Making: Need and Purpose
- Financial Resource Management: Process and Procedureincluding Zero Budgeting and Performance Budgeting

School Effectiveness: Parameters and Quality concern – Role of the SchoolHead and Teachers in creating a Joyful learning environment

Problems of Wastage and Stagnation in School: Concept and Remedies

School Supervision: Need, Purpose; Role of Head, Teachers,Staff, PTAs,SMCs, MTAs and Students in Supervision

Unit- IV Elementary Education: Research and Innovation

Launch of Innovative Programmes to strengthen Elementary Education:HoshangabadVigyanProject,B. El. Ed. Programme, D. El. Ed.Laadli scheme

Financing of Education in India (Centre- State Relationship, Mobilisation ofResources): Perspective from Research FindingsCritical Action Research Areas in School and the Classroom with respect toElementary Education.

References:

•Celin Richards (1984). The Study of Elementary Education and Resource Book.Vol. I.

• Government of India (1986) National Policy on Education, New Delhi, MHRD.

• Government of India (1987) Programme of Action, New Delhi: MHRD.

• Government of India (1987) Report of the Committee for Review of National Policyon Education, New Delhi, MHRD.

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•Rita Chemicals (2008): Engaging pupil voice to ensure that every child matters: Apractical guide. David Fultan Publishers.

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•The Study of Elementary Education – A Source Book, Volume I & II, 1984.

•Victor & Learner (1971): Readiness in Science Education for the ElementarySchool, McMillan Co., N.Y.

•UNESCO (2006): Teachers and Educational Quality: Monitoring Global Needs for2015. UNESCO Publication. Montreal.

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Course Title: Elementary Education in India: Administration and Management

Course Code: MED 211 **Credit:1**

Practicum (any one of the following)

- Visit any two elementary schools and find out innovative teachingmethodologies. Prepare a detailed report.
- After surveying a Govt. & private school, prepare a report on how the nationand state agencies are really working for their betterment?
- Prepare a status report on elementary education in a chosen state or districtwith reference to classroom process, enrolment
- Retention/participation, dropout and learning achievement
- Evaluate a textbook of elementary class with reference to its adequacy andappropriateness in achieving expected learning out comes in any subject
- Design an instructional plan of a unit in a subject at elementary level

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Course Title: Planning & Management at Secondary Level

Course Code: MED 212 **Credits: 3(2L+1T)**

Objectives: The students will be able to:

- Acquaint themselves with the need, scope and purpose of educationalplanning in terms of national and community needs.
- Determine and implement objectives of planning on the basis of individualneeds of the students.
- Develop the skills in planning and implementing conventional administrativeprocedures.
- Develop the skills and attitudes to utilise human energy in getting themaximum work done.
- Understand the recommendations of different education commissionsregarding secondary education commissions.
- Know different programmes and policies for realising the constitutionalobligations related to secondary education in India.
- develop an idea about the structure of secondary education in India

Unit I: Introduction to Secondary & Senior Secondary Education

- Meaning, aims, objective of secondary & Senior Secondary education
- Purpose, function & Indigenous system of Secondary education.
- Secondary Education in India – Historical Perspective, pre and post-independence.
- Constitutional Provisions and centre-state relationship in India.
- Recommendations of various committees and commissions: SecondaryEducation Commission, Kothari commission, Programme of Action, 1986,

NPE, Ramamurti Review Committee Janardhan Reddy Committee, Yashpal,Committee, RMSA and NCF-2005.

- **Constitutional provisions**related to secondary education.

Unit II: Institution Planning

- Concept, scope and nature of Institution Planning
- Need and importance of Institution Planning
- Types of Institution Planning
- Evaluation of Institutional Planning.

-Difference between inspection and supervision.

Unit III: Principles and techniques of Educational Planning

- Formulation of aims and objectives.
- Methods and techniques of planning.
- Approaches to Educational Planning: Social demand approach, Man-powerapproach, Rate of Return of Investment approach.

- Concepts: Optimal analysis, Input and output, Marginal analysis,Programming, Target and control figures, Tools for Planning,

- New approach to planning: Planning, Adoption, Execution

Unit IV: Educational Management

- Meaning, Concept and need for management at secondary to seniorsecondary school level.

- Management at Nation: MHRD, CABE, NCERT

- State, District, Sub-district level.

- Management of educational Institution at secondary school level.

-Type of Management, Effective management, Co-ordination, Supervision &Inspection.

-TQM in Education and Educational Administration

-Recent Trends in Research and Innovation in the field of EducationalManagement.

References:

• Mudhopadyay, Sudesh and Anil Kumar K (2001) Quality Profiles of secondaryschools, NIEPA, New Delhi

• Govt. of India (1953) Report of Secondary Education Commission, New Delhi

• Govt. of India (1996) Indian Education Commission (1964-66) Report. New Delhi

• Govt. of India - (1986/1992) National Policy of Education, 1992 Modification andtheir POA's, MHRD, Dept. of Education

• Malhotra, P.L. (1986) School Education in India: Present Status and Future NeedsNCERT, New Delhi

• Yadav, M.S. & Lakshmi, T.K.S. (2003): Conceptual inputs for Secondary TeacherEducation: The instructional Role. India, NCTE.

• MohantyJagannatu, (1990), “Educational Administration, supervision and schoolManagement ,Deep& Deep Publications F-159, Rajouri Garden, New Delhi-110027

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Course Title: Planning &Management at Secondary Level

Course Code: MED 212 **Credit:1**

Practicum (any one of the following):

• To prepare a report with the help of documents/reports on major obstacles andchallenges in universalization of secondary education.

• To study the annual report of RMSA/NCERT or any Govt. agency to identify issuesof secondary education in India.

• To prepare a blue print of Process of Institution Planning in India.

• To prepare an annual school calendar for secondary/senior secondary school.

•To prepare a hypothetical institutional plan.

Specialization Courses II:

Course Title: Issues and Curricular Concerns at Elementary level

Course Code: MED 213 **Credits: 3(2L+1T)**

Objectives:The students will be able to:

□□Understand various schemes &programmes of Govt. for elementaryeducation.

□□Study effective practices with various curriculum transaction strategies.

□□Find out research trends in elementary education.

□□Select and use appropriate assessment practice to meet the needs of thestudents.

□□Practice continuous assessment of students for all round development.

□□Understand how various aspects of education are measured, evaluatedinterpreted and their results are recorded to help learners.

□□Understand the concept of quality education at elementary level.

□□understand different programmes and agencies for ensuring the quality ofelementary education in India

□□develop an idea about the structure of elementary education in India

□□Reflect upon different issues, concerns and problems of elementary educationin India.

□□Understand principles, aims and features of elementary school curriculum.

Unit I:-Issues & concerns of Elementary Education

- Major quality dimensions of elementary education and Quality monitoringtools.

- Quality issues at upper elementary stage: - teacher qualification,competency, subject specific deployment in schools, training needs ofteachers, classroom based support and supervision issues. Minimum Level ofLearning, Quality Assurance.

- Alternative Strategies for achieving UEE and implementing RTE act.
- Dialect, drop out, socio-economic issues, inclusive education.
-

Wastage, Stagnation, Culture, Capability Capacity, Reform Needs andimprovement of the System; building accountability

Unit II: - Teachers and Curriculum Transaction Strategies

- Thematic & Constructivism base of curriculum
- Joyful learning, Teachers and Pedagogical Attributes
- Research in curriculum
- Life skill education & creativity
- Analysis of Elementary Education Curriculum
- Role of I.C.T.
- Research Trends in Elementary Education

Unit III- Type of schools & Pedagogy

-Child centered pedagogy: Process of knowledge construction for developmentof concepts, understanding, logical reasoning, critical thinking and problemsolving.

- Type of school & their contribution to society
- Forms of learner's engagement: observing, exploring, discovering,analyzing, critical thinking and reflection, contextualization, multipleinterpretations, collaboration.
- Pedagogical analysis of the subject contents: Critical Pedagogy. Criticalanalysis of the pedagogy prescribed in the educational thoughts of Socrates(dialogue), John Dewey, Tagore, Gandhi, J. Krishnamurthy, Sri Aurobindo,andGijubhai with special reference to their relevance in teaching-learning.
- Innovative Educational Programmes in India

Unit IV:-Assessment Process

- Pupil Assessment Techniques
- National Expert Group on Assessment in Elementary Education (NEGAEE)
- Concept of Evaluation & CCE
- Types of evaluation
- Diagnostic & remedial teaching
- Student records
- Cumulative records

- Progress reports, grading system, class school, School Grading.

References:

• Aggerwal, J.C, (2005) "The Progress of Education in free India, "Man Singh Aryabook Depot, Naiwala. Karol Bagh, New Delhi-110005

• Chaube, Dr. S.P, (2011), "History and Problems of Indian Education "AgrawalPublications, Jyoti Block Sanjay place, Agra-2

• Ronald c. Doll, (1978) "Curriculum Improvement Decision Making and Process,Allyn and Bacon, Inc., 470, Atlantic Avenue, Boston, Massachusetts 02210

• NCTE (2009) National Curriculum Framework for Teacher Education, New Delhi.

• NCERT (2005): Position paper on Teacher Education for Curricular Renewal, New Delhi.

• Report of the Education Commission (1964-66).

• Report of the National Commission on Teachers (1983-85).

• National Curriculum Framework on school education, NCERT (2005).

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Course Title: Issues and Curricular Concerns at Elementary level

Course Code: MED 213 **Credit: 1**

Practicum (any one of the following):

• Prepare unit-test, administrate the test, determine gaps in attainment ofobjectives and plan remedial instruction for non-masters.

• Make an Evaluation of assessment process in any school and write about itsmerit and demerits.

• To prepare a critical review on schemes and programmes to achieve UEE in the state.

• Conduct a survey in a school to assess quality issues, and make an actionplan to resolve it.

• Find out the best learning engagement method of elementary level student,after school visit.

• Prepare a report after analysing the innovative educational programmes inIndia Visit DIET of the district to review on types and trends of research, actual practices in the institution and prepare a report on variation, betweennational or international trend (if any).

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Course Title: Issues & Curricular Concerns at Secondary level

Course Code: MED 214 **Credits: 3 (2L+1T)**

Objectives:The student will be able to:

- Understand the problem and challenges related to secondary and seniorsecondary education.
- Examine the status of development of secondary and senior secondaryeducation in India after Independence.
- Reflect on various issues related with secondary education
- Understand the interventions to solve the problems and issues related toalternative schooling at secondary schools.
- Identify the problems issues of secondary school teachers and visualize theimpact of Rights of children to free and Compulsory Education Act, 2009 foruniversalization of Secondary Education
- Identify critical issues related to universalization of secondary education.
- Visualize the impact of Rights of children to free and Compulsory EducationAct, 2009 for universalization of Secondary Education
- Understand the concept of quality education at secondary school level.
- understand different programmes and agencies for ensuring the quality ofsecondary education in India
- Reflect upon different issues, concerns and problems of secondary educationin India.
- Understand principles, aims and features of secondary school curriculum.
- Examine the present school curriculum.
- Analyse the present evaluation system at secondary school level.

UNIT I: Quality in secondary Education

- Concepts, indicators of quality, setting standards for performance.
- Continuous professional development of teachers.

-Teacher selection test CTAT,SAT etc. and in-service programme

-Privatization of secondary education.

- Present status of quality education in India (status and prospects) - Delor's -Commission Report regarding quality- Professional enrichment of secondaryteachers (different in-service programmes for ensuring quality, - differentagencies - SCERT – NCERT – CIET – NUEPA – IASE etc.

UNIT-II Issues & Concerns

- Challenges related to Universalization of Secondary Education, RMSA.

- Problems and Strategies of Alternative Schooling at Secondary schoolStage.

-Challenges / strategies / intervention in relation to access, enrolment,dropout, achievement and equality of Educational opportunities

-Problems of education for girls, disadvantaged and differently abled childrenand slow learners and interventions to solve the problems

-Type of schools and their contribution to society.

- Issues of quality in secondary and senior secondary education.

- Management system of secondary education - role of Department ofEducation, Directorate, Inspectorate and NGO's.

Unit III: - Teachers and Curriculum Transaction Strategies

- Thematic & Constructivism base of curriculum

-Joyful learning, Teachers and Pedagogical Attributes

- Research in curriculum

- Life skill education & creativity

- Analysis of Elementary Education Curriculum • Role of I.C.T.

- Research Trends in Elementary Education.

- Critical appraisal of present Secondary School curriculum in the state.

-ICT, Blended learning.

UNIT IV: Assessment and evaluation in secondary school level.

-Meaning, nature and functions of evaluation & assessment, difference between assessment and evaluation, testing, appraisal and examination, Types of assessment formative,diagnostic and summative assessment.

- New trends in evaluation – grading, internal assessment, semester system, CCE,On Demand Examination System.

-Critical appraisal of the present evaluation system at secondary school level.

References:

• Aggerwal, J.C, (2005) "The Progress of Education in free India, "Man Singh Aryabook Depot, Naiwala. Karol bag, New Delhi-110005

• Chaube, Dr. S.P, (2011), "History and Problems of Indian Education "AgrawalPublications, Jyoti Block Sanjay place, Agra-2

• Ronald c. Doll, (1978) "curriculum Improvement Decision Making and Process,Allyn and Bacon, Inc., 470, Atlantic Avenue, Boston, Massachusetts 02210

• NCTE (2009) National Curriculum Framework for Teacher Education, New Delhi.

• NCERT (2005): Position paper on Teacher Education for Curricular Renewal, New Delhi.

•NIOS: On Demand Examination System(2003).

• Report of the Education Commission (1964-66).

• Report of the National Commission on Teachers (1983-85).

• National Curriculum Frameworks for Teacher education, 2009

• National Curriculum Framework on school education, NCERT (2005).

Course Title: Issues & Curricular Concerns at Secondary level

Course Code: MED 214 **Credit: 1**

Practicum (any one of the following):

• Critical review on education management system of secondary school education -.

•Conduct a survey in a school to assess quality issues, and make an action plan toresolve it.

•Evaluation of assessment process in any school and write about its merit anddemerits.

•Visit IASE of the district to review on types and trends of research, actual practicesin the institution and prepare a report on variation, between national or internationaltrend (if any)

•Visit secondary teachers training in the district to review on types and trends ofresearch, actual practices in the institution and prepare a report on variation,between national or international trend (if any)

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Course Title: Internship in school

Course Code: MED 296 **Credits: 4P**

Objectives: The students will be able to

- Experience and understand the academic and social environment of schoolas social Institution.
- Observe and list the developmental needs of students.
- Identify and workout practical solutions of different types of problems.
- Develop teaching competence through practice teaching and social modelling.
- Try out different content based and learner based methods of teaching.
- Frame and assign different types of questions vis knowledge, understanding,application, HOTS (analysis and synthesis) and Evaluation Questions.

Select any two activities from each group given below:-

Group I:

Activity Marks

Prepare a report after analysis of private/innovative/alternative schoolswhich develop their own curricular or Co-curriculum activities/material orany innovation.

Working with community based on any project of social welfare.

(Submission of activity report)

Identify role and functions of key personnel like teachers, CRCs, BRCs,DIETs, community and others who will implement the programme andstrategies for their capacity building.

Prepare a report on teacher/ community participation in materialpreparation and in developing a school vision with plan of action forenhancement of the participation.

Laying down of minimum levels of learning and their incorporation incurricula, textbooks and teaching process

Group II:

Activity Marks

Preparing a suggested comprehensive plan of action for some aspects ofschool improvement.

Prepare portfolio, including detailing of teaching-learning plans, resourcesused, assessment tools, student observations and records.

Analysis of text book from peace perspective

Analyze any one course curriculum /text book to find out whether thevalues enshrined in the Constitution of India and the National Policy onEducation have been incorporated or not.

Analyse any one course curriculum /text book in the light of reflectingsensitivity to gender, caste and class parity, peace, health and needsof children with disabilities/ Link school knowledge in differentsubjects and children's everyday experiences.

Group III:

Activity Marks

Preparation, administration and analysis of diagnostic test (s) followed byremedial teaching.

Learning achievement surveys (baseline, midterm and end term) wouldbe made to track children's performance over the period.

Collect information about the background of children, their learning difficulties, challenges related to their performance along with the totalnumber of children to be covered.

Monitoring learner achievement vis-à-vis diagnostic test and action forimproving attainment levels in any school subject.

Group IV:

Activity Marks

Exhibition of work done by the students during the internship programme.

Seeking reactions of students, headmasters/ principals/ cooperatingteachers and supervisors with respect to the school environment.

Interaction with head teacher, management, teachers and non-teachingstaff for preparation of a report on school environment.

(Physical, psycho-social, and sustainability issues).

Type of materials to be developed for students. Analyze quality andprepare a suggestive report.

Conduct a programme in school with/in association of local workmen inschool activities.

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Course Title: Dissertation

Course Code: MED 297 **Credits: 2P**

To give the background of the problem, Review of the related literature, framing aresearch design, selection of tools, collecting and using data **in t**hought provokinglyand in a convincing manner, analysis and tabulation of data. Writing of ResearchReports with up to date references.

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Course Title: Academic Writing

Course Code: MED 298 **Credits: 2P**

Objectives: The students will be able to

- Reflect on their communicative behaviour.
- Improve their communicative behaviour performance
- Build capacities for self-criticism and facilitate self- growth.
- Enhance their listening & writing skills.
- Present effective class room lectures after enhancing their listening skills.
- Write or draft professional letters and mail etc.
- Use & differentiate different kinds of writings and writing styles according toCo-curricular activities.
- Reflect on essential requirements of academic writing & distinguish a goodacademic writing from others.
- Analyse academic sources and how to refer to them.
- Cite a source, paraphrase and acknowledge the source & edit one's ownwriting.

Practicum (any one of the following):-

- Prepare a programme on reflective thinking and negotiation skill and conductit in NGO/School/Educational Institution.
- Workshop on listening, conversing, speaking, presenting, explaining andexpositing ideas in groups and before an audience.
- Write a paragraph on any topic of interest, then acknowledge the source &edit one's own writing. Prepare a report on the entire programme.
- Attend a seminar/workshop or conference and write a report on entireprogramme.
- Workshop on academic writing skill and report writing.

References:

- www.ugc.ac.in
- www.ncte-india.org

- www.ngu.ac.in
- www.education.nic.in
- www.scribid.com
- HNGU Handbook-I
- HNGU Handbook-II

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SCHOOL OF EDUCATION

SEMESTER-II

Course Title: Philosophical Foundations of Education

Course Code: MED-105 **Credits: 3 (2L+1T)**

Objectives: The students will be able to

- Understand the relevance of Philosophy as a liberal discipline and a critical inquiry process.
- Undertake Philosophical enquiry as the basis of all Educational endeavors.
- Sensitize students to the concerns of human beings and the contributions of Philosophy there in.
- Appreciate the contribution of Western philosophy and Indian Philosophy to Education.

Unit I: Philosophy of Education- Its nature and function

- Education as a disciplinary,interdisciplinary and multidisciplinary field.
- Functions of Philosophy: Speculative ,Analytic, Prescriptive
- Philosophical Methods used in Education: Analysis, Synthesis ,Induction, Deduction, Dialectical.
- Fundamental Philosophical Domains-Epistemology, Metaphysics, Axiology
- Indian Philosophy and Education: - Axiology and Education: Critical appreciation of the contribution made by Upanishads, *Bhagavad Gita*, Buddhism, Jainism, Christianity, Islam ,Sikhism, and to Education in terms of value development. Commonality of all religions in terms of human values.

Unit II: Epistemology of Education

- Knowledge-Its meaning, nature, limits, origin, , types.
- Methods of acquiring valid knowledge with respect to analytical, dialectical & scientific approaches.
- Methods of acquiring valid knowledge with respect to Nyaya& Yoga.

Unit III: Recent Philosophical approaches to Education

- Realism
- Logical Positivism
- Existentialism
- Phenomenology
- Humanism
- Critique of the Scientific Method in the context of Education
- Thinkers and their contributions to Education: Vivekananda, M.K Gandhi AurobindoGhose,JidduKrishnamurti, J.P. Naik,B.RAmbedkar ,Madan Mohan Malviya, Immanuel Kant,Jean Paul Sartre,Henry Giroux, Israel Scheffler, David Carr.

Unit IV: Metaphysics and Education

- Concept of human nature and its relation with society.
- Impact of philosophical suppositions on education made by some prominent schools of Indian philosophies viz Vedanta &Sankhaya.
- A critical comparison of Indian& Western Schools of philosophies with respect to metaphysical implications of education.

References:

- Giroux Henry (2011) On Critical Pedagogy, Continuum Press.
- NoddingsNel (2012) Philosophy of Education, WestView Press.
- Paulo Freire (1996) Pedagogy of the Oppressed, Penguin Books.

- Brubacher (1950) Modern Philosophies of Education, McGraw Hill Book Co. New York
- Gallnick D.M. & Chinn P.C. (1994) Multicultural Education in Pluralistic Society; N.Y. Merrill.

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- Kilpatrick W. (1967) Source book in Philosophies of Education an Introduction, MacMillan Company New York.

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- Park Joe (1968) Selected readings in the Philosophy of Education, The Macmillan Co. London.
- Ross J. (1977) Groundwork of Educational Theory, Oxford University Press, Calcutta.Readings by Aurobindo, JP Naik, David Carr, Sartre

Course Title: Philosophical Foundations of Education

Course Code: MED-105 **Credit: 1**

Practicum (Any one of the following):

- Reflections on any two writings of:(chose any two of the following: Vivekananda, AurobindoGhose, J.Krishnamurti, J.P. Naik , David Carr, Jean-Paul, Sartre, Israel Scheffler, Henry Giroux,Immanuel Kant
- Reflections on the Educational Philosophy of any philosopher of your choice

Course Title: Sociology of Education

Course Code: MED-106 **Credits: 3 (2L+1T)**

Objectives: The students will be able to

- Understand the social nature of education.
- Realize the need of studying education with sociological perspectives.
- Understand the relationship of different social institutions with education.
- Understand the role of education and change.
- Understand the relationship of education and national development.
- Understand the social foundation of education.
- Understand the role of school in creating and fostering the socialization process.

Unit I: Education and Sociology

- Need to understand education with sociological perspectives.
- Concept of educational sociology and sociology of education.
- Scope of sociology of education.
- Sociological perspective.
- Education, Culture and Socialization.
- Education as a sub system of social system.

Unit II: Education and Social Structure

- Concept of social unity, unity and diversity of caste, class, religion, human language, gender in society with specific reference to Indian society with respect to living together.
- Education for social unification.
- Concept of social equity and justice.
- Concept of Equality of Educational Opportunity.
- Relationship of education and social justice.
- Concept of inclusive education, inclusive schools and inclusive class rooms.

Unit III: Education, National Integration and International Understanding

- Education and politics.
- Education and India as a India as a nation state.
- Education and globalization.
- Core values of Indian constitution and its inculcation.

Unit IV: Education and Social Change

- Concept of: social change, social development, sustainable development, economic development.
- Education as a means of social change: scope and limitations.
- Modernization and post-modernization, liberalization-privatization-globalization (LPG).
- Education for empowerment.

References:

- Ambasht, N.K.(1971).A Critical Study of Tribal Education. New Delhi: S. Chand & Company.
- Gore M.S. (1967**)** Papers in the Sociology: Education in India, NCERT, New Delhi.
- Gore M.S. (1994**)** Indian Education: Structure & Process Rawat Publications, New Delhi.
- Ruhela S.P. (1970) Sociological Foundation of Education in Contemporary India, DhanpatRai, Delhi. 29
- Shepard Jon M. (1981)Sociology, West Publishing Co.St. Paul.
- ShuklaSureshchandra (1985)Sociological Perspectives in Education A Reader, Chanakya Publication, Delhi.

Course Title: Sociology of Education

Course Code: MED-106 Credit:1

Practicum (any one of the following):

- Study of the concerns of the implementation of the RTE Act. Critical study of any social problem vis-a-vis the role of education

Course Title: Curriculum Studies in Education

Course Code: MED-107 Credits: 3(2L+1T)

Objectives: The students will be able to

- Explain the significance of curriculum as a field of study in Teacher Education.
- Get sensitized to curriculum as a process, product and praxis.
- Develop critical understanding on various issues of curriculum as a discipline and across disciplines.
- Acquaint students with the different aspects of curriculum evaluation.

Unit I: Curriculum-Meaning and Foundations

- Concept of Curriculum, syllabus/courses of study, domains of curriculum, curriculum objectives, course content, teaching learning experiences, evaluation.
- Curriculum as a field of study and its evolution
- Foundations of the curriculum: philosophical, sociological, psychological, and historical.Societal needs and the Curriculum.
- Components of curriculum
- Types of Curriculum with special reference to Hidden Curriculum.
- Social reconstructions curriculum: purpose, characteristics, role of teacher Humanistic Curriculum: Purpose, Characteristics, Role Teacher and Implications for Pedagogical practice, the class room.
- Curriculum change (Determinants and the role of a teacher)

Unit II: Curriculum Planning and Designing

- Curricula objectives: Sources and Formulation.
- Curriculum Planning Framework: Need and Relevance
- Brief overview of Curriculum Planning Frameworks in India with reference to NCFSE-2000, NCF-2005 and NCFTE 2009.
- Step of curriculum planning.
- Models of curriculum planning
- Community knowledge.

- Approaches to Curriculum Development-Subject centred, Learner centred, Community centred.

- Principles of Curriculum Development

Unit III: Curriculum Transaction

- Concept of instruction, instructional design and instructional media.
- Role of Communication in Effective Curriculum Transactions (Verbal and Non Verbal)
- Qualitative and Competences of a Teacher to engage as a critical Pedagogue.
- Factors influencing Curriculum Transaction
- Approaches for Curriculum Transaction: Collaborative Learning, Cooperative Learning, Team Teaching.
- Need and Role of Challenge and Feedback in effective Curriculum Transaction

Unit IV: Assessment and Evaluation:

- Curriculum Evaluation: Concept and Purpose
- Types: Formative and Summative
- Norm-referenced and Criterion -referenced.
- Continuous Comprehensive Evaluation
- Transparency and Objectivity in Evaluation

Techniques of Curriculum Assessment and Evaluation

(i) Types of questions
(ii) Portfolios
(iii) Rubrics
(iv) Self-Assessment
(v) Peer Assessment
(vi) Content analysis
(vii) Grading
(viii) Computer Assisted Assessment

References:

- Dewey, J. (1966). The Child and the Curriculum. The University of Chicago Press.
- Diamond Robert M. (1986) Designing and Improving Courses in Higher Education: A Systematic Approach, California, Jossey-Bass Inc. Publication.
- Joseph, P.B. et al; (2000): Cultures of Curriculum (studies in Curriculum Theory). New York. Teacher College Press.
- Oliva, Peter F. (1988) Developing the Curriculum. Scott, and Foresman and Co.
- Reddy, B. (2007): Principles of curriculum planning and development.
- NCERT (2000). National Curriculum Framework for School Education, NCERT, New Delhi.
- NCERT (2005). National Curriculum Framework-2005, NCERT, Sri AurobindoMarg, New Delhi.
- Arora, G.L. (1984): Reflections on Curriculum. NCERT.
- Dewey, John (1966). The Child and the Curriculum. The University of Chicago Press.
- McKernan, James (2007): Curriculum and Imagination: Process, Theory, Pedagogy and Action Research. Routledge. U.K.

Course Title: Curriculum Studies in Education
Course Code: MED-107 **Credit:1**

Practicum (any one of the following):

- Critical Review of original documents i.e. National Curriculum Frameworks developed by NCERT (NCF-2000 and 2005) /NCFTE 2009, NPE-1986 (modified version 1992) POA on NPE-1986, 1992 and examine the same with respect to various aspects of foundation, critical comments be supplied for the same.
- Students will go through various definition of curriculum and will arrive at comprehensive definition of curriculum. They will identify various components of Curriculum.
- Prepare a rubric for evaluation of workshop/ seminar/one microteaching skill.

- Evaluation of a text book.

Course Title: Teacher Education
Course Code: MED-108 **Credits: 3(2L+1T)**

Objectives: The students will be able to

- Get sensitized to the aims and development of teacher education in India.
- Develop an understanding of the teacher education curriculum in India.
- Acquaint with the competencies essential for a teacher for effective transaction.
- Get equipped with the skills to become effective and efficient teachers and teacher-educators.

Unit I: Teacher Education in India: Historical Perspective

- Teacher Education – Concept, aims and scope; Need and significance of Teacher Education, Aims & Objectives of Teacher Education at various levels.
- Teacher Education in Ancient, Medieval and Modern India.
- Teacher Education in the Post-Independence Period
- Approaches to Teacher Education
- Recent Trends in Teacher Education and present scenario.

Unit II: Teacher Education Programmes and Institutions in India

- Teacher Education Programmes in India.
- Institutions and Agencies of Teacher Education its monitoring and implementation.
- Centrally Sponsored Schemes in Teacher Education-IASE, DIETs etc.
- Pre-service and In-service Teacher Education in India: Need, concept, objectives and techniques.
- Issues of teacher education.
- Issues related to in- service training and suggestions.
- Students teaching role, rationale and models of student teaching.

Unit III: Teacher Education Curriculum and Transaction

- Analysis of Teacher Education Curriculum at different stages Pre-primary, Elementary, Secondary and Higher Education: Approaches to Teacher Education–consecutive and integrated.
- Qualities of a good teacher- teaching skills.
- Competency-based teacher education: Quality assurance in teacher education.
- Initial and Continuing Education of Teachers and Teacher Educators.

Unit IV: Teacher Education through Open and Distance Learning- Innovations and Research in Teacher Education

- Open and Distance Learning: Need, Scope, Types and Characteristics.
- Use of Training Technology and Media& ICT in teacher education.

- Innovative Programmes for continuous professional development of school teachers
- Research in Teacher Education and scope of Action Research in teacher education.
- New development in teacher education: study of futuristic, innovations, experiments and researches in teacher education.

References:

- Desai D.M.: New directions in the Education of Indian teachers Baroda, M.S. University 1971.
- Gupta Arun K.: Teacher Education: Current & Prospects New Delhi, Sterling Publications 1984.
- India, Ministry of Education; Report of the Education Commission (1964-66) Education &Nationaldevelopment New Delhi publication division 1966.
- Jangira N.K.: Teacher training &teachereffectiveness an experience in teacher, behaviour New Delhi, National Publishing House, 1979.
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- Kochar S.K.: Methods & techniques of teaching 2nd & rev & enlarged edition, New Delhi, Sterling Publishers 1985.

- NCF 2000, NCF 2005-NCERT Publication, New Delhi.
- NCFTE-2009-NCTE Publication, New Delhi.
- Regional colleges of: New dimensions in teachers Education, New Delhi, NCERT.

- Uday Shankar: Education of Indian Teachers, New Delhi, Sterling publishers, 1984.
- UNESCO: Regional office for Education in Asia, Bangkok, Exploring, New dimensionsin Teacher Education, Bangkok, UNESCO, 1976:
- UNESCO: A System approach to teaching & learning procedures a guide for teacher Educators, Paris: UNESCO, 1981.
- Upasani N.K.: Effective college Teaching, Mumbai S.N.D.T Women's University, 1988.
- Upasani N.K.: Planning for better learning Mumbai, S.N.D.T. Women's University, 1988.

Course Title: Teacher Education

Course Code: MED-108 **Credit:1**

Practicum (any one of the following) :

- A survey of research in Teacher Education conducted during last two years on school teachers, or on higher education teachers, or on teacher educators.
- Preparation of facilitative resource materials in school education (on any teaching unit).
- A work study project related to teacher education, problems andimprovement possibilities.
- Examining teaching competency and effectiveness of prospective teachers with reference to teaching methods and skills used.
- Preparing a" Peer Group Observation Performa", administer it and evaluate teaching materials and skills. Give feedback and suggestions forimprovement.

Course Title: Dissertation
Course Code: MED-194 **Credits: 2P**

Dissertation

- Teacher educator will facilitate the areas of research related to educational issues.

- Students are expected to take up a research based project on an area of interest which is associated with optional/specialization course or challenges faced /recent needs and trends.
- Identification of the problem and its statement.
- Preparation of Synopsis/Research Proposal.
- Preparation of research proposal and its presentation, followed by viva.

Course Title: Internship in Teacher Education Institutions
Course Code: MED-195 **Credits: 4P**

Internship will be organized with deputation to both pre- service as well as in- service teacher education institutions setting for 3 weeks such as CBSE,NUEPA,NCERT, **SCERT,DIETs, IASE,NGOs, Curriculum Development Bodies, University Education**Departments, Colleges of Education etc. Necessary orientations to the students, teachers, concerned supervisor and teacher
educators from the respective institutions of teacher education need to be provided before organizing the internship.

Learning Outcomes: The students will be able to

- Internalize the working of teacher training institution.
- Develop insight into the working of institution.
- Create an interface of theory and practice.

Assessment (marks wise) is based
on the following activities:

Activities Marks

1. Mode of transaction, giving suggestive plan for improvement.

2. Observation of day-to-day activities of the institution and report of an in- depth study of any two activities.

3.Participation and organization of Co-curriculum activities
a. Cultural b. Literacy
c. Games & sports
d. Sharman.

4. Teaching work Five periods in any one compulsory paper of TEI and five periods in methodology of teaching.
5.Observation & supervision of five lessons in teaching subjects
6. Selecting two students and mentoring on psychology, social, academics and perspective, prepare a report.
7. Prepare reflective journal
8. Critical review with suggestions of lesson plan diaries, including supervisor's remarks

9. Participation in, any one, pre- or in- service teachers training programme for preparation of in- depth report on it.
10. Analyze nature & type of any one pre-or in-service teachers training programmeorganized by the institution
11. Prepare an evaluation Performa in pre- or in- service teachers training programme, apply it and prepare a report on its effectiveness of the programme with suggestive plan.

12. Prepare a module for pre- or in- service teachers training programme and find its affectivity.
13. Review new trends in research of teacher education and Draft a report.

14. Training report about arrangement of different departments of theschool like
a. Library management
b. Administration and scoring of any five psychological tests.
c. Science club.
d. Office Records and maintenance of attendance register, teacher's diary & stock Register.
e. Maintenance of technology department
15. Training report for evaluation process:-
a. Construction of question paper
b. Preparation for Examination.
c. Evaluation of answer books and preparation of result

MASTER OF EDUCATION

Semester - IV (Credits = 16) (Marks= 400)								
Course No.	**course code**	**Course Title [THEORY]**	**Marks**	**Credit**	**Internal Assessment Weighage**			**External Assessment Weighage**
					MSE-I	**Project Work**	**TOTAL**	**TOTAL**
1	MED-216	Advance Curriculum Theory	100	4	10	20	30	70
		Specialization Courses-III(Any One of the following						
2(a)	MED-217	Policy, Planning and Financing of Education	100	4	10	20	30	70
b)	MED-218	Educational Technology	100	4	10	20	30	70
(c)	MED-219	Issues, Planning and Policies of Elementary Education	100	4	10	20	30	70
		Specialization Courses-IV(Any One of the following						
3(a)	MED-220	Peace Education	100	4	10	20	30	70
(b)	MED-221	Educational, Vocational Guidance	100	4	10	20	30	70
(c)	MED-222	Inclusive Education	100	4	10	20	30	70
(d)	MED-223	Environmental Education	100	4	10	20	30	70
PRACTICAL								
1	MED-299	Dissertation	100	4			40	60

Semester IV

Course Title: Advance Curriculum Theory
Course Code: MED-216 **Credits: 3(2L+1T)**

Objectives: The students will be able to

- Enhance quality of syllabus, after understanding of curriculum and concept of syllabus \analysis.
- Develop expertise/ specialize in curriculum theories, models and analysis of syllabus.
- Develop capabilities of theoretical understanding of curriculum as well as practical abilities to work in these areas.
- Understand appropriate text books, syllabus and other curriculum material.
- Understand the rationale behind teaching.

Unit I: Curriculum Theories

- Major Characteristics of Curriculum Theory: - Logic Structure, conceptual structure, cognitive structure Empirical structure, Existential Structure.
- Meaning and nature of curriculum theory and curriculum models, difficulties in evolving curriculum theories.
- Approaches to curriculum theory: scientific- technical, humanistic, system.

- Models of curriculum development-inductive and deductive.
- Type of Curriculum in Elementary Level.
- Curriculum Theories: - Idealist, Realist, Naturalist, Pragmatic, Existential, conservatism Curriculum Theory.

Unit II: Analysis of Syllabus

- Criteria for analyzing the syllabus
- Analysis of the syllabi for the elementary education in India
- Characteristics & Mechanism of the preparation of text book.

Pedagogical analysis, concept mapping.

- Criteria for Text book Evaluation: - Physical Aspects, presentation of content and its organization in the text books

a. Content and Organization of curriculum. 61
b. Methodology of development of curricular materials viz., textbooks, workbooks, teacher handbooks.

Unit III: Model of Curriculum Evaluation

- Objective model, Tradition Model, Illuminative Model, Decision-Making Model, Case study of portrayal Model, Research and Development Model, Professional Model.
- Parameters of Curriculum Evaluation- Curriculum Prescription, Evaluation Agency unit of evaluation, temporal context, Expected Impact of curriculum Evaluation.

Unit IV: Elementary Curriculums in India

- Critical analysis of curriculum: concept, importance and process
- Study of different state (any three) curriculum
- Difference of curriculum among different type of school
- Curriculum Development in NCERT and SCERT

References:

- Ambasht, N.K. (2009).Why we are teaching what we are teaching: IASE (Deemed University, SardarShehar, Rajasthan)
- J.B. MacDonald (1971). Curriculum Theory. The Journal of Educational Research, 64, 5, 195-200.

- Erickson, H.L. (2002): Concept-based Curriculum and Instruction. Crown Press, Inc. California. NCERT (2005): National Curriculum Framework, NCERT, New Delhi.
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- W.F. Pinar (2004). Understanding Curriculum. New York, NY: Peter Lang Publishing, Inc., p. 97.
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- Dewey, J. (1902). The Child and the Curriculum (pp. 1-31). Chicago: The University of Chicago Press.
- W.F. Pinar (2004). Understanding Curriculum. New York, NY: Peter Lang Publishing, Inc., p. 116-142.
- W.F. Pinar (2004). Understanding Curriculum. New York, NY: Peter Lang Publishing, Inc., p. 148-151.

- Banks, J. A. (1995). Multicultural education and curriculum transformation. The Journal of Negro Education, 64(4), 390–400
- McGee Banks, C. A., & Banks, J. A. (1995). Equity pedagogy: An essential component of multicultural education. Theory into Practice, 34(3), 152–158
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- Freire, P. (2000). Pedagogy of the oppressed. Bloomsbury Publishing. 63
- D'Souza, D. (1991). Illiberal education: The politics of race and sex on campus. Simon and Schuster
- Banks, J. A. (1995). Multicultural education and curriculum transformation. The Journal of Negro Education, 64(4), 390–400

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Course Title: Advance Curriculum Theory

Course Code: MED-216 **Credit: 1**

Practicum (any one of the following):

- Critical study of existing school curriculum of state (at any level), preparing a training plan or design for the in service training or specified target group on a specified theme.
- Review of any school text book, in the light of physical aspects, presentation of content and its organization.
- Comparative study of status of elementary education in various state (at least four).
- Visit two schools, where different curricula are adopted and find out learning level or attain educational objective.

Specialization-III

Course Title: Policy, Planning and Financing of Education

Course Code: MED 217 **Credits: 3(2L+1T)**

Objectives of the Course:

- To sensitize students to the factors affecting Educational Planning in India.
- To develop critical understanding of the dynamics of Educational Management.
- To examine the process and procedures related to financing of Indian Education.
- To analyze the recent trends in Educational Management in India.

Unit I: Indian Education: Planning and Policy

- Concept, Scope and Dimensions of Educational Planning
- Approaches to Educational Planning
- Educational Planning at the National, State, District and Institutional Level
- Policy Formulation :Process and Implementation Analysis, Issues and Policy change at national and state level affecting Indian Education 64

Unit II: Management of Education: Meaning and Scope

- Nature, Scope and Functions of Educational Administration and Management.
- Management Styles: Autocratic, Democratic, Lazes faire.
- Theories of Management and their Implications for Education.
- Total Quality Management in Education: Concept, Stages of TQM, Need andRelevance in Indian Education.

Unit III: Financing of Education

- Education as Investment
- Financing of Education in India since Independence
- Sources of Finance
- Budgeting of Education: Types and Procedures
- Provisions of Financing Education in the 12th Five Year Plan

Unit IV: Recent Trends in Educational Management in India

- Globalization and Internationalization and their Impact on Educational Policy
- Decentralized Planning and Management: Problems and Issues
- Institutional Autonomy and Accountability
- Assessment and Accreditation in Education: Concept Role of ISO, QCI, NAAC.

References:

- Blaug. Mark (1972): An Introduction to Economics of Education, Allen lane. London, Penguin. Cohn E and T.
- Gaske (1989), Economics of Education, Pregamon Press, London.
- Coombs, P.H and Hallak.J (1988) Cost Analysis in Education: A Tool for Policy and Planning, Baltimore: John Hopkins Press.
- G. Psacharopoulos (1987): Economics of Education: Research and Studies, NewYork: Pergamon Press.
- Mehrotra, Santosh(2006) The Economics of Elementary Education in India, The Challenge of public finance,private provision and household costs, sage publication,New Delhi.

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Course Title: Policy, Planning and Financing of Education
Course Code: MED 217 Credits: 1
Practicum

- Visit any Govt. / private school to study financial resources of the schools, giving suggestions for enhancement of the resources.
- Through internet surfing of literature review find out chronologically financial resources of elementary school/education.
- Analyze similarities & differences of thoughts of Indian & western economists on economics of education.
- Preparation of budget for a school
- Preparation of a blue print for expenditure control in a school.
- Preparing a report on the existing status of the secondary school teachers, method of recruitment and salary structure.
- Draft a report on Financial Contribution of community to school and prepare a suggestive action plan /strategy for enhancement.
- Seminar on Models of development based on free market economies.
- Poster designing competition on Central and state level expansion on Elementary Education & girl education

Specialization-III

Course Title: Policy, Planning and Financing of Education
Course Code: MED 217 **Credits: 3(2L+1T)**
Objectives of the Course:

- To sensitize students to the factors affecting Educational Planning in India.
- To develop critical understanding of the dynamics of Educational Management.
- To examine the process and procedures related to financing of Indian Education.
- To analyze the recent trends in Educational Management in India.

Unit I: Indian Education: Planning and Policy

- Concept, Scope and Dimensions of Educational Planning
- Approaches to Educational Planning
- Educational Planning at the National, State, District and Institutional Level
- Policy Formulation :Process and Implementation Analysis, Issues and Policy change at national and state level affecting Indian Education 64

Unit II: Management of Education: Meaning and Scope

- Nature, Scope and Functions of Educational Administration and Management.
- Management Styles: Autocratic, Democratic, Lazes faire.
- Theories of Management and their Implications for Education.
- Total Quality Management in Education: Concept, Stages of TQM, Need and Relevance in Indian Education.

Unit III: Financing of Education

- Education as Investment
- Financing of Education in India since Independence
- Sources of Finance
- Budgeting of Education: Types and Procedures
- Provisions of Financing Education in the 12th Five Year Plan

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- Globalization and Internationalization and their Impact on Educational Policy
- Decentralized Planning and Management: Problems and Issues
- Institutional Autonomy and Accountability
- Assessment and Accreditation in Education: Concept Role of ISO, QCI, NAAC.

References:

- Blaug. Mark (1972): An Introduction to Economics of Education, Allen lane. London, Penguin. Cohn E and T.
- Gaske (1989), Economics of Education, Pregamon Press, London.
- Coombs, P.H and Hallak.J (1988) Cost Analysis in Education: A Tool for Policy and Planning, Baltimore: John Hopkins Press.
- G. Psacharopoulos (1987): Economics of Education: Research and Studies, New York: Pergamon Press.
- Mehrotra, Santosh(2006) The Economics of Elementary Education in India, The Challenge of public finance,private provision and household costs, sage publication,New Delhi.

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Course Title: Policy, Planning and Financing of Education
Course Code: MED 217 Credits: 1
Practicum

- Visit any Govt. / private school to study financial resources of the schools, giving suggestions for enhancement of the resources.
- Through internet surfing of literature review find out chronologically financial resources of elementary school/education.

- Analyze similarities & differences of thoughts of Indian & western economists on economics of education.
- Preparation of budget for a school
- Preparation of a blue print for expenditure control in a school.
- Preparing a report on the existing status of the secondary school teachers, method of recruitment and salary structure.
- Draft a report on Financial Contribution of community to school and prepare a suggestive action plan /strategy for enhancement.
- Seminar on Models of development based on free market economies.
- Poster designing competition on Central and state level expansion on Elementary Education & girl education

Course Title: Issues, Planning and Policies of Elementary Education

Course Code: MED219 **Credits: 3 (2L+1T)**

Objectives: The students will be able to

- Gain insight into the vision and mission of Elementary Education in the country.
- Develop understanding for enhancing learner's achievement.
- Reflect on various concerns of elementary education
- Gain insight into factors promoting success and participation in quality in elementary education.
- Develop understanding about quality dimensions of elementary education
- Promote understanding of vision and mission of elementary education.
- Examine the existing reports to gain insight into concerns of elementary education.
- Reflect on various issues related with elementary education.
- Understand about the policies and programmes of elementary education
- Contribute to reform the elementary education system of India.

Unit I: Vision and mission

- Vision and Mission of Elementary Education
- School Systems across the States
- 12th Five-Year Plans –Objectives, key issues and focus.
- Constitutional Provisions, Right to Education and its implications
- Quality Assurance in Elementary Education
- Constitutional provisions regarding role of central and State Govts. For providing elementary education.

Unit II: Concerns in Elementary Education

- School Effectiveness, Classroom Climate and Teacher Attributes, Joyful learning, Order and Discipline, Law and Order in the Society and its Effect on School, quantity & quality of trained teachers. Quality of Elementary Education.
- Problems of equity and equality of opportunities.
- Management of Resources: Manpower Planning, Recruitment; Budget Constraints Planning for School
- Inspection, Supervision and Monitoring.
- Innovative Approaches: Activity Based learning Experiment

Unit III: Policies & Programs of Elementary Education

- District Primary Education Programme-goals and strategies.
- Minimum Levels of Learning
- SarvaShikshaAbhiyan& RTE Act 2009- goals and specific programme interventions at national level and in respective states to improve access, enrolment, retention/participation and achievement. Problems of wastage and stagnation.
- Monitoring, research and evaluation of specific schemes like mid-day meals, establishments of VEC and different incentive schemes and achievement levels.

Unit IV: Financing and Planning of Elementary Education

- Meaning, nature and scope
- Economic development and financing of education
- Financing of education in India: Centre- State relationship, mobilization of resources
- Cost Benefit Analysis in Education
- RTE Act 2009-analysis and implications for curriculum planning, teaching methodology and evaluation.

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- Bruns, Barbara; Minqat, Alain and Rakotomalala, Ramahatra (2003). Achieving Universal Elementary Education by 2015. A Chance for Every Child. World Ban Publications.
- De, Anuradha&Dreze, Jean (1999). Public Report on Basic Education In India. Oxford University Press. USA. 70
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- Hayes, Denis (2008): Elementary Teaching Today: An Introduction. Routledge Publications, U.K.
- Hurlock, E. (1995). Child Development. McGraw Hill Book Company, USA
- Kabra, K.M. (1977) Planning Process in a District, New Delhi: Indian Institute of Public Administration.
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- Rao, V.K. (2007): Universalization of Elementary Education. Indian Publishers, New Delhi.
- Rita Chemicals (2008): Engaging pupil voice to ensure that every child matters: A practical guide. David Fultan Publishers.
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Course Title: Issues, Planning and Policies of Elementary Education
Course Code: MED-219 **Credit: 1**
Practicum (any one of the following):

- Preparation of research design on a theme, discipline.
- Students will be required to critically analyze any one of the following reports: Annual Status of Education Report (ASER); Achievement surveys; PROBE; Pastiche Report on Education; Global Monitoring; Report of UNESCO
- Write a report on Criteria of resource mobilization and resource utilization
- Cost analysis in Education
- Each student is required to prepare and present in a seminar a status report on economic development & financing of education.
- Visit a school for reporting on access, and enrolment/ retentions of girl students and give suggestions for improvement.
- Critical Analysis of Research Studies on programs and policies related to elementary education.

Course Title: Educational Technology
Course Code: MED-218 **Credits: 3 (2L+1T)**
Objectives: The students will be able to

- Appreciate the relevance of Information and Communication Technology in education.
- Develop an understanding of Media Technology and Instructional System foruse in education.
- Acquaint with the nature, forms, research trends and applications of Educational Technology.

Unit -I: Instructional Technology

- Educational Technology (E.T.): Historical development, Evolution, Concept, Types and Scope.
- Teaching: different concepts and their implications.
- Various levels of Teaching and Learning.
- Instructional Theory: Concept, nature and types, with special reference to Cognitive Construct Theories (Bruner and Amusable), Task Analysis Theory, Systems Approach and Information Processing Theory.
- Instructional Procedures: Teaching of Concepts and Principles. Teaching for problem solving.
- Models of Teaching: Concept, nature and major types, with special referenceto CAM, A OM, ITM (Suchman), Jurisprudential Inquiry.

Unit- II: Instructional Media and Theory

- Communication: (i) concept, process and components: Unidirectional and interactive communication. (ii) Teaching-learning as a communication process, factors influencing classroom communication.
- Media: Concept, characteristics, uses and limitations of various media. Media-selection and integration, Multi-media packages and their uses in formal, non-formal and distance education. Media development policy, programmes and strategies.

Unit- III: Instructional Design

- Instructional Design: Concept and componel1ts. Individualized Instruction (Programmed instruction, Keller's plan, Mastery learning), small-groupinstruction, Large-group instruction.
- Teacher Behavior Modification: Micro-teaching, Simulation, Interaction Analysis, Competency Based Teacher Education.
- Open/Distance learning systems –Concept, need characteristics and scope, nature of learning materials, evaluation and feedback.

Unit IV: Recent Trends and Research in Educational Technology

- Research in Educational Technology -trends and priority areas.
- Information Technology in Education
- Development of Teaching Learning Material, Development of self-learning material and audio video material
- Interactive multimedia and their use.
- Role of CIET, UGC, IGNOU etc. in promoting education technology

References:

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- Bharihoke, Deepak (2000). Fundamental of Information Technology. New Delhi: Pentagon Press.
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- Honcok, A, (1977). Planning for Educational Mass Media: New York. Lougman Group Ltd.
- Kovalchick, Anna and Dawson, Kara (2005). Encyclopedia of Education and Technology: New Delhi. Vol 1 and 2 Pantagon Press.
- Kumar, Keval. J. (2006). Mass Communication in India. Mumbai.

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- Mohanti, J. (1992). Educational Technology. New Delhi Deep and Deep Publication Co.

Course Title: Educational Technology
Course Code: MED 218 **Credits: 1**
Practicum (anyone of the following):

- Designing an instructional programme based on Systems Approach.
- Preparation of instructional material based on CAM/ AOM/ITM/JIM.
- Preparation and use of instructional material for teaching at elementary/secondary/senior secondary levels of teaching and learning. Preparation of Instructional material for teaching of concepts/ principles/ problem solving for elementary/secondary/senior secondary levels.

Specialization-IV

Course: Inclusive Education
Course Code: MED-222 **Credits: 3(2L+1T)**
Learning Objectives: The students will be able to

- Understand concept, meaning and significance of inclusive education.
- Appreciate the need for promoting inclusive practice and the roles and responsibilities of the teachers.
- Develop critical understanding of the recommendations of various commissions and committees towards teacher preparation for inclusive education and special education
- Understand the nature of difficulties encountered by children
- Analyze special education, integrated education, mainstream and inclusive education practices.
- Identify and utilize existing resources for promoting inclusive practice.
- Develop a positive attitude and sense of commitment towards actualizing the right to education of all learners,
- Prepare a conducive teaching learning environment in varied school settings,
- Develop the ability to conduct and supervise action research activities,

Unit I: Introduction, Issues& perspectives of Inclusive Education

- Definition, concept and importance of inclusive education.
- Historical perspectives of inclusive education for children with diverse needs.
- Difference between special education, integrated education and inclusive education.
- Advantages of inclusive education for education of all children in the context of Right to Education.
- NCF-2005 and adaptation of teaching learning material

Unit II: Policy Perspective

- Recommendations of Indian Education Commission (1964-66).
- Scheme of Integrated Education for Disabled Children
- SSA
- Inclusive Education of Disabled at Secondary Stage (IEDSS).
- National Policy on Education (NPE, 1986-92).
- National Curriculum Framework, 2005 NCERT
- The Convention on the Rights of the Child (Article 23, 28, 29 a2, 3, 6 and 10 &12).
- The World Declaration on the Survival, Protection and Development of Children and the Plans of action (Outcome of the UNICEF World Summit for Children, (1990).
- Educational provisions in Person with Disability Act.
- Rehabilitation Council of India Act(1992).
- National Trust Act (1999).
- UN convention on the Rights of Persons With Disabilities.
- Promoting Inclusion Preventing Exclusion
- The National Trust for the Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disabilities Act 1999.

UNIT-III: Diversity in the classroom

- Diversity -- Meaning and definition.
- Disability – Legal definition, discrimination.
- Giftedness.
- Concept, Nature, and Characteristics of Multiple Disabilities.
- Guidelines for adaptation for teaching/ practicing science, mathematics, social studies , languages, physical education yoga, heritage arts theatre, drama etc in inclusive settings.
- Utilization of records/ case profiles for identification, assessment, and intervention for inclusive classrooms.
- Techniques and methods used for adaptation of content , laboratory skills and play material

Unit IV: Teacher Preparation and Inclusive Education

- Review existing educational programmes offered in secondary school (general, special education).
- Skills and competencies of teachers and teacher educators for secondary education in inclusive settings.
- N.C.F 2005 and curriculum for teacher preparation and transaction modes.
- Roles, responsibilities and professional ethics of an inclusive education teacher and teacher educators.
- Evaluation and follow up programmes for improvisation of teacher preparation programmes in inclusive education programmes.
- Role of different national and international agencies {institutions, universities} in promoting inclusive education.

References:-

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- Ahuja. A, Jangira, N.K. (2002): *Effective Teacher Training; Cooperative Learning Based Approach: National* Publishing house 23 Daryaganj, New Delhi 110002.
- Jangira N.K. and Mani, M.N.G. (1990): *Integrated Education for Visually Handicapped*, Gurgaon, Old Subjimandi, Academic Press.
- Jha. M.(2002) *Inclusive Education for All: Schools Without Walls,* Heinemann Educational publishers, Multivista Global Ltd, Chennai, 600042, India.
- RCI (2008).Status of Disability in India.New Delhi.
- Sharma, P.L. (1990) *Teachers handbook on IED-Helping children with special needs* N. C. E R T Publication.
- Sharma P.L (2003) *Planning Inclusive Education in Small Schools*, R .I E. Mysore

Course: Inclusive Education
Course Code: MED 222 Credits: 1
Practicum (any one of the following):

- Make a critical appreciation of Right to Education Act in the context of inclusive education.
- Conduct a survey in the local area to ascertain the prevailing attitudes / practices toward social, emotional and academic inclusion of children with diverse needs.
- Study & review any two national policies in the light of inclusive education.
- Critical analysis of N. C. F 2005 for planning quality teacher preparation programme
- Selecting appropriate areas of research.
- Types of research needed for enhancement of learning.
- Steps involved in planning and supervising research activities.
- Recent trends in research - national and international level
- Observation of inclusive teaching strategies and discussion.
- Planning and conducting multi-level teaching in the DMS (two classes).
- Identify suitable research areas in inclusive education.
- Visit to special schools for VI, HI, ID, CP, and Autism and prepare a list of tools for identification.
- Observe an inclusive class at least five days and find out skills & competencies used by the teacher. Give suggestive strategy/plan of teaching for betterment.
- Conduct a survey on the type of supportive service needed for inclusion of children with any disability of your choice and share the findings in the class.

Course Title: Peace Education
Course Code: MED 220 **Credits: 3(2L+1T)**
Learning Objectives: The students will be able to

- Appreciate the current challenges of teacher education in context with the introduction of education for peace harmony.
- Develop skills among teacher trainees in human values, harmonious living with co-existence.
- Create awareness among student teachers for development of activities forpeace and harmony education.
- Articulate and identify the activities &programmes for promoting peace and harmony.
- Understand Vedic Darshan of international work for promoting peace values.

Unit I: Peace Education- Concept and Scope

- Peace: Meaning, nature and its relevance relating to the present global scenario,
- Ideal vs Pragmatic definition of Peace.
- Different sources of peace: Philosophical, Religious, Social, Secular and Psychological.
- Classification and analysis of peace:- Individual and social, Positive and negative peace, concept, characteristics,
- Role of different organizations like UNESCO in Peace Education.
- Peace in the minds of men, culture of peace and non-violence, positive personality development.
- NCF 2005 recommendations on Peace Education : nurturing of knowledge, skills, attitude and values of a culture of peace for shaping individuals.

Unit II: Peace Education- Agencies and Methods

- Family and Home: first school of peace education
- Role of community, school, family and neighbors in peaceful values inculcation.
- Importance of co existence and harmonious living in pluralistic-multi cultural, multi religious and multi ethnic societies.
- Peace education –objectives, scope and its relevance: inculcating duty consciousness in individuals.
- Role of Peace educators as motivators, trainers and guides.
- Methods for peace education: introspection, imbibing values and application of principles in daily life.
- Ongoing researches in the field of peace education – present scenario and suggestions.

Unit III: Education for International Peace & Understanding

- Nationalism & Internationalism
- Needs for developing International Understanding & Peace.
- Guiding principles for education for International Understanding and peace: non-violence, conflict resolution, pacifism, international mediation and courts of justice and peace building.
- Barriers for developing International Understanding & Peace: just warism and terrorism.
- Recommendations of International Commission (Delor's Commission) on International Understanding & Education for Peace.

Unit IV: Role of Educational Institutions in propagation of Peace Education

- Schools programmes: United Nations programmes of peace in minds of men, culture of peace and learning ways to peace.
- Application of conflict resolution on individuals, society, national and international scenarios.
- Importance of Human rights as a duty
- Teaching about Human Rights.

- Teaching about other countries-History, Geography, Civics, Science& Literature.
- Co-curricular Activities- Drawing, Painting, Modelling, Handicrafts etc.
- Role of Teacher with respect to transaction of Peace Education

References:

- Bagchi, JyotiPrakash and Vinodteckchandani, (2005), "Value Education" University book House (P) Ltd. Chaura Rasta, Jaipur-302003
- Chitkara, M.G, (2009), "Education and Human values", A.P.H Publishing Corporation, Anrari Road, Darya Ganj, New Delhi-110002 .
- Delors J., Learning the Treasure within, UNESCO, 1997.
- Falk, Richard A.; Johansen, Robert C.; Kim, Samuel S., editors. Constitutional.
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- Singh, Dr. Suresh Pal, and AnyanaKaul and SaritaChoudary,(2010), " Peace and human rights education , A.P.H Publishing Corporation, Anrari Road, Darya Ganj, New Delhi-110002.
- UNESCO: Learning the treasure within, Delores Commission Report.

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Course Title: Peace Education
Course Code: MED 220 **Credit: 1**
Practicum (Any one of the following):

- Preparing a report on conflict management in a class room through peaceful negotiation.
- Analysis of the Delores's Commission report for conceptual understanding of the four the pillars.
- Reflecting and preparing a report on Conflict resolution in a classroom through Peaceful negotiation.
- Study of the Delors Commission Report for conceptual understanding of the four pillars.
- Preparing an activity chart for Primary/Secondary/Senior Secondary/Higher Education stage to impart Human Rights as a duty and peace education through the curriculum.
- A Book or Documentary Film review in the area of Peace and Human Rights education. Case study of a child suffering from bad habits.
- Observation of classroom situation and identification of factors promoting peace.
- Analysis of morning assembly programme of a school from the point of view of peace and harmony education.
- Debate on characteristics of teacher as peacemaker.
- Make your own programme (based on activities) to conduct cooperative games and education activities for inculcation of harmony in students.
- List out the resources for effective implementation of peace education programme.
- Workshop on *ChetnaVikasMulyaShiksha*for seven days. After workshop prepare a report on Human relationship in family and in community, classification of values.

Course Title: Environmental Education
Course Code: MED 223 **Credits: 3 (2L+1T)**
Objectives: - The students will be to

- Understand the relationship between Humans Beings and their Environment.
- Develop sensitivity towards Environmental Disaster Management.
- Acquire an understanding of the process of Environmental Education.
- Develop skills and competencies as teachers for Management of Environmental Awareness Programmes
- Acquire a critical understanding of the different curriculum transaction and evaluation strategies for environmental education.

Unit- I: Environment, Initiatives for Protection and Disaster Management 96

- Environment: Meaning & types Natural, Social & Economic environment: interdependence & interaction among them, Relationship between Man and Environment
- International Conferences For Environmental Protection:
- Stockholm Conference (1972), Rio Conference (1992) and Johannesburg Conference (2002)
- United Nations Environmental Programme (UNEP) –Objectives & Functions
- Environmental Disasters: meaning, natural & manmade disasters and their management, Natural Disasters and their Management: Earthquake, Volcano, Cyclones, Flood& Drought.
- Management of Pollution as a Manmade Disaster: Causes, effects & control of- Air pollution, Water pollution, Land pollution and Sound pollution

UNIT-II: Education for Conservation of Natural Resources and Sustainable Development

- Conservation of Natural Resources: Concept, need and Importance Ways of Conservation of Natural Resources: Refuse, Reuse, Recycle, Reduce, Replace, Restore, Regenerate, and Reshape.
- Environmental Movements: -*Chipko*, Silent Valley, *Narmada Bachao.*
- Role of Environmental Movements in Environmental Conservation
- Role of Education in Conservation of Natural Resources
- Sustainable Development: Meaning & dimensions (natural, social & economic)
- Strategies For Sustainable Development: suggested in Agenda –Guiding Principles for Sustainable Development
- Environmental Impact Assessment (EIA) – meaning, steps, principles & importance of EIA in Sustainable Development
- Role of Environmental Education in Sustainable Development-Need of an Inter- disciplinary Approach.

Unit -III: Environmental Education-Need and Scope

- Environmental Education: Meaning, need and scope
- Need of Environmental Education for School Teachers and TeacherEducators
- Guiding Principles of Environmental Education
- Place of Environmental Education in National Curricular Framework (2000) given by NCERT and Environmental Education Curriculum Framework For Teachers and Teacher Educators (2005) given by NCTE.

Unit -IV: Environmental Education- Transaction and Evaluation 97

- Teaching – Learning Strategies For Environmental Education: Field visits, Experimentation, Demonstration, Observation, Group- Discussion, Dramatization and Games.
- Evaluation in Environmental Education Use of Observation,

- Self-reporting techniques (attitude scale, interview and questionnaire) and Projective Techniques in Environmental Education.
- Training For Environmental Education – (Preparing an Environmental Education Teacher), Major components of the Training Programme, Role of Central & State Government in Environmental Education
- Role of NGOs in Environmental Education (with reference to two National & two Local NGOs)
- Role of Media in Environmental Education – Print Media, Posters, Slides, Television, Radio and Computer (Internet)

References:

- DattaAmol K., (2000). Introduction to Environmental Science & Engineering. NewDelhi- 110 001: RajuPrimlani for Oxford & IBH Publishing, Co. Pvt. Ltd., 66, Janpath.
- Dayani, S. N., (1993). Management of Environmental Hazards. New Delhi: 110014.Vikas Publishing House, Pvt. Ltd. 576, Masjid Road, Jangpura.
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- NCTE, (2005). Environmental Education Curriculum Frame working for Teachers& Teacher Education. New Delhi: NCERT.

Course Title: Environmental Education
Course Code: MED 223 **Credit: 1**
Practicum (any one of the following):

- Preparation & use of an Evaluation Tool for measuring the attainment of the teaching objectives.
- Planning & Conducting an Environmental Awareness Programme for a class (5th to 12th std.) in any one school or college.
- Preparation and Use of a strategy for teaching Environmental Education at school level / college level.

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Course Title: Educational, Vocational Guidance and Counselling
Course Code: MED 221 **Credits: 3 (2L+1T)**
Objectives: The students will be able to

- Understand the basic principles of guidance & counseling and the application of the same to the process of education.
- Develop practical knowledge of the various techniques used in counselling.

UNIT- I: Nature of Guidance

- Concept, importance and areas of guidance –educational guidance, vocational guidance and personal guidance.
- Organization of guidance services in schools-need, principles and mechanism of organizing guidance functions, ethical and legal guidance.
- Guidance services.
- Occupational information- meaning and need, method of imparting occupational information, sources of occupational material in India.

UNIT- II Planning and Organizing Guidance Programme

- Group Guidance: Meaning, Scope, Principles, Types.
- Guidance for promoting self-discipline in a school: Causes for indiscipline, Anger Control, Yoga and Meditation for Self-Discipline, Self-Management.
- Understanding Programme Management: Personal, Finance and Facilities.
- Developing Guidance programme at Primary level, Middle level and Secondary & Senior Secondary level. 99
- Guidance for Children with Diversity: Children within Sensory and Motor Disabilities, Children with Learning Difficulties, Exceptional Children, Gifted Children, Children with Divergent Socio-Cultural Background.
- Guidance for Human Development and Adjustment.

UNIT-III: Career Development and Vocational Guidance

- Understanding the concept of work, career and vocation: preparing for future.
- Career development meaning and importance.
- Super's theory of career development.
- Theories of Career Choice and Development (Trait Theory, Theory of Occupational Choice).
- Career Development of Women: Current Status, educational Needs and problems, factors, process.
- Assessment and appraisal for Career development: Meaning, Purpose, Principles and Process.
- Job Analysis: Meaning, types and purposes of job Analysis.
- Placement Services: Meaning, functions and principles
- Follow up Service: Meaning, purposes and characteristics**.**

UNIT -IV : Counseling-Meaning, Tools and Techniques of Assessment

- Counseling-Meaning, Need and Principles
- Directive Counseling: Concept, Procedure, advantages and limitations.
- Non-Directive Counseling: Concept, Procedure, advantages and limitations.
- Eclectic Counseling: Concept, Procedure, advantages and limitations.

- Study of the individual, data collecting techniques of information.
- Standard and Non-standardized Techniques, Biographies, Rating Scale, Case Study, Questionnaire, Observation, Interview and Cumulative Records.

References:

- Agrawal J.C.: Educational Vocational Guidance and Counselling, Doaba House, NaiSarak, Delhi.
- Anatasi Anne: Psychological testing, New York, Mac Millan 1982
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- Directorate General of Employment and Training Ministry of labor, Govt. of India, New Delhi.
- Gupta S.K.: Guidance and Counselling in Indian Education, Mittal Publication Pvt. Ltd.
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- Koceher S.K.: educational and Vocational Guidance in Secondary Schools, Sterling Publisher (P) Ltd. Delhi.
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- Jayawal S.R.: Guidance and Counselling. Prakashan Kendra Lucknow.
- Rogers C.R.: Client Centered Therapy, Mifflin.
- Rao, S.N: Counselling and Guidance, Tata McGraw Hill, Delhi.
- Central Institute for Research and Training in Employment Service (C.E.D.G.E. & T), Ministry of Labor and Rehabilitation, Govt. of India, New Delhi,- Handbook in Vocational Guidance,1972.
- Sarswat. K.R. Gaul, J.S.: Manual for Guidance Counsellors, NCERT, Delhi, 1993.

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Course Title: Educational, Vocational Guidance and Counselling
CourseCode: MED 221 Credits: 1
Practicum (any one of the following):

- Maintenance of Self -Appraisal reports with respect to Guidance Programme at Elementary/Secondary level.
- Conduct a Guidance and Counseling Programme at Elementary/Secondary level.
- Organizing a Job Fair/Career Fate for school children.

- Preparation and administration of any two tool that is Observation, Interview, Questionnaire etc. with respect to Guidance services at Elementary/Secondary level.
- Preparation of Job resume for Self-enrichment.

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SCHOOL OF EDUCATION

Compulsory Course Work

Course Title: Dissertation
Course Code: MED-299 **Credits:4**

- **Components of dissertation:-**writing of final report and submission of final Dissertation. Presentation and viva will be taken on submission of the final report.

LINGAYA'S VIDYAPEETH
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SCHOOL OF LAW

SCHEME FOR LL. B – 3 YEARS COURSE

LL.B			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	LLB 111	LAW OF CONTRACT-1	4	0	0	4
2	LLB 113	Jurisprudence (Legal Method ,Indian Legal System, and Basic Theory of Laws)	4	0	0	4
3	LLB 115	Family Law-1	4	0	0	4
4	LLB 117	Constitutional Law-1	4	0	0	4
5	LLB 119	LAW OF TORTS(mv Accident and Consumer protection Laws)	4	0	0	4
6	LLB 121	Legal English & communication skills	4	0	0	4
7	LLB 123	Social Awarness :Legal awareness	0	0	2	1
		Total	**24**	**0**	**2**	**25**

LL.B			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	LLB 112	Law of Contract-II	4	0	0	4
2	LLB 114	Environmental Law	4	0	0	4
3	LLB 116	Family Law-II	4	0	0	4
4	LLB 118	ConstitutionLaw- II	4	0	0	4
5	LLB 120	Public International Law	4	0	0	4
6	LLB 122	Adminstrative Law	4	0	0	4
7	LLB 124	Moot Court, Pre- Trial Preparation & Participation in Trail Proceedings (includingInterviewing techniques & pretrial Preparations)	0	0	2	1
		Total	**24**	**0**	**2**	**25**

LL. B			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	LLB 211	Law of Crime -I(IPC-I)	4	0	0	4
2	LLB 213	Corporate Law	4	0	0	4
3	LLB 215	Labour & Indusrial Law-1	4	0	0	4
4	LLB 217	Property Law	4	0	0	4
5	LLB 219	Interpretation of Statutes	4	0	0	4
6	LLB 221	Professional Ethics,Lawyer's Accountability and Bar-bench Relation(Theory)	4	0	0	4
7	LLB 251	Professional Ethics,Lawyer's Accountability and Bar-bench Relation(Theory)	0	0	2	1
		Total	**24**	**0**	**2**	**25**

LL. B			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	LLB 212	(Criminal Procedure Code,1978)	4	0	0	4
2	LLB 214	Law relating To Right To information &media law	4	0	0	4
3	LLB 216	Labour & Industrial Law-II	4	0	0	4
4	LLB 218	Civil Procedure Code,1908 (Including Limitation act,1963& Specific Relief Act,1963)	4	0	0	4
5	LLB 220	Public Interest Lawyering, Legal Aid & Para Legal services	4	0	0	4
6	LLB 222	Arbitration, Conciliation & alternative dispute resolution system (Theory)	4	0	0	4
7	LLB 252	Arbitration, Conciliation & alternative dispute resolution system (Practical)	0	0	2	1
		Total	**24**	**0**	**2**	**25**

LL. B			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	LLB 311	Law of Evidence	4	0	0	4
2	LLB 313	law of trust, Equity & Fiduciary Relation	4	0	0	4
3	LLB 315	Principles of taxation	4	0	0	4
4	LLB 317	Land Laws including ceiling and other Local Laws	4	0	0	4
5	LLB 319	Media Law & Censorship	4	0	0	4
6	LLB 321	Drafting, Pleading &conveyance(Theory)	4	0	0	4
7	LLB 323	Drafting, Pleading &conveyance(Practical)	0	0	2	1
		Total	**24**	**0**	**2**	**25**

LL. B			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	LLB 312	Intellectual Property Law	4	0	0	4
2	LLB 314	Cyber Laws	4	0	0	4
3	LLB 316	Banking and Insurance Law	4	0	0	4
4	LLB 318	Competition Law	4	0	0	4
5	LLB 320	Human Rights Law	4	0	0	4
6	LLB 352	Moot Court, Pre- Trial Preparation & Participation in Trail Proceedings (includingInterviewing techniques & pretrial Preparations)	4	0	0	4
7	LLB 354	Internship	0	0	2	1
		Total	**24**	**0**	**2**	**25**

CLCC 1002	Law of Contracts – I (General Principles of Contract)	L	T	P	C
Version 1.0		4	0	0	4
Pre-requisites/Exposure	Basic knowledge of Law				
Co-requisites					

Course Objectives

1. To acquaint the students with the essentials of a valid contract so that they are able to differentiate between valid contracts, void agreement and voidable contract.
2. To develop sound knowledge of the concepts of the general principles of the Law of Contract.
3. To draw a comparison between English principles of Law of Contract with that of the Indian principles and highlighting the similarities as well as differences.
4. To provide sound knowledge to students about various aspects of contract such as contractual obligations, breach of contract, remedies for breach of contract etc.
5. To make the students understand the practical aspects of contract in modern day commerce and industry so that they are able to and be able to analyze a contract agreement when they go for internships, etc

Course Outcomes

On completion of this course, the students will be able to

C1002.1. understand the rationale of the essentials of a valid contract and differentiate between different kinds of contract.

C1002.2. Exhibit an understanding of the General Principles and doctrines that guide Contract.

C1002.3 Draw out a comparison between Indian Law of Contract and English Law of contract in the field of various business and investment laws.

C1002.4 Assess and evaluate the various processes involved in contract formation in modern day Trade and commerce and be able to analyze a contract agreement when they go for internships, etc.

C1002.5 Practically apply different aspects of Contracts determining the rights and liabilities of contractual parties, keeping the approach both theoretical and critical in nature.

Catalog Description

Law of contract I deals with the general principles of the Law of Contract. The subject basically revolves around The Indian Contract Act 1872. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical

applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems,Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

COURSE OUTLINE

It has **9 modules** which are as follows:

1. **Introduction (5 lectures)**

   i. Development of Law of Contract in Changing Society.
   ii. Definition and Classification of Contracts.

2. **Offer Acceptance and Revocation of Contract (5 lectures)**
   i. Intention to create legal relationship
   ii. Offer and invitation to offer
   iii. Kinds of offer
   iv. Communication
   v. Acceptance
   vi. Revocation of offer and Acceptance & Modes of revocation

3. **Consideration, Privity of contract and Estoppel (6 lectures)**
   i. Meaning and need of consideration
   ii. Doctrine of Privity of Contract
   iii. Adequacy of consideration
   iv. Kinds and exceptions to consideration
   v. Promissory Estoppel

4. **Capacity to Contract (6 lectures)**
   i. Legal disability to enter into contract
   ii. Minors
   iii. Lunatics
   iv. Idiots
   v. Nature and effects of an agreement with a person under legal disability
5. **Enforcement of Contract (5 lectures)**
   i. Free Consent
   ii. Factors vitiating free consent
   iii. Coercion
   iv. Undue Influence
   v. Fraud
   vi. Misrepresentation
   vii. Mistake of Law & Fact

6. **Limitation of contract (5 lectures)**
   i. Limitation On Freedom Of Contract
   ii. Unlawful agreements
   iii. Public Policy
   iv. Agreements and unlawful consideration in part and object
   v. Agreements without consideration
   vi. Agreement in restraint of marriage
   vii. Agreement in restraint of trade
   viii. Agreement in restraint of legal proceeding
   ix. Wagering agreements

7. **Discharge of contract and the Doctrine of Novation (5 lectures)**
   i. Discharge Of A Contract
   ii. Discharge by Performance
   iii. Discharge by Agreement
   iv. Frustration
   v. Supervening impossibility of performance
   vi. Discharge by Operation of Law
   vii. Discharge by Breach
   viii. Novation

8. **Breach of Contract and Relief (5 lectures)**
   i. Discharge Of A Contract
   ii. Damage
   iii. Remoteness of damages
   iv. Mitigation of damages
   v. Penalty and un-liquidated damages

9. **Quasi Contract, Standard format Contracts and Online Contracts (6 lectures)**
   i. Quasi Contract
   ii. Standard formats
   iii. Online contracts

TEXTBOOKS:

1. Anson, Law of Contract, 28th Ed., Oxford University Press, 2002.
2. Chesire , Fifoot & Furmston's Law of Contract, 15th Ed. , Oxford University Press, 2007
3. Mulla, Indian Contract Act and Specific Relief Acts, 13th Ed., Lexis Nexis, 2006.
4. Avtar Singh, Law of Contract, , 11th Ed., Eastern, Lucknow, 2013

REFERENCE MATERIAL

BOOKS

- Poole, Jill, Textbook on contract law,1st Indian edition, Oxford University Press, 2002
- Stone, Richard, The modern law of contract, 6th Ed. Cavendish publishing, 2005
- Markanda, P.C., The law of contract, 1st Ed., Wadhwa & Company, 2006
- Singh, R.K., Law relating to Electronic Contracts, Lexis Nexis, 2014
- Bhat, Sairam, Law of Business Contracts in India, Saga Publications, 2009

ARTICLES

1. Cohen, Morris R., The Basis of Contract, Harvard Law Review, Vol. 46, No. 4 (Feb., 1933), pp. 553-592
2. Fuller, Lon L., Consideration and Form, Columbia Law Review , Vol. 41, No. 5 (May, 1941), pp. 799-824
3. Scott, Kenneth E., The Evolving Roles of Contract Law: Comment, Journal of Institutional and Theoretical Economics (JITE) / Zeitschrift für die gesamte Staatswissenschaft, Vol. 152, No. 1, The New Institutional Economics Transformations in the Institutional Structure of Production (March 1996), pp. 55-58.
4. Kronman, Anthony T., Mistake, Disclosure, Information, and the Law of Contracts, The Journal of Legal Studies, Vol. 7, No. 1 (Jan., 1978), pp. 1-34.
5. Gardner, George K., An Inquiry into the Principles of the Law of Contracts, Harvard Law Review, Vol. 46, No. 1 (Nov., 1932), pp. 1-43.
6. Friedmann, W., Changing Functions of Contract in the Common Law, The University of Toronto Law Journal, Vol. 9, No. 1 (1951), pp. 15-41.

Modes of Evaluation:

Components	**Internal Examination**	**Mid-term written Examination**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination

Components	**Quiz/Class Assgnt 1**	**Assignment 2/ Case Comment**	**Assignment 2/ Case Comment**	**ABQ/Viva**	**Total 15 Marks**
Weightage (%)	**10% weightage**	**10% weightage**	**10% weightage**	**10% weightage**	**15**

Mapping COs with POs and PSOs

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
C1002.1	3	-	-	-	-	2	2	2
C1002.2	-	2	2	1	-	-	-	-
C1002.3	-	2	2	1	-	-	-	2
C1002.4	-	3	2	2	2	-	2	2
C1002.5	-	2	2	1	-	-	2	2
C1002	3	2	2	1	2	2	2	2

1=weakly mapped
2= moderately mapped
3=strongly mapped

Model Question Paper

Roll No: ----------

Logo
Name of the University
End Semester Examination, December 2020

Program: B.B.A., LL.B. **Semester – I**
Subject (Course): Law of Contracts I **Max. Marks : 100**
Course Code :BBALLB 109 **Duration : 3 Hrs**
No. of page/s:

Instructions:
Attempt all five questions from Section A (each carrying 2 marks); Two compulsory Questions from Section B (each carrying 10 marks). Section C is Compulsory (carrying 10 marks). Section D is compulsory carrying 25 marks**.**

Section A

1.	Define the following a) Define "Coercion". b) Quantum Meruit c) Anticipatory Breach d) Commercial Hardship e) Novation of contract	**[2x5=10]**	**CO1**

LLB113	Legal Method (Jurisprudence)	L	T	P	C
Version 1.0		4	0	0	4
Pre-requisites/Exposure					
Co-requisites					

COURSE OBJECTIVES

The students will have an elementary understanding of the debates around the nature of law and will able to distinguish between the major kinds of law, legal systems and institutions; know the structure of the legal institutions and the hierarchy of courts in India; acquire the ability to identify legal issues and principles underlying any given factual situation, and to undertake and present research on such issues; know the various sources of law and be able to synthesize such sources and use them to formulate arguments in their research.

COURSE OUTCOMES

On completion of this course, the students will be able to

CO1: Understand &conceptualize the evolution, meaning & scope of the legal systems.

CO2: Understand &critically analyze the concept related to various sources of law.

CO3: Understand &critically analyze the concept related with Socio-Economic Approach and philosophy.

O4: Critically analyze &evaluate the concepts related with legal aid & Lok Adalat.

CO5: Evaluate & Comparative Analysis of the multilateral aspects of the Legal system of India, U.K. & U.S.A.

CATALOG DESCRIPTION

Legal Methods is a way of introducing the philosophical ideas of Law and Jurisprudence to the students. The subject basically revolves around theories, definition and contradictions. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability. An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

COURSE OUTLINE

UNIT-I **No. of Lectures -11**

Concept of Law

a. Legal Method and Introduction to legal System.
b. Law: Definitions and different perspectives.
c. Nature and Functions of Law.
d. Hart's concept of Law and the Indian Constitution.
e. Social Contract theory.

Unit-II **No. of Lectures -09**

Sources of Law

a. Custom
b. Precedent
c. Legislations
d. Judicial Pronouncements

Unit-III: **No. of Lectures -08**

Socio-Economic Approach and philosophy

a. Law and social change.
b. Locus Standi.
c. Public Interest Litigation and Social Interest Litigation.
d. Judicial Activism.

Unit-IV **No. of Lectures -09**

Legal-Aid and Lok-Adalat

a. Meaning and Definition of Legal aid.

b. Concept of Justice, Liberty and Equality.

c. Lok-Adalat and its Composition

d. Ombudsman.

Unit-V **No. of Lectures -08**

Legal Systems

a. Separation of Power.

b.Legal System in U.S.A.

c. Legal System in U.K.

d.Legal System in India.

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	2	-	-	1	-	-	1
CO2	2	-	-	-	-	-	-	-	-
CO3	1	2	1	1	1	1	1	-	-
CO4	2	3	1	3	3	2	1	-	-
CO5	2	2	2	1	-	-	-	-	1

SESSION PLANS

S.NO	TOPIC	NO. OF LECTURE	REFERENCE BOOK	PEDAGOGY
1	**Unit-I** Legal Method and Introduction to legal System.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
2	Law: Definitions and different perspectives.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
3	Nature and Functions of Law	3	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
4	Hart's concept of Law and the Indian Constitution.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
5	Social Contract theory.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
6	**Unit-II** Sources of Law: Custom	3	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
7	Sources of Law: Precedent	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT

8	Sources of Law: Legislations	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
9	Sources of Law: Judicial Pronouncements	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
10	**Unit-III** Law and social change	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
11	Locus Standi.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
12	Public Interest Litigation and Social Interest Litigation.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
13	Judicial Activism.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
14	**Unit-IV** Legal-Aid and Lok-Adalat: Meaning and Definition of Legal aid.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
15	Concept of Justice, Liberty and Equality.	3	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
16	Lok-Adalat and its Composition	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT

17	Ombudsman.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
18	**Unit-V** Separation of Power.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
19	Legal System in U.S.A.	1	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
20	Legal System in U.K.	2	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT
21	Legal System in India.	3	1. S. R. Myneni 2. V. D. Mahajan 3. N. V. Paranjape	Lecture Discussion Debate PPT

BOOKS RECOMMENDED

1. S. R. Myneni, Legal Language and Legal Writing (14 ed.), Asia Law House, Hyderabad, 2008.
2. V. D. Mahajan, Jurisprudence and Legal Theory, (5th ed.), Eastern Book Co., Lucknow, 2005.
3. I. P. Massey, Administrative Law, Eastern Book Company, (7th ed.), 2008.
4. N. V. Paranjape, Studies in Jurisprudence & Legal Theory, (9h ed), Central Law Agency, 2019.
5. Friedmann, Legal Theory, Columbia University Press. 1967.

ARTICLES

1. Bell, J. (2018). *Sources of law*. The Cambridge Law Journal, 77 (1), 40-71. https://www.repository.cam.ac.uk/handle/1810/278028
2. Ravindra Kumar Singh,*Hart's concept of law and justice*, Banaras Hindu University. https://www.bhu.ac.in/law/blj2006-072008-09/BLJ_2006/8_RAVINDRA.doc
3. Nature of Law. https://plato.stanford.edu/entries/lawphil-nature/
4. Prof. Dr. Nishtha Jaswal & Dr. Lakhwinder Singh. *Judicial Activism in India*. Manupatra. http://docs.manupatra.in/newsline/articles/Upload/0BD8AAF5-4031-484F-AB92-2B84EFE0ABCA.pdf
5. Khushi Pandaya, *Sepration of Powers – An Indian Perspective. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2254941*

LINGAYA'S VIDYAPEETH
NACHUALI, JASANA ROAD, FARIDABAD
LL.B.

Family Law – 1 (Hindu Law) **L-4, T-0 P-0**
Credits–4
Course Code- LLB 115
Max Marks: 60

OBJECTIVE

Hindu law refers to the code of laws applied to Hindus, Buddhists, Janis and Sikhs. It also refers to the legal theory, jurisprudence and philosophical reflections on the nature of law discovered in ancient and medieval era. It gives us the base of the society i.e. family. It deals with different families' positions, traditions, rights and duties, family problems and legal solutions to them which directly relate to the society. The main objective of the subject is to resolve the socio-legal disputes arising in the society regarding marriage, divorce, property rights, partition, succession, maintenance, guardianship, adoption etc. It also sensitizes the students about Hindu society for their legal rights and duties

COURSE OUTCOME

On completion of the course students will be able to :

CO1: Learn, appreciate and understand the sources and schools of Hindu Law.
CO2: Understand the basic concepts of Hind Law such as Hindu Joint family, Coparcener, Karta etc.
CO3: Understand the guiding principles of valid marriage and divorce followed under Hindu Law.
CO4: Gain knowledge of succession, partition, adoption, maintenance and guardianship.
CO5: Gain skills of thinking, analyzing, verbal and written presentation of ideas of argument.
CO6: Students will be able to put their acquired knowledge into practice in their research on contemporary constitutional law issues.

COURSE OUTLINE

UNIT-I

1. Application of Hindu Law,

2. Sources of Hindu Law,

3. Schools of Hindu Law,

4. Hindu Joint Family, Joint Families, Coparcenary, Classification of Property,

5. Karta of Joint Family, Position, Liabilities and Powers of Karta,

6. Coparcener's Power of Alienation, Coparcener's Right to Challenge Improper Alienation,

7. Alienee's Rights and Remedies

UNIT-II

1. The nature and concept of Hindu Marriage..

2. Essential Conditions for Valid Hindu Marriage, and Ceremonies of Marriage,

3. Registration of Hindu Marriages,

4. Remedy of Restitution of Conjugal Rights,

5. Void and Voidable Marriages,

6. Judicial Separation and Divorce,

7. Various Types of Grounds for Divorce and Judicial Separation,

UNIT-III

1. Nature and Scope of The Hindu Succession Act, 1956,

2. Effects of the Hindu (Succession) Amendment, 2005,

3. Rules of Succession to the Property of Hindu Male, Succession to the Property of Hindu Female, Succession to the Mitakshara Coparcerer's Interest,

4. General Rules of Succession, Partition. Subject Matter of Partition, Persons who have a right to Partition Right to Share

UNIT-IV

1. Nature and Scope of The Hindu Minority and Guardianship Act, 1956,
2. Concept of Minority and Guardianship.
3. Types of Guardians
4. Natural Guardians and their Powers,
5. Testamentary Guardian: Appointment and Powers,
6. Certified Guardian,
7. Defecto Guardian,
8. Guardian By Affinity.

UNIT-V

1. The Hindu Adoption & Maintenance Act, 1956,
2. Nature of Adoption,
3. Essential Conditions for Valid Adoption,
4. Effects of Adoption,
5. Registration of Adoption,
6. Personal Obligation,
7. Maintenance of Dependents,
8. Quantum of Maintenance,
9. Maintenance As a Charge on Property

BOOKS RECOMMENDED

- Ranganath Misra, Mayne's Treatise on Hindu Law & Usage (16th ed. 2008)
- Sanajeet A. Desai, Mulla Principles of Hindu Law, Vol. I & II 21st ed. 2010)
- Paras Diwan and Peeyushi Divan, Modern Hindu Law (Allahabad Law Agency, Reprint 2018)
- Duncan M. Derrell, A Critique of Modern Hindu Lan (1970)
- Basant K Sharma. Hindu Lanv. (Central Law Publication Sth Ed 2017)

Modes of Evaluation:

Components	**Internal Examination**	**Mid-term written Examination**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination

Components	**Quiz/Class Assgnt 1**	**Assignment 2/ Case Comment**	**Assignment 2/ Case Comment**	**ABQ/Viva**	**Total 15 Marks**
Weightage (%)	**10% weightage**	**10% weightage**	**10% weightage**	**10% weightage**	**15**

MAPPING CO with PO and PSO

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	1	-	-	-	-	2	2
CO2	3	1	-	1	1	2	-	2	2
CO3	2	2	1	2	2	3	-	3	3
CO4	2	2	1	2	2	-	-	3	3
CO5	-	3	2	2	2	-	-	1	2
CO6	-	3	2	2	2	-	-	1	1

CONSTITUTIONAL LAW – I **L-4, T-0, P-0**

COURSE CODE : LLB 117

CREDIT:4

COURSE OBJECTIVE

1. Constitution of India is the pillar on which the governance of our country rests.
2. The course aims to examine the political, social and economic value structure of the Constitution of India.
3. The balancing of positive responsibility of the state to establish a economy of growth, social justice and political aspiration of all sections of the Indian society through Constitutional Governance.
4. The objective of this course is to make students understand the basic concepts of Indian constitution.

COURSE OUTCOME

On completion of the course students will be able to :

CO1: Learn, appreciate and understand the fundamental features of the Constitution.

CO2: Critically evaluate the role of fundamental rights and the correlation between fundamental rights and duties.

CO3: Understand the guiding principles of state policy in governance of the country.

CO4: Become a responsible citizen after being aware of their fundamental rights and duties

CO5: Understand the process of judicial review and how judiciary actively plays a role in protection of human rights.

CATALOG DESCRIPTION:

Constitutional law: is a body of law which defines the role, powers, and structure of different entities within a state, namely, the executive, the parliament or legislature, and the judiciary; as well as the basic rights of citizen. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

COURSE OUTLINE

It has **5 modules** which are as follows:

UNIT-I **(Lecture : 5)**

1. Nature ,Silent features and Preamble of the Constitution of India
2. Union and its Territory
3. Citizenship

UNIT-II **(Lecture :7)**

1. Fundamental rights in general (Article-12 and 13)
2. Right to Equality(Art.14),
3. Special Provision for Weaker Sections of the Society,
4. Reservation Policy,

UNIT- III **(Lecture :12)**

1. Fundamental Freedoms under Art. 19,
2. Freedom of Press.
3. Protection in respect of conviction of offence (Act-20),
4. Right to Life and Personal Liberty Article 21),
5. Protection against Arrest and Detention (Art 22),

UNIT - IV **(Lecture : 13)**

1. Right against Exploitation (Art-23 & 24),
2. Right to Religion (Art 25-28).
3. Cultural & Educational Rights of Minorities (Art.29 & 30).

UNIT-V **(Lecture: 11)**

1. Right to Constitutional Remedies(Art, 32),
2. Directive Principles of State Policy,
3. Fundamental Duties

BOOKS RECOMMENDED

1. Kagzi, M.C. Jain. The Consitutional of India, (Vol. 1 & 2, New Delhi, India Law House, 2001)
2. Pylee, M.V. Constitutional Amendments in India (Delhi, Universal Law, 2003)
3. Hasan, Zoya & E. Sridharan. India's Living Constitution: Ideas, Practices, Controversies

(Delhi,Permanent Black, 2002 ed.)
4. Basu, Durga Das. Commentary on the Constitution of India, (Calcutta, Debidas Basu, 1989 Ed.)
Seervi, H.M. Constitutional Law of India (Vol. I & II, III, Bombay N.M. Tripathi, 1991)
Chaube, Shibanikinkar. Constituent Assembly of India (New Delhi, Wadhwa and Com.Pvt. Ltd.
5. Bakshi, P.M. The Constitution of India (Delhi Universal Law Publishing, 2002)
6. Jain Subhash C. The Constitution of India; Select Issues & Percetpions (New Delhi Taxmann Publications, 2000) .

Modes of Evaluation:

Components	**Internal Examination**	**Mid-term written Examination**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination

Components	**Assignment/ Case Comment**	**Project Work Court Room Exercise**	**Subject Grand Viva**	**Attendance**	**Total 15 Marks**
Weightage (%)	**25% weightage**	**25% weightage**	**25% weightage**	**25% weightage**	
		Report / Viva /PPT			

MAPPING

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	-	1	-	-	2	1
CO2	3	1	2	1	1	3	-	2	2
CO3	2	2	-	1	1	3	-	3	3
CO4	2	2	1	-	1	-	1	1	1
CO5	1	3	-	-	-	-		1	2

Details of class schedules

LECTURE NO	TOPIC	REFERENCE BOOK	PEDAGOGY
1	**UNIT- I** Nature , silent and preamble of the constitution of India	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
2	Continue…	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
3	Union and its territory	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
4	Citizenship	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation

5	**UNIT-II** Fundamental rights in general(Article 12 and 13)	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
6	Continue….	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
7	Right to Equality(Article 14)	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
8	Special Provision for weaker section of the society,	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation
9	Reservation	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
10	Continue	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT

11	Continue	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation
12	**UNIT- III** **Fundamental Freedom under article 19**	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
13	Continue	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
14	Continue	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presenatation
15	Freedom of press	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
16	Protection in respect of conviction of offences(Article-20)	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT

17	Continue	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • presentation
18	Right to Life and Personal Liberty (article 21)	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
19	Continue….	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
20	Continue…..	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presenatation
21	Protection against Arrest and detention(article 22)	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
22	Continue…	• Singhal book • Bare act • J N	• Lecture • Discussion • Debate • PPT

		Pandey	
23	Continue…	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation
24	**UNIT-IV** **Right against exploitation(article 23&24)**	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
25	Continue…	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
26	Continue..	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
27	Continue…	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation
28	Right to religion (article 25-28)	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation

29	Continue..	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
30	Continue…	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
31	Continue..	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation
32	Cultural & education rights of Minorities.(Article 29 &30)	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
33	Continue….	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
34	Continue	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT

35	Continue….	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
36	Continue…	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
37	**UNIT-V** Right to Constitutional Remedies(article 32)	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
38	Continue	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
39	Continue	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
40	Continue	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation

41	Directive principle of State Policy	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
42	Continue..	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation
43	Continue..	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation
44	Continue…	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation
45	Fundamental Duties	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT
46	Continue..	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation

47	Continue…	• Singhal book • Bare act • J N Pandey	• Lecture • Discussion • Debate • PPT • Presentation
48	MOOT COURT	• Singhal book • Bare act • J N Pandey	• Discussion • Debate • Presentation

LAW OF TORT AND CONSUMER PROTECTION ACT

Semester : 1st Semester

L	T	P	C
4	0	0	4

Program : LL.B.

Code : LLB 119

Course Objectives:

To primarily concerned with redressal of wrongful civil action by awarding compensation. In a society where men live together, conflict interests are bound to occur and they may from time to time cause damage to one or the other. In addition with the rapid industrialization tortuous liability has come to be against manufacturers and industrial units. As the law of tort is a basically a judge made law, students are required to make a judicial pronouncements. They are required to keep themselves with the latest developments extending to the entire course.

Course Outcome :

On completion of this course, the students will be able to

CO1: Analyse the foundational principles of law of tort and consumer protection act.

CO2: To make students aware of relevant cases relating to tort law.

CO3: To familiarize the students difference between civil wrong and criminal wrong

CO4: Students will be aware of basic procedure for handling consumer dispute

CO5: Students will have comprehensive undertaking about existing law on consumer

protection in India.

Catalog Description

Law of torts deals with the general principles of the Law of torts. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

Course Contents:

It has 5 units which are as follows:

UNIT 1 **12**

Lectures

1. Nature & Definition of Tort
2. Motive,
3. Capacity
4. Joint Tort fessors
5. General defences,

UNIT 2 **11**

Lectures

1. Vicarious liability,
2. Remoteness of Damage
3. Extinction of liability,
4. Strict liability and Absolute liability,

UNIT 3 **9**

Lectures

1. Negligence
2. Nervous shock
3. Nuisance

UNIT 4 **8**

Lectures

1. Trespass to land and goods
2.Nuisance,
3.Defamation
4. Assault & Battery

UNIT 5 **8**

Lectures

1. Evolution of Consumer Law,
2. The Consumer Protection Act, 1986.
3. Remedies (including remedies under MV Act 1989).

Modes of Evaluation:

Modes of Evaluation:

Components	Internal Examination	Mid-term written Examination	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination

Components	Quiz/Class Assgnt 1	Assignment 2/ Case Comment	Assignment 2/ Case Comment	ABQ/Viva	Total 15 Marks
Weightage (%)	10% weightage	10% weightage	10% weightage	10% weightage	15

Mapping CO With PO and PSOs

CO	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO2	PSO3
CO1	3	-	-	-	-	2	2	2
CO2	-	2	2	1	-	2	-	-
CO3	-	2	2	1	-	-	-	-
CO4	-	3	2	2	2	2	-	2
CO5	-	2	2	1	-	3	-	2

SESSION PLANS

Lecture Plan No.	TOPIC	Reference Book	Pedagogy
1	**UNIT- I** Introduction of the chapter	1)Ratanlal and Dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
2	Nature and definition of Tort	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
3	Motive	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
4	Capacity	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
5	Continue..	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
6	Joint Tortfeasors	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-	• Lecture • Discussion • Debate • PPT • Research

		Nexis, 10th Ed. 2007)	
7	Continue..	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
8	General defences	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
9	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
10	**UNIT-II** Introduction of the chapter	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
11	Vicarious liability	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
12	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research

13	Remoteness of damage	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
14	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
15	Extinction of liability	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
16	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
17	Strict liability	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
18	Absolute liability	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-	• Lecture • Discussion • Debate • PPT • Research

		Nexis, 10th Ed. 2007)	
19	Difference between strict and absolute liability	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
20	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
21	**UNIT-III** Introduction of the chapter	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
22	Continue..	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
23	Negligence	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
24	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-	• Lecture • Discussion • Debate • PPT • Research

		Nexis, 10th Ed. 2007)	
25	Nervous shock	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
26	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
27	Nuisance	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
28	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
29	Doubt session of unit II	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
30	**UNIT-IV** Introduction of the chapter	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research

31	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
32	Trespass to land and goods	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
33	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
34	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
35	Nuisance	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
36	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research

37	Defamation	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
38	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
39	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
40	Assault	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
41	Battery	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
42	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research

43	**UNIT-V** Introduction of the chapter	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
44	Evolution of consumer law	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
45	The consumer protection Act, 1986	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
46	Continue	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
47	Remedies	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research
48	Doubt session and revision	1)Ratanlal and dhirajlal- Law of torts 2) RK Bangia-Law of torts 3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)	• Lecture • Discussion • Debate • PPT • Research

LEGAL ENGLISH AND BUSINESS COMMUNICATION **L-4, T-0 P-0**
Code: LLB 121
Credits–4
Max Marks: 100

Objective

This course will focus on enhancement of student's thought, ideas and vision for practical application in their professional life. Combined with communication skills, the paper will help in developing critical and analytical skills among the among the students. Further business communication will make their professional communication effective.

Course Outcome

CO1: To introduce students to English legal resources in order to understand the legal language.

CO2: To enable the students to use legal vocabulary and terminology.

CO3: To enable successful and efficient communication (oral) appropriate to each situation.

CO4: To introduce students to various forms of legal writing appropriate to their specific needs.

CO5: To provide students with opportunities to develop basic English skills (written) in respect to topics dealt with in class.

COURSE OUTLINE

UNIT I: Comprehension and Composition

a) Reading comprehension of general and legal texts
b) Paragraph and precise Writing
c) Abstract writing
d) Drafting of Reports and Notices

UNIT II: Language and Law

a) Meaning and communication approaches: types, directions and challenges.
b) Culture and language sensitivity
c) Legal sensitivity
d) Legal maxims
e) Sounds of spoken language: Phonetics

UNIT III: Literature and Law

a) Play 'Justice' By John Galsworthy (Justice Was A 1910 Crime Play By The British Writer John Glasworthy)
b) The Trial Of Bhagat Singh
c) Biography/Autobiography Of Martin Luther and Nelson Mandela

UNIT IV: Business Communication

a) Theories of business communication: Importance of communication
b) Communication Process
c) Significance of Feedback
d) Barriers to effective communication, ways to overcome the barriers

UNIT V:E-correspondence

a) E-correspondence:Meaning and concept
b) E-Mail:Guidelines for smart E-mail
c) Constructing the message
d) Tools for presenting messages

Textbooks:

1. J.S Singh & Nishi Behl, legal language, writing and general English, Allahabad Law Agency,2009
2. N.R. Madhav Menon, Clinical Legal Education, Eastern Book company, 2011(Reprint)

References:

1. Jenny Chapman, Interviewing and counseling, Routledge Cavendish, 2000(2nd Edn)
2. Stephens P. Robbins, Organizational Behaviour, Perason Education India, 2013 (15th Edn)
3. John Galsworthy, Justice, F.Q. Books, 2010 4.
4. Varinder Kumar, Raj Bodh, et. Al., Busness Communication, Oscar Publication, 2010

5. **MAPPING CO with PO and PSO**

POs COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	3	1	2	-	-	2	1
CO2	1	1	2	-	-	1	1
CO3	1	2	2	-	2	1	1
CO4	2	2	3	1	2	2	1
CO5	-	1	2	-	-	1	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid-term written Examination**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination

Components	**Quiz/Class Assgnt 1**	**Assignment 2/ Case Comment**	**Assignment 2/ Case Comment**	**ABQ/Viva**	**Total 15 Marks**
Weightage (%)	**10% weightage**	**10% weightage**	**10% weightage**	**10% weightage**	**15**

SOCIAL AWARENESS: LEGAL AWARENESS

L	T	P	C
4	0	0	4

Program: LLB

Code: LLB123

Objective-

This course is for the empowerment of individuals regarding issues involving the law. Legal awareness helps to promote consciousness of legal culture, participation in the formation of laws and the rule of law. This course aims to empower the youth of our country with the knowledge of their legal rights and duties, ultimately to be able to share power equally, gain full access to the means of development and to inspire a whole generation to work together towards achieving gender equality and justice.

Course Outcome

On completion of this course, the students will be able to

CO1.Learn about their rights and duties and basic features of the Indian constitution.

CO2.To create awareness about the various machineries/organs of the Justice delivery system available for redressal of their problems/grievances.

CO3.Learn about the procedure of approaching and utilizing various channels available for the 3 redressal of grievances i.e. the Police, the Executive and the Judiciary.

CO4.Discuss the basic concepts of labour law.

CO5. Learn the procedural guidelines mentioned under the criminal law system.

Catalog Description

This course aims to empower the youth of our country with the knowledge of their legal rights and duties, ultimately to be able to share power equally, gain full access to the means of development and to inspire a whole generation to work together towards achieving gender equality and justice.

The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis.
Class discussion will also take places in order to discuss the practical applicability of the Law.
The students will be able to put in practice and exhibit effective corporate lawyering skills,

employing legal research, analysis, rationalisation and critical-thinking ability
An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

Course Content

It has 5 units which are as follows:

Unit-I FEATURES OF THE INDIAN CONSTITUTION
(10 Lectures)

a. Preamble
b. Fundamental rights
c. Fundamental duties
d. DPSP
e. Writs
f. Emergency provisions

Unit-II FAMILY LAW
(12 Lectures)

a. Marriage and Divorce

b. Judicial Separation

c. Special Marriage Act, 1954

d. Guardianship and Adoption Maintenance

e. Women and Right to Property

Unit-IIICRIMINAL
(13 Lectures)

a. Obscenity

b. Dowry death

c. Acid Attack

d. Outraging the modesty of women

e. Kidnapping and abduction

f. Rape and sexual assault

g. Cruelty

h. Domestic Violence

Unit-IV LABOUR LAWS
(9 Lectures)

a. Prevention of sexual Harassment at Workplace Act, 2013

b. Maternity Benefit Act, 1961 The Factories Act, 1948

c. The Equal Remuneration Act, 1976

Unit- V PROCEDURAL GUIDELINES
(7 Lectures)

a. Free Legal Aid And Services

b. Right of an Arrested Person Bailable / non – bailable offences

c. Family Court

d. Crimes against Women cell

e. Mahila Courts

TEXTBOOKS:

1. Kai Ambos, Judith Large, Marieke wierda, Building a Furture on Peace and Justice :

Studies on Transitional Justice, Peace and Development The Nuremberg Declaration on

Peace and Justice, Springer Science & Business Media, 2008

2. Andrew Byrnes, Mika Hayashi, Christopher Michaelsen, International Law in the New Age

of Globalization, Martinus Nijhoff Publishers, 2013

3.New Age of Globalization, Martinus Nijhoff Publishers, 2013

4. Jan Aart Scholte, Globalization – A critical introduction

5.Jarrod Wiener – Globalization and the harmonization of law

6.Michael Goodhart – Democracy as Human Rights – Freedom and Equality in the age of Globalization

7. James H Mitelman, The Globalization Syndrome

ARTICLES:

1. Joseph Stiglitz , Making Glogalisation Work: The Next Step to Global Justice, Penigun 2007

2. Antony Anghie (Editor), The Third World and International Order: Law, Politics, and Globalization, Kluwer Law International , 2003

Note: Latest edition of text books may be used.

Modes of Evaluation:

Components	Internal Examination	End term written Exam
Weightage (%)	40%	60%

Internal Examination

Components	Assignment/ Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	40

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	2	-	2	2
CO2	-	2	2	1	-	2	-	-	-
CO3	-	2	2	1	-	-	-	-	-
CO4	-	3	2	2	2	-	-	-	2
CO5	-	2	2	1	-	2	-	-	2

Details of class schedules

Lecture Plan No.	TOPIC	Reference Book	Pedagogy
1	**UNIT- I** Introduction of the Chapter	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
2	Features of the Indian Constitution	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
3	Preamble	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
4	Fundamental rights	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
5	Fundamental duties	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research

6	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
7	DPSP	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
8	Writs	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
9	Emergency provisions	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
10	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
11	**Unit-II Introduction to the chapter (Family law)**	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
12	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial	• Lecture • Discussion • Debate • PPT • Research

		law by S.N Mishra • CRPC bareact	
13	Marriage	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
14	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
15	Divorce	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
16	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
17	Judicial Seperation	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
18	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research

19	Special Marriage Act, 1954	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
20	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
21	Guardianship and Adoption Maintenance	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
22	Women and right to property	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
23	**Unit-III Introduction to the chapter** **(Criminal law)**	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
24	Obscenity	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
25	Dowry death	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial	• Lecture • Discussion • Debate • PPT • Research

		law by S.N Mishra • CRPC bareact	
26	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
27	Acid attack	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
28	Outraging the modesty of women	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
29	Kidnapping and Abduction	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
30	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
31	Rape and sexual assault	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research

32	Cruelty	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
33	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
34	**Unit-IV Introduction to the chapter(Labour Laws)**	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
35	POSH Act	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
36	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
37	Maternity benefit Act	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
38	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial	• Lecture • Discussion • Debate • PPT • Research

		law by S.N Mishra • CRPC bareact	
39	Equal Remuneration Act,1976	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
40	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
41	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
42	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
43	**Unit-V Introduction to the chapter(Procedural Guidelines)**	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
44	Free legal Aid and service	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research

45	Continue	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
46	Rights of arrested person	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
47	Family court	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research
48	Crime against women cell and mahila courts	• Constitutional Law of Ibdia by M.P Jain • Bareact –The Indian Penal Code, 1860 • Labour and Industrial law by S.N Mishra • CRPC bareact	• Lecture • Discussion • Debate • PPT • Research

II Semester

LINGAYA'S VIDYAPEETH

NACHUALI, JASANA ROAD, FARIDABAD

BACHELOR OF LEGISLATIVE LAW

LLB122: LAW OF CONTRACT-II

L-4, T-0 P-0 **Credits–4** **Max Marks:100**

Objective-

The objective of this paper will impart comprehensive information of Indemnity, Guarantee, Agency, Partnership, Sale of goods Act.

Course Outcome
On completion of this course, the students will be able:

CO1: To analyze the concept and nature of Indemnity and Guarantee.
CO2. To Differentiate between Pledge and Bailment.
CO3. To familiarize Kinds of Agency, Rights and duties of agent.
CO4. To analyze the concept of Contract of sale.
CO5. To analyze the Formation of Partnership, Rights and Duties of partners.

This course has 5 units:

Unit-1

(A) Indemnity
1. The concepts
2. Need for indemnity to facilitate commercial transactions
3. Definition of Indemnity
4. Nature and extent of liability of indemnifier
5. Commencement of liability of the indemnifier
6. Situations of various types of Indemnity creations
7. Agreements of indemnity

(B) Guarantee
1. Definition of Guarantee: as distinguished from indemnity
2. Basic essentials for a valid guarantee contract
3. Continuing guarantee
4. Nature of surety's liability- duration and termination of such liability
5. Creation and identification of continuing guarantees
6. Rights of surety
7. Co-surety and manner of sharing liabilities and rights
8. Extent of surety's liability
9. Discharge of surety's liability

Unit-ll

(A) Bailment
1. Manner of creation of bailment contracts
2. Commercial utility of Bailment contracts
3. Definition of bailment
4. Kinds of Bailor and Bailee towards each other
5. Rights of Bailor and Bailee
6. Finder of goods as a Bailee
a. Liability towards true owner
b. Obligation to keep the goods safe
c. Right to dispose off the goods

(B) Pledge
1. Pledge : comparison without bailment
2. Commercial utility of pledge transactions
3. Definition of pledge under Indian Contract Act
4. Other statutory regulations (state and Centre) regarding pledge, reasons for the same
5. Rights of the pawner and pawnee
6. Pledge by certain specified persons mentioned in the Indian Contract Ad

Unit-III: Agency

1. Identification of different kinds of agency transactions in day to day life in the commercial world
2. Kinds of agents and agencies, distinction between agents and servants
3. Essentials of a agency transactions

4. Various methods of creations of agency
5. Delegation
6. Duties and rights of agent
7. Scope and extent of agent's authority
8. Liability of the principal for acts of agents including misconduct and tort of agent
9. Liability of the agent towards the principal
10. Personal liability toward the parties
11. Methods of termination of agency contract

Unit-IV: Sale of goods act

1. Concept of sale as a contract
2. Illustrative instances of sales of goods and the nature of such contracts
3. Essentials of contracts of sale
4. Essential condition in every contract of sale
5. Implied terms in contract of sale
6.The rule of Caveat Emptor and the exceptions thereto under the Sales of Goods Act
7. Changing concept of caveat emptor
8. Effect and meaning of implied warrantees in a sale
9. Transfer of title and passing of risks
10. Delivery of goods : various rules regarding delivery of goods.

11. Unpaid seller and his rights
12. Remedies for breach of contract

Unit-V: Partnership

1. Nature of partnership : definition
2. Distinct advantages vis-a-vis partnership and private limited company
3. Mutual relationship between partners
4. Authority of partners
5. Admission of partners
6. Outgoing of partners
7. Registration of partnership
8. Dissolution of partnership

TEXTBOOKS:

1. Avtar Singh , Contract Act (2000) Eastern Book Company, Lucknow
2. Avtar Singh , Principles of the Law of Sales of Goods and Hire Purchase (1998), Eastern book
Company, Lucknow
3. Bangia,R.K. Contract II,Allahabad Law Agency
4. R.K. Abhichandani (ed.) Pollack and mulla on Contract And Specific Relief Acts (1999), Tripathi, Bombay
5. Krishna Nair , Law of Contract (1999) Orient Law House , New Delhi
6. J.P. Verma (ed.) Singh and Gupta , The Law of partnership in India(1999) Orient law House,
New Delhi
7. A.G. Guest (ed.) Benjamin's Sales of Goods (1992), Sweet and Maxwell.
8. Bhashyam and Adiga, The Negotiable Instrument Act(1995) Bharath, Allahabad
9. Beatson (ed.),Anson's law of Contract (1998),Oxford, London

MAPING COs WITH POs AND PSOs

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	-	-	3	-	2	2	2
CO2	2	-		-	3	-	1	1	2
CO3	2	-	1	1	2	1	2	2	2
CO4	3	2	2	1	3	-	2	3	3
CO5	2	-	-	-	1	1	3	2	2

LINGAYA'S VIDYAPEETH
SCHOOL OF LAW
SYLLABUS LL.B. 3 YEARS PROGRAMME
SUBJECT : ENVIRONMENT LAWS
SUBJECT CODE : BBALLB 114

CREDIT : 4

Course Objectives

The paper seeks to inculcate a general awareness of the major problems of environmental protection in three categories: (1) Protection of the environment, (2) Pollution abatement, and (3) Protection of natural and living resources, and the major legal framework obtaining in the Indian law.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understand &conceptualize the evolution, Sources & fundamentals related with Environmental law.

CO2:Understand & critically analyze the concept related with Pollution & its types, Statues related with Air & Water for prevention & control of pollution and Coastal Zone Management.

CO3: Understand & critically analyze the laws related with forest management, Wildlife protection & Judicial Contribution with regards to wildlife protection.

O4: Critically analyze & Evaluate contribution of domestic laws with regards to Land resources, Wetlands, Water resources & Ground water management.

CO5: Evaluate&analyze the contribution of Judiciary with regards to multilateral aspects related with Protection of Environment & Wildlife.

Course Outline

Unit I

General Introduction to Environmental Studies

1. Natural resources and its kinds
2. Concept of pollution of the environment
3. Impact of pollution on natural resources (forest, water, minerals, food energy, Land, air)
4. Sources of environment law
5. India's ancient tradition and environment law
6. Evolution of the Indian laws re. protection of the environments

Unit II

Environmental Pollution and Prevention

1. Definition and causes of pollution
2. Types of Pollution:

(a) Air pollution
(5) Water pollution
(c) Soil pollution
(d) Marine pollution
(e) Noise pollution
(f) Thermal pollution
(g) Nuclear hazards

3. Air (Prevention and Control of Pollution) Act 1981 and judiciary's initiative
4. Water (Prevention and Control of Pollution) Act 1974 and judiciary's initiative
5. Environment Protection Act 1986
6. Noise pollution and judiciary's initiative
7. Coastal zone management

Unit III

Protection of Forest Habitat

1. Forest law in India
2. Sustainable use of forest
3. Role of central government in forest protection
4. Wildlife protection Act 1972
5. Judicial initiative for wildlife protection Act

Unit IV

Resource Management

1. Land resources management
2. Wetlands management
3. Water resources management
4. Ground water management
5. Environment impact assessment

Unit V

Contribution of Indian Judiciary

1. Articles in constitution of India
2. Polluter pays principle
3. Precautionary principle
4. Public Trust Doctrine
5. Compensation and rehabilitation

BOOKS RECOMMENDED

1. K.D. Gaur, Criminal Law -Cases and Material, Universal Law Publishing Co.
2. R. C. Nigam, Law of Crimes -Principles of Criminal Law, Asia Publication House Reference Books: 1. K. I. Vibhute (Rev.), P.S.A.Pillai's Criminal Law, Lexis NexisButterworths India 2008.
2. V.B. Raju, Indian Penal Code, 1860, State Mutual Book and Periodical Service Ltd.
3. K.N.C. Pillai &ShabistanAquil (Rev.), Essays on the Indian Penal Code (The Indian Law Institute, 2005)
4. K.T. Thomas and MA Rashid, Ratanlal&Dhirajlal's The Indian Penal Code, Lexus Nexis, 2015.

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	-	-	2	1
CO2	3	2	1	-	2	-	-	2	-
CO3	2	1	2	1	1	-	-	2	-
CO4	2	1	2	3	2	-	2	2	1
CO5	2	3	2	1	1	1	1	2	2

LINGAYA'S VIDYAPEETH
NACHUALI, JASANA ROAD, FARIDABAD
BACHELOR OF BUSINESSN ADMINSTRATION AND BACHELOR OF LAW INTEGRATED

BBALLB 116 : FAMILY LAW II(Mohammedan Law)

L-4, T-0 P-0 Credits–4 Max Marks: 100

Objective: To overview of Muslim law in its historical and evolutional perspective. It includes a critical analysis of the history, development, and the schools of Muslim law, classical and modern theories, evolution of the law up to the present and its contemporary applications. It comprehensively covers the law of marriage, dissolution of marriages, guardianship, talaq, maintenance, paternity and the concept of legitimacy among Muslim and deals with debts and bequest (wasiyat), hiba (gift) and Muslim law of inheritance, the family courts, the civil Marriage Law, the Special Marriage Act etc.The main objective of the subject is to sensitize the students about the Islamic society, their legal rights and duties.

Course Outcome

CO1: To make students understand the scope, sources and schools of muslim law in India.
CO2: To familiarize students with muslim marriage, marital right and dower.
CO3: To analyze the concept of divorce and maintenance under muslim law.
CO4: To analyze the concept of gift, bequests, inheritance under muslim law

UNIT 1
1. Status and Scope of Muslim Law in India,
2. Statutory Application of Muslim Law including the Muslim Personal Law (Shariat) Application Act, 1937;
3. Sources of Muslim Law and their position in India
4. Schools of Muslims in India,.

UNIT 2
1.Muslim Marriage(Nikah)- legal requirements including all forms of Marriage and Legal impediments thereon,
2. Effects of marriage
3. Marital Rights, including dower and its Characteristics and Enforcement;
4. Special terms and conditions in marriage and their enforcement;

5. Post Marriage Conversion to Islam
6. Post Marriage renunciation of Islam,

UNIT 3

1.Divorce and its Policy in Islam
2. Forms of divorce in Muslim Law of India, including divorce by wife outside and through courts
under the Dissolution of Muslim Marriages Act, 1939,
3. Post-Divorce Rights of parties including iddat period, remarriage,
4. Maintenance including the Muslim Women(Protection of Rights on Divorce) Act, 1986 and
Maintenance of Wife and Widow under Ss 125-128 Cr.P.C., 1973.

UNIT 4

1.Surviving Spouse- his or her right to inherit;
2. Deceased wife's dower, widow's lien/wife's right to retain,
3. Rights of deceased husband's heirs, transferability and inheritability of dower,
4. Parent Child relations including acknowledgement of paternity and concept of Legitimacy;
5. Concept of Minority and puberty including guardianship and custody of minor's person and/or
property; Parents maintenance under Muslim Law and Cr.P.C. (Ss 125-128),

UNIT 5

1.Disposition of property including gifts(hiba), debts and bequests (wasiyat);
2. Revocation and lapse of legacies,
3. Bequest to heirs, and bequeathable third and death-bed transactions,
4. Muslim Law of inheritance including Women's right to inherit and disqualification of heirs;
5. Muslim Law on Increase and return,
6. Muslim Law relating to wakfs and their administration including the Wakf Act, 1995.

RECOMMENDED BOOKS

1.M. Hidayatullah & Arshad Hidayatullah, Mulla, Principles of Mahomedan Law (19th ed., 1990)
(reprint 2010)
2. Asaf A.A. Fyzee, Outlines of Muhammadan Law (5th ed., 2008)
3. Tahir Mohmmad. Introduction to Muslim Law (Universal Law Publisher, 2nd Ed. 2014)
4. Paras Diwan. Muslim Law in India. (Allahabad Agency, Reprint 2017)
5. M.P. Tandon. Muslim Law in Modern India. (Allahabd Law Agency, Reprint 2012)
6. M.A. Qureshi. Muslim Law. (Central Law Publication, 5th Ed. 2015)
7. H.D. Kohli. Muslim Law Cases & Material. (Universal Law Publication, 1st Ed. 2012)
8. Tahir Mohmmad. Muslim Law in India and Abroad (Universal Law Publisher, 2nd Ed.2016

MAPPING WITH COs WITH Pos AND Cos.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-
CO2	1	1	-	1	-	-	-	1	-
CO3	1	2	-	1	-	-	-	1	-
CO4	1	-	-	-	-	-	-	-	-

LINGAYA'S VIDYAPEETH

NACHUALI, JASANA ROAD, FARIDABAD

LL.B

LLB 118 Constitutional Law – 1I

L-4, T-0 P-0

Credits–4

Max Marks: 60

Objective- Constitution of India is the pillar on which the governance of our country rests. The course aims to examine political, social and economic value structure of the constitution of India. The balancing of positive responsibility of the state to establish a economy of growth, social justice and political aspiration of all sections of the Indian society through constitutional governance.

The objective of the paper is to apprise the students with the laws relating to system of governance at the Union and State level.

Course Outcome
On completion of the course students will be able to :

CO1: To define the different organs of the state and their powers.
CO2: Explain centre state relations and the relations between the different organs of the state.
CO3: Critically evaluate the role and importance of constitutional bodies, functionaries and institutions.
CO4: critically analyze working of the Judiciary, Executive and Legislative bodies, their working and comparison with other similar legal systems of the world
CO5: critically analyze other miscellaneous provisions in constitution related to election, emergency and amendment.
CO6: Students will be able to put their acquired knowledge into practice in their research on contemporary constitutional law issues.

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

SYLLABUS

LL.B. 3 YEARS PROGRAMME

SUBJECT: COSTITUTONAL LAW II

SUBJECT CODE:LLB 118

CLASS :LL.B. IIND YEAR

SEMESTER: II

CREDIT: 4

Objective: Constitution of India is the pillar on which the governance of our country rests. The course aims to examine political, social and economic value structure of the constitution of India. The balancing of positive responsibility of the state to establish a economy of growth, social justice and political aspiration of all sections of the Indian society through constitutional governance.

The objective of the paper is to apprise the students with the laws relating to system of governance at the Union and State level.

UNIT-I

1. The Union Executive

I. Forms of Government-presidential and Parliamentary

II. The nature and extent of executive power- the position, power and functions of the president.

III. Procedure for the election and impeachment of president

IV. Constitutional position of the president

V. Vice president- power,function, election and removal

VI. Council of Ministers

VII. Attorney General of India

2. State Executive

I. Constitutional power of Governor

II. The position power and functions of the Governor

III. Advocate General for the State

IV. Comparison between Presidential power and Power of Governor

UNIT -II : Union Legislature and State Legislature

1. Powers of Chairman - Deputy Chairman, Speaker and Deputy Speaker-their removal from

office, Salaries and priviledges of Parliament and its members.

2. Legislative Procedure, Various stages in the enactment of a statute, Sitting of house, Procedure relating to ordinary bills, money bills and financial bills.

3. Composition and duration of the houses - the legislative procedure and privileges by the house

4. The doctrine of Pleasure

UNIT-III: Judiciary

Union Judiciary

1. Establishment and constitution of Supreme Court

2. Qualification, appointment and removal of Judges

3. Original, Appellate and Advisory Jurisdiction of Supreme court

State Judiciary

1. High Court Judge's appointment, qualification conditions of services.

2. Removal and transfer of Judges

3. Powers and Jurisdiction of High Courts

4. Subordinate courts -appointment of district judges, control over subordinate courts

5. Doctrine Stare decisis

UNIT-IV: Legislative Relations

1. Distribution of legislative powers between the Union and State

2. Freedom of Trade, commerce and Intercourse

UNIT-V: Miscellaneous Provisions

1. Civil service under Constitution

2. Government liability in Contract and Torts

3. Election Commission: constitution and powers of election commission

4. Emergency provisions

5. Constitutional amendments

BOOKS RECOMMENDED

1. J.N. Pandey - Constitutional Law of India. Central Law Agency

2. M.P. Jain - Constitutional Law Wadhawa and Company, Nagpur

3. V.N. Shukla-Constitution of India , Eastern Book Company

4. D.D. Basu - Introduction to the Constitution of India, Lexis Nexis India.

5. H.M. Seeravai -Constitutional Law of India. Universal Law Publishing Company Ltd.

6. K. C. Wheare- Modern Constitution. Thomas and Hudson 1990

7. P.M. Bakshi- The Constitution of India.Universal Law Publication.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	1	-	-	1	-	3	2
CO2	3	1	1	1	-	1	-	3	2
CO3	2	2	1	2	1	-	-	3	2
CO4	2	1	1	1	1	1	-	2	2
CO5	2	-	-	-	1	-	-	3	3
CO6	-	3	2	2	3	-	1	2	2

LINGAYA'S VIDYAPEETH

NACHUALI, JASANA ROAD, FARIDABAD

BACHELOR OF LEGISLATIVE LAW

LLB 122: ADMINISTRATIVE LAW

L-4, T-0 P-0 **Credits–4** **Max Marks:100**

Objective-

1) The objective of studying of administrative law is to understand the nature of administration and the rule of law.
2) To make students understand the nature, scope, concept, necessity and growth of Administrative law.
3) To familiarize the students with the conceptual and operational parameters of the general principles of the Administrative Law.
4) To make the students understand the difference between Constitutional law and administrative law.
5) To make the students aware of the working of Administration.

Course Outcome
On completion of this course, the students will be able to:

CO1: Define the objectives of Administrative law and the rule of Law
CO2. Explain the nature, scope, necessity and development of Administrative Law and action.
CO3. Identify the basic rules and principles followed to render administrative justice;
CO4. Identify distinction between the Constitutional Law and Administrative Law
CO5. Examine the functioning of the special bodies constituted as alternative means for administering justice viz., Administrative Tribunals, Ombudsman, Lokayukta, Lokpal;

This course has 5 units:

Unit-1: Introduction

1. Meaning, Definition & Scope of Administrative Law

2. Sources & Development of Administrative Law

3. Relationship between Constitutional Law and Administrative Law

4. Separation of powers & Constitutional law

5. Rule of law & Constitutional law

6. Distinction between judicial, quasi-judicial and Administrative functions

7. Relationship between Constitutional law and Administrative Law

Unit-ll: Delegated Legislation

1. Delegated Legislation - Definition & Form

2. Necessity of Delegated Legislation

3. Reasons for the growth of Delegated Legislation

4. Types of Delegated Legislation

5. General Limitations upon Delegation of Powers - Principles:

i. Subsidiarity

ii. delegatus non potest delegare

6. Droit Administratif

Unit-III: Principle of Natural Justice and Rule of Law

1. Natural Justice & Legal Justice

2. Basic principles of natural law:

i. No man can be judge of his own cause (Dr. Bonham's Case)

ii. Audi alteram partem (right to fair hearing)

3. Exceptions to the rule of Natural Justice

4. Effects of non-compliance with principles of Natural Justice

5. Rule against Bias: Principle against arbitrariness: Wednesbury Rule

Unit-IV: Adjudication & Judicial Review Power under the Administrative law

1. Need for Administrative Adjudication

2. Modes of Administrative Decision making

3. Administrative Tribunals

4. Judicial Review of Administrative Actions: Constitutional Framework

5. Doctrine of ultra vires

6. Power to review own Decisions

7. Grounds for review:

i. Failure to exercise discretion

ii. Excess of discretionary authority

iii. Arbitrary exercise of discretion

8. Doctrine of proportionality

9. Doctrine of Legitimate Expectations

Unit-V: Administrative Discretion & Mechanism for Control of Administrative Actions

A. Meaning of Discretionary Power & its rationale

1. Scope of discretion & Grounds for challenging the exercise of Administrative Discretion

2. Abuse of discretion - Study of case-law:

a. Non-application of mind

b. Improper purpose

c. Irrelevant considerations

d. Fettering of discretion acting under dictation

3. Sovereign immunity in Administrative Law

B. Institutional controls on Administrative Actions

a. Public audit

b. Commissions of Enquiry

c. Ombudsman in India (Lokpal & Lokayuktha)

d. The Right to Information Act

C. Methods of judicial review

a. Statutory appeals

b. Writs

c. Declaratory judgments and injunctions

d. Civil Suits for Compensation

TEXTBOOKS:

1. K. Takwani, Lectures on Administrative Low, Eastern Books Co, Lucknow

2. P. Mittal, Natural Justice Judicial Review & Administrative Low

3. HWR Wade & CF Forsyth, Administrative Low, OUP, 2009.

4. MP Jain, Cases & Materials On Indian Administrative Low, LexisNexis, New Delhi, 1 st edn. 1994

5. Tushar Kanti Soha, Administrative Law, Kanishka, 2001

ARTICLES:

1.Ajoy P.B., Administrative Action and the Doctrine of Proportionality in India, http://www.iosrjournals.org/iosr-jhss/papers/Vol1-issue6/D0161623.pdf

2.Justice MarkandeyKatju., Administrative law and judicial review of administrative action, http://www.ebcindia.com/lawyer/articles/2005_8_25.htm

3.Anupa V. Thapliyal, Central Administrative Tribunals and Their Power to Issue Directions, Orders or Writs Under Articles 226 and 227 of the Constitution, http://www.ebc-india.com/lawyer/articles/92v4a4.htm

4.ShubhamManojKhare, Administrative Discretion & Limitation on Administrative Discretion By Article 14 & 16 of the Indian Constitution, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1465519

5. D.Y.Chandrachud,Constitutional and Administrative Law in India, http://scholarship.law.cornell.edu/cgi/viewcontent.cgi?article=1142&context=ijli

6. Prof. S.S. Vishweshwaraiah, Emerging Trends In Administrative Law, http://elearning.vtu.ac.in/P3/CIP71/5.pdf

7. A. T. Markose, 'Judicial Control of Administrative Action in India. A Study in Methods.'http://www.jstor.org/stable/pdfplus/1337434.pdf?acceptTC=true

8.Y Pardhasaradhi, Ravinder Kaur, Administrative Reforms for Good Governance, http://socialsciences.in/article/administrative-reforms-good-governance

9. 162nd Report of the Law Commission on Central Administrative Tribunal, http://lawcommissionofindia.nic.in/101-169/report162.pdf

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	-	2	1	2	1	2	2
CO2	2	3	1	-	1	-	1	1	2
CO3	1	2	-	1	-	2	-	1	2
CO4	2	1	2	-	-	-	1	2	1
CO5	1	1	-	1	-	1	-	1	2

LLB 120	**International Law**	L	T	P	C
Version 1.0		4	0	0	4
Pre-requisites/Exposure	Basic awareness related with International Law				
Co-requisites	Understanding of Municipal Laws				

LINGAYAS VIDYAPEETH
SCHOOL OF LAW

Course Objectives

To apprise the students about the similarities and difference between Municipal law and International Law, various sources, explanation of the term State including types of states, Recognition of State, Extradition, Asylum, Diplomatic agents, Amicable and Coercive modes of settlement of dispute, War, Blockade, Evolution of human rights and its National and international perspective.

Course Outcomes

On completion of this course, the students will be able to

CO1:Understand &Conceptualize the evolution, Sources & interconnection with domestic law related with International law.

CO2:Understand & Critically analyze the concept related with State Territory, State Jurisdiction, Recognition & Acquisition related with Public International Law.

CO3: Understand & Critically analyze the concept related with State Succession, Extradition, Asylum & Settlement of Disputes related with Public International Law.

O4: Critically analyze & Evaluate applicability of various laws which falls under the purview of Public International Law.

CO5: Evaluate the multilateral aspects of human rights & related enactment under the purview of Public International Law.

Course Outline

UNIT-I
1. Definition, Nature and Sanctions of International Law,
2. Relationship between International Law and Municipal Law,
3. Sources and subjects of International Law including position of individual

UNIT-II
1. State Territory,
2. State Jurisdiction,
3. Recognition of States and Governments,
4. Acquisition and loss of State Territory,

UNIT-III

1. State Succession,
2. Extradition,
3. Asylum,
4. Settlement of Disputes

UNIT-IV

1. Nature, Definition and Effects of War,
2. Belligerent Occupation,
3. War Crimes,
4. Contraband,
S. Blockade,
6. Prize Counts,
7. Enemy Character, Rules of Warfare

UNIT-V

1. Human Rights: Concept of Human Rights,
2. Provisions of U.N. Charter relating to Human Rights,
3. Universal Declaration of Human Rights, 1948 and its Legal Significance,
4. Covenant on Civil and Political Rights, 1966
5. Covenant on Economic, Social and Cultural Rights,
6. National Commission on Human Rights

BOOKS RECOMMENDED

1. Starke's International Law (Oxford University Press Butterworth & Co. publisher Ltd. 11th Ed.
2013)
2. V.K. Ahuja. Public International Law (Lexis Nexis, Ist Ed. 2016)
3. V.C. Govindaraj. Conflict of Laws-Cases and Materials (Lexis Nexis, Ist Ed. 2017)
4. Aggarwal, H.O. Public International Law and Human Rights (Central Law Publications Ed. 20
5. Kappor, S.K. International Law (Central Law Publications 2013)
6. Harris, D.J. Cases and Material on International Law (Sweet & Maxwell Ed. 2013)
7. Greig, DW. International Law (Butterworths and Co. (Publishers) Ed. 2007)

Mapping CO's with PO's & PSO's

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	-	2	1	2	1	2	2
CO2	2	3	1	-	1	-	1	1	2
CO3	1	2	-	1	-	2	-	1	2
CO4	2	1	2	-	-	-	1	2	1
CO5	1	1	-	1	-	1	-	1	2

LINGAYA'S VIDYAPEETH

NACHUALI, JASANA ROAD, FARIDABAD

B.B.A. LL.B

LLB 352 Moot Court, Pre Trial Preparation & Participation in Trial Proceedings (including interviewing techniques & Pretrial preparations)

L-4, T-0 P-0 **Credits–4** **Max Marks: 100**

Objective- The objective of this subject is to teach students how to do legal research, present arguments and prepare memorial in a moot court along with basics professional ethics required in a court room.

Course Outcome
On completion of the course students will be able to :

CO1: Take part in Moot court competitions following relevant rules and instructions
CO2: Learn how to do legal research, form issues, address those issues and frame arguments.
CO3: Understand the pros and cons of argumentation.
CO4: Learn courtroom etiquettes and act in a professional manner
CO5: Develop confidence and communication skills.
CO6: Gain legal research skills.

LÍNGAYA'S VIDYAPEETH
SCHOOL OF LAW
SYLLABUS
LL.B. 3 YEARS PROGRAMME
SUBJECT: Moot Court, PreTrial Preparation & Participation in Trial Proceedings (including interviewing techniques & Pretrial preparations)

SUBJECT CODE : LLB 124
CLASS :LL.B. 3RD YEAR
SEMESTER : VI
CREDIT : 4

Objective: The objective of this subject is to teach students how to do legal research, present arguments and prepare memorial in a moot court along with basics professional ethics required in a court room.

RULES FOR MOOT COURT COMPETITION

► MARKING CRITERIA FOR MEMORIALS:

Marking Criteria	Marks Allotted
Evidence of Original Thought	20
Knowledge of Law and Facts	20
Proper and Articulate Analysis	20
Correct format and Citation	20
Extent and Use of Research	20
TOTAL MARKS	100

Number of Copies of Memorial to be submitted: 2
• Number of Compendium to be submitted: 1

RULES FOR THE ORAL ROUNDS:

Preliminary Rounds

The preliminary rounds will be held on February 12, 2020. The Preliminary rounds shall comprise of Two Rounds of oral arguments subject to the allotment of team codes where three teams are representing as Applicant and three teams as the Respondents. In preliminary rounds, each team shall have to argue once, as per their allotment, either as Applicant or as Respondent.

Each team will get a total of 20 minutes to present their case. And 5 minutes will be allotted for rebuttal. The division of time per speaker is left to the discretion of the team, where the teams shall divide timings as:
a. Speaker 1- mention the specific time with respect to specific issues.
b. Speaker 2- mention the specific time with respect to specific issues,
(on A4 size paper to be submitted in the court room)

• The oral arguments should be confined to the issues presented in the memorial. The researcher may sit with the speakers during the oral rounds. Maximum scores for the oral rounds shall be 50 points per speaker by a judge
.The speakers shall provide the copies of the compendium in the court room. No two Teams will argue against each other more than once in the Preliminary Rounds.

The oral rounds shall be judged on the following criteria:

Marking Criteria	Marks Allotted
Preparation and familiarity with facts	10
Structure of Legal Argument	10
Knowledge & Application of Law	10
Organization, Presentation, Speaking Ability	05
Responsiveness to Questions	05
Persuasiveness and Advocacy	05
Courtroom Etiquette	05
MARKS FOR EACH SPEAKER	50
TOTAL MARKS	100

• The winners of the preliminary rounds, i.e. total two teams (2 teams) shall qualify for the Final Rounds.

Final Rounds:

The Final Rounds shall also take place on February 12, 2020. The two teams who stand declared as winners of the Preliminary Rounds shall qualify for the Final Rounds. Each team will get a total of 30 minutes to present their case which will include rebuttal and sub-rebuttal time. The Winner of the Final Round shall be declared Winner of the Competition.

> Scouting

Teams shall not be allowed to observe the orals of another team, unless they have been officially knocked-out of the competition. Scouting is strictly prohibited. Scouting by any team shall entail instant disqualification.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	3	3	2	1	2	3	1	-
CO2	1	3	2	2	2	1	2	1	-
CO3	1	2	3	2	1	1	1	3	2
CO4	-	2	2	2	2	2	2	-	1
CO5	-	1	3	-	2	-	2	-	-
CO6	1	1	2	1	2	-	-	1	1

3RD SEMESTER

Lingaya'sVidyapeeth

(Approved under section 3 of UGC Act. 1956)

SCHOOL OF LAW

COURSE PLAN

For the Session 2021-2022

Semester	: 3rd Semester
Subject	: LAW OF CRIME (IPC 1)
Course	: LL.B and BBALLB
Sub Code	: LLB211 and BBALLB205

L	T	P	C
4	0	0	4

Course Objectives:

This paper will deal with the basic principles of criminal law determining criminal liability and punishments as well as Marital offences.

Course Outcome:

On completion of this course, the students will be able to

CO1: Identify ingredients of crime and basic Principles of Criminal Law.
CO2: learn how crimes are categorized by types and seriousness.
CO3: learn general exceptions mentioned under the IPC.
CO4: Analyze the different types of Punishments.
CO5: Identify types of marital offenses.

Catalog Description

Law of crime I deals with the general principles of the Law of Crime. The subject basically revolves around The Indian Penal Code, 1870. The teaching methodology includes chalk and
talk and power point presentation as the primary mode, along with case studies and analysis.

Class discussion will also take places in order to discuss the practical applicability of the Law.
The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability
An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

Course Contents:

It has 5 units which are as follows:

Unit-1: Introduction to Substantive Criminal Law (10 Lectures)

a. Extent and operation of the Indian Penal Code

b. Definition of Crime

c. Constituents Elements of Crime: Actus Reus and Mens rea

d. Stages in commission of a Crime- Intention, Preparation, Attempt etc.

Unit-II: General Exceptions (Sections 76-106) (10 Lectures)

a. Definitions

b. Mistake

c. Judicial and Executive acts

d. Accident

e. Necessity

f. Infancy

g. Insanity

h. Intoxication

i. Consent

j. Good Faith

k. Private Defense against Body and Property

Unit-III: Incoherent Forms of Crime
(9 Lectures)

a. Joint and Constructive Liability

b. Criminal Conspiracy

c. Attempt

d. Abetment

Unit-IV: Punishment
(9 Lectures)

a. Offence against the State

b. Offence against Public Tranquility,

c. Theories of Punishment with special reference to Capital Punishment

Unit-V: Marital offences
(10 Lectures)

a. Offences relating to marriage (Chapter-XX)-Bigamy, Adultery etc.

b. Offences of cruelty by the Husband or relatives of Husband(Chapter-XXA/Section

498A)

Reference Books

1. Ratanlal Dhiraj Lal, The Indian Penal Code, Lexis Nexis, Butterworths Wadhwa, Nagpur,

2012

2. K.D. Gaur, Textbook on Indian Penal Code, Universal Law Publishing Co., New Delhi, 2012

3. PS A Pillai, Criminal Law, Lexis Nexis, 14" Edition, 2019

4. Bare Act of Indian Penal Code, 1860

5. https://unacademy.com/lesson/criminal-law-overview/XLHB52G3

Note: Latest edition of text books may be used.

Mode of Evaluation

Modes of Evaluation:

Components	**Internal Examination**	**End term written Exam**
Weightage (%)	**40%**	**60%**

Internal Examination

Components	**Assignment/ Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**40**

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	2	-	2	2
CO2	-	2	2	1	-	2	-	-	-
CO3	-	2	2	1	-	-	-	-	-
CO4	-	3	2	2	2	-	-	-	2
CO5	-	2	2	1	-	2	-	-	2

Lecture Plan No.	TOPIC	Reference Book	Pedagogy
1	**UNIT- I** Introduction to Substantive Criminal law	1)Ratanlal and Dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
2	Extent and operation of the Indian Penal Code	1)Ratanlal and Dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
3	Definition of crime	1)Ratanlal and Dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
4	Constituents Elements of Crime:Actus Reus and Mens Rea	1)Ratanlal and Dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
5	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research

6	Stages in Commission of crime	1)Ratanlal and Dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
7	Continue	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
8	**UNIT-II** General Exception(Section-76-106)-Introduction	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
9	Definitions	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
10	Mistake	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
11	Judicial and executive Acts	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
12	continue	1)Ratanlal and dhirajlal-Indian Penal Code	• Lecture • Discussion

		2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Debate • PPT • Research
13	Accident	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
14	Necessity	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
15	Infancy	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
16	Intoxication	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
17	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
18	Consent	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act	• Lecture • Discussion • Debate • PPT

		3) K.D Gaur- Textbook on Indian Penal Code	• Research
19	continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
20	Good faith	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
21	Private Defense against body	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
22	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
23	Private Defense against property	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
24	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on	• Lecture • Discussion • Debate • PPT

		Indian Penal Code	• Research
25	**UNIT-III** Incoherent Forms of Crime-Introduction	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
26	Joint liability	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
27	Continue	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
28	Constructive liability	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
29	Continue	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
30	Criminal Conspiracy	1)Ratanlal and dhirajlal-Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research

31	Attempt	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
32	Abetment	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
33	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
34	**UNIT-IV** Punishments- Introduction	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
35	Offence against the state	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
36	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
37	Offence against Public Tranquility	1)Ratanlal and dhirajlal- Indian Penal Code	• Lecture • Discussion

		2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Debate • PPT • Research
38	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
39	Theories of Punishment with special reference to Capital Punishment	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
40	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
41	**UNIT-V-** Marital Offences Introduction of the chapter	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
42	Offences relating to marriage	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
43	Bigamy, Adultery etc.	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act	• Lecture • Discussion • Debate • PPT

		3) K.D Gaur- Textbook on Indian Penal Code	• Research
44	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
45	Offences of cruelty by the Husband or relative of husband	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
46	continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
47	Section-498 A	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research
48	Continue	1)Ratanlal and dhirajlal- Indian Penal Code 2) Bare act 3) K.D Gaur- Textbook on Indian Penal Code	• Lecture • Discussion • Debate • PPT • Research

L	T	P	C
4	0	0	4

CORPORATE LAWS

Program: LL.B.

Code: LLB 213

OBJECTIVES: The emphasis in this course is on the fundamentals principles, concepts and doctrines revolving around the subject around the subject matter of corporate law covering from pre incorporating to the establishment, management and to winding up companies. The course content has been designed keeping in mind the companies Act, 2013 and its implications on the corporate sector.

COURSE OUTCOME:

On completion of this course, the students will be able to:
CO1: have an elementary understanding of various nuances of corporate law like corporate personality, doctrine of piercing the corporate veil etc.
CO2: Identify the relevant legal issues that arise on a given set of facts in the area of corporate law.
CO3: Explain and apply the principles of corporate law covered in the course
CO4: Analyze and predict how unresolved or ambiguous corporate law questions could be resolved by the courts through an analysis of case law and the judicial method.

Catalog Description

The course of corporate Law has been specifically designed to provide in-depth knowledge about incorporation, raising capital by companies, borrowings and investments by companies and other related important issues. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-I: COMPANY FORM & STRUCTURE

a) Corporate Personality, personification-Concept & Jurisprudential aspects
b) Company- Definition, Nature, Characteristics
c) Classification of Companies
d) Doctrine of piercing of the corporate veil- Statutory exceptions and judicial interpretations
e) Promotion of companies-Legal position of Promoters, duties and Liabilities
f) Pre-incorporation Contracts

UNIT-II: COMPANY-REGISTRATION AND INCORPORATION

a) Memorandum of Association-Importance and contents
b) Articles of Association-significance and Interrelationship
c) Doctrine of Ultra vires- Applicability, consequences
d) Doctrine of constructive Notice- Rule of presumption
e) Doctrine of Indoor management-Concept & exceptions
f) Prospectus (meaning, issue and kinds)

UNIT-III: CORPORATE FUND RAISING

a) Share/Equity Capital-Meaning and Nature of shares, kinds of shares
b) Rights issue, Bonus issue, rationale, mechanism
c) Allotment-Principles & Procedure
d) Debenture/Debt Capital-Concept, meaning and kinds
e) Debenture Trustee, Debenture Trust Deed
f) Shareholder vis-a-vis Debenture holder

UNIT-IV: CORPORATE MANAGEMENT

a) Directors-Meaning, Types, Qualifications, Disqualifications
b) Legal position of Directors
c) Shadow, De-Facto and De-jury Director
d) Powers and Duties of directors
e) Meetings-kinds and requisites of valid meeting

UNIT-V: CORPORATE ABUSE AND REMEDIES

a) Shareholders Democracy
b) Majority Powers and minority rights
c) Principle of Non-Inference (Rule established in Foss v Harbottle)
d) Protection against oppression
e) Protection against Mismanagement

UNIT-VI: CORPORATE COLLAPSE

a) Winding up-Meaning and Types
b) Modes of winding up and Procedure
c) Winding up by the tribunal
d) Voluntary winding up
e) Merger and acquisition of company(Arcelor Mittal and Air India case)
f) Reconstruction and Amalgamation

Text Books:

1. Ramaiyya, Guide to Companies Act, 2013
2. Charlesworth & Morse, Company Law
3. Gower & Davies, Principles of Modern Company Law
4. K Majumdar, Dr. G K Kapoor Company Law & Practice, Taxman
5. Sekhar K, SEBI Capital Issues, Debentures and Listing, Wadhwa And Company, Nagpur
6. CR Dutta On The Company Law, 6th Edn., 2008 by Kamal Gupta
7. Pennington, Company Law
8. Agarwal & Baby on SEBI Act, Taxman Publications
9. Palmer, Company Law
10. Nicolas Bourne, Principles of Company Law

Modes of Evaluation:

Components	Internal Examination	Mid-term written Examination	End term written Exam
Weightage (%)	15 %	25%	60%

Internal Examination

Components	Assignment	Project Work	Viva	Attendance	Total Marks
Weightage (%)	15% weightage	15% weightage	15% weightage	15% weightage	15

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	1	-	1	-	-	2	1	2
CO2	2	2	2	1	2	-	-	1	1	-
CO3	2	2	1	-	1	1	-	1	1	2
CO4	3	3	2	1	2	2	1	2	2	2

Lecture No.	Topic to be covered	References	Pedagogy
1.	UNIT-I: COMPANY FORM & STRUCTURE Introduction and advantages of a company	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
2.	Corporate Personality	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research

3.	Personification-Concept	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
4.	Jurisprudential aspects of company	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
5.	Definition and Nature of Company	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar	• Lecture • Discussion • Debate • PPT • Research

		Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	
6.	Characteristics of company	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
7.	Classification of Companies	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law,	• Lecture • Discussion • Debate • PPT • Research

		Ramaiyya, Guide to Companies Act, 2013	
8.	Doctrine of piercing of the corporate veil	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
9.	Statutory exceptions of corporate veil	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research

10.	Judicial interpretations of corporate veil	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
11.	Introduction on promotion of companies	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
12.	Legal position of Promoters	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar	• Lecture • Discussion • Debate • PPT • Research

		Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	
13.	Duties of Promoters	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
14.	Liabilities of Promoters	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law,	• Lecture • Discussion • Debate • PPT • Research

		Ramaiyya, Guide to Companies Act, 2013	
15.	Pre-incorporation Contracts	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
16.	UNIT-II: COMPANY-REGISTRATION AND INCORPORATION-Introduction	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research

17.	Importance of Memorandum of Association	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
18.	Contents of MOA	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
19.	Significance of Articles of Association	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar	• Lecture • Discussion • Debate • PPT • Research

		Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	
20.	Interrelationship between MOA & AOA	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
21.	Applicability of Doctrine of Ultra vires	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law,	• Lecture • Discussion • Debate • PPT • Research

		Ramaiyya, Guide to Companies Act, 2013	
22.	Consequences of Doctrine of Ultra vires	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
23.	Doctrine of constructive Notice	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research

24.	Rule of presumption	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
25.	Concept of Doctrine of Indoor management	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
26.	Exceptions of doctrine of indoor management	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar	• Lecture • Discussion • Debate • PPT • Research

		Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	
27.	Meaning, issue and kinds of Prospectus	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
28.	UNIT-III: CORPORATE FUND RAISING -Introduction	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law,	• Lecture • Discussion • Debate • PPT • Research

		Ramaiyya, Guide to Companies Act, 2013	
29.	Share/Equity Capital-Meaning and Nature of shares, kinds of shares	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
30.	Rationale & mechanism of Rights issue, Bonus issue	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research

31.	Principles & Procedure of Allotment	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
32.	Concept, meaning and kinds of Debenture/Debt Capital	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
33.	Debenture Trustee, and Debenture Trust Deed	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar	• Lecture • Discussion • Debate • PPT • Research

		Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	
34.	Shareholder vis-a-vis Debenture holder	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
35.	UNIT-IV: CORPORATE MANAGEMENT Directors-Meaning, Types, Qualifications, Disqualifications	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law,	• Lecture • Discussion • Debate • PPT • Research

		Ramaiyya, Guide to Companies Act, 2013	
36.	Legal position of Directors Shadow, De-Facto and De-jury Director	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
37.	Powers and Duties of directors	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research

38.	Meetings-kinds and requisites of valid meeting	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
39.	UNIT-V: CORPORATE ABUSE AND REMEDIES Shareholders Democracy	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
40.	Majority Powers and minority rights	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar	• Lecture • Discussion • Debate • PPT • Research

		Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	
41.	Principle of Non-Inference (Rule established in Foss v Harbottle)	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
42.	Protection against oppression	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law,	• Lecture • Discussion • Debate • PPT • Research

		Ramaiyya, Guide to Companies Act, 2013	
43.	Protection against Mismanagement	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
44.	UNIT-VI: CORPORATE COLLAPSE Winding up-Meaning and Modes of winding up and Procedure	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research

45.	Winding up by the tribunal Voluntary winding up	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
46.	Merger and acquisition of company	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research
47.	Arcelor Mittal and Air India case	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar	• Lecture • Discussion • Debate • PPT • Research

		Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	
48.	Reconstruction and Amalgamation	Dr. G K Kapoor Company Law & Practice, Company Law by Avtar Singh, Gower & Davies, Principles Of Modern Company Law, Ramaiyya, Guide to Companies Act, 2013	• Lecture • Discussion • Debate • PPT • Research

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

NACHAULI, JASANA ROAD, FARIDABAD

L	T	P	C
4	0	0	4

Subject : Property Law

SUBJECT CODE :LLB 217

CLASS :LLB

SEMESTER : 3

CREDIT :4

Objective: Objective: Property Law is one of the basic fundamental laws. It mainly deals with transfer of Immovable Property among the Living persons; the students are made aware regarding the basic principles of Transfer of Property as well as specific transfer like Election, Part Performance, Sale, Mortgage, Lease, Charge and Gift. This paper is very useful in practice for advocates since most of the common disputes are directly and indirectly associated with the Right to Property.

COURSE OUTCOME:

At the end of the course, students should be able to:

CO1: Examine and define the nature and concept of transfer of immovable property, and illustrate different types of transfers and rules relating to it.

CO2: Interpret the different rules regarding transfer of property between two living persons and the consequences of it.

CO3: Evaluate the rules relating to general transfer of immovable property

CO4: Analyse the rules of sale of immovable property and rights and liabilities of buyer and seller

CO5: Evaluate the rules governing the Mortgages, Leases, Exchanges, Gifts and actionable Claims.

CO6: Evaluate the rules relating to concept of easement and kinds of easement and rights and liabilities of transferor and transferee.

Catalog Description

The Transfer of Property act 1882 broadly regulates the voluntary transfer of property between living persons. This subject contains different types of transfers and conditions which make this transfer valid.The teaching methodology traditional classroom teachinh and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective civil law skills, employing legal research, analysis, rationalisation and critical-thinking ability

Regular study on case laws assignments and Moot Court in the end will be given to students.

UNIT- I (13 Lectures)

1. Object and Scope of the Transfer of Property, 1882,
2. Interpretation Clause (Section-3), Definition of Transfer of Property
3. Subject Matter of Transfer,
4. Persons competent to Transfer, Oral Transfer,
5. Condition restraining alienation restriction repugnant to interest created
6. Transfer for the benefit of Unborn Person

UNIT-II (10 Lectures)

1. Rule Against Perpetuity,
2. Vested and Contingent Interests,
3. Conditional Transfer
4. Doctrine of Election
5. Apportionment,
6. Transfer of Property by Ostensible Owner(Section-41)

UNIT-III (9 lectures))

1. Transfer by unauthorized Person who subsequently acquires Interest in Property Transferred,
2. Transfer by One Co-owner,
3. Joint Transfer for consideration,
4. Priority of Rights created by Transfer,
5. Fraudulent Transfer,
6. Doctrine of LIS- Pendens,
7. Doctrine of Part-Performance

UNIT-IV (10 Lectures)

1. Definition of Sale,
2. Rights and Liabilities of Buyer and Seller
3. Marshalling by Subsequent Purchaser,
4. Definition of Mortgage and kinds of Mortgage (Section 58-59),
5. Rights and Liabilities of Mortgagor (Section 60 to 66),
6. Rights and Liabilities of Mortgagee (Section 67 to 77),
7. Priority (Section 78 to 80).

UNIT-V (6 Lectures)

1. Charge (Section 100)
2. Definition of Lease,
3. Rights and Liabilities of Lessor and Lessee (Section 105 to 108).
4. Different Modes of Determination of Lease (Section 111),
5. Gift (Section 122 to 129)

BOOKS RECOMMENDED:

1. D.F. Mulla. Transfer of Property Act (Lexis Nexis 11th Ed. 2013)
2. Shukla S.N. Transfer of Property, reprint (Allahabad Law Agency. Ed. 2017)
3. Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016)
4. Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)

Modes of Evaluation:

Components	Internal Examination	Mid-term written Examination	End term written Exam
Weightage (%)	15 %	25%	60%

Internal Examination

Components	Assignment	Project Work	Viva	Attendance	Total Marks
Weightage (%)	15% weightage	15% weightage	15% weightage	15% weightage	15

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	1	2	2	-	-	1	3
CO2	1	2	2	1	2	-	-	2	1
CO3	1	2	1	-	3	1	-	-	-
CO4	1	1	1	1	2	2	1	2	-
CO5	1	2	-	2	1		-	-	-
CO6	2	-	-	1	2	3	2		1

Lecture No.	Topic to be covered	References	Pedagogy
1.	Object and Scope of the Transfer of Property, 1882	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
2.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
3.	Interpretation Clause (Section-3), Definition of Transfer of Property	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed.	• Lecture • Discussion • Case Laws • PPT • Research

		2016)	
4.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
5.	Subject Matter of Transfer	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research • Case Laws
6.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
7.	Continued	Sinha R.K. The Transfer of Property	• Lecture • Discussion • Case Laws • PPT

		Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Research
8.	Persons competent to Transfer, Oral Transfer,	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
9.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) ,. Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
10.	Condition restraining alienation restriction repugnant to interest created	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property	• Lecture • Discussion • Case Laws • PPT • Research

		Act (Central Law Publication 19th Ed. 2016)	
11.	Transfer for the benefit of Unborn Person	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research • Case Laws
12.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
13.	Rule Against Perpetuity,	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research

14.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
15.	Vested and Contingent Interests,	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) ,Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
16.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
17.	Conditional Transfer	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research

		, Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	
18.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) ,. Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
19.	Doctrine of Election	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
20.	Apportionment	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed.	• Lecture • Discussion • Case Laws • PPT • Research

		2016)	
21.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
22.	Transfer of Property by Ostensible Owner(Section-	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) ,Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
23.	Transfer by unauthorized Person who subsequently acquires Interest in Property Transferred,	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
24.	Continued	Sinha R.K. The Transfer of Property	• Lecture • Discussion • Case Laws • PPT

		Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Research
25.	Transfer by One Co-owner	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016). , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
26.	Joint Transfer for consideration	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research • Case Laws
27.	Priority of Rights created by Transfer	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property	• Lecture • Discussion • Case Laws • PPT • Research

		Act (Central Law Publication 19th Ed. 2016)	
28.	Fraudulent Transfer	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
29.	Doctrine of LIS- Pendens	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
30.	Doctrine of Part-Performance	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research

31.	Definition of Sale	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
32.	Rights and Liabilities of Buyer and Seller	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
33.	Marshalling by Subsequent Purchaser,	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
34.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research

		, Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	
35.	Definition of Mortgage and kinds of Mortgage (Section 58-59	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
36.	Continued	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
37.	Rights and Liabilities of Mortgagor (Section 60 to 66),	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed.	• Lecture • Discussion • Case Laws • PPT • Research

		2016)	
38.	Rights and Liabilities of Mortgagee (Section 67 to 77),	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
39.	Priority (Section 78 to 80).	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) ,Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
40.	Charge (Section 100)	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
41.	Definition of Lease,	Sinha R.K. The Transfer of Property	• Lecture • Discussion • Case Laws • PPT

		Act (Central Law Agency Ed. 2016) ,Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Research
42.	Rights and Liabilities of Lessor and Lessee (Section 105 to 108).	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) ,Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
43.	Different Modes of Determination of Lease (Section 111),	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
44.	Gift	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) , Tripathi G.P. The Transfer of Property	• Lecture • Discussion • Case Laws • PPT • Research

		Act (Central Law Publication 19th Ed. 2016)	
45.	Revision of Unit I and II	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) ,Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
46.	Revision of Unit III	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) ,Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research
47.	Revision of Unit IV	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016) ,Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research

48.	Revision of Unit V	Sinha R.K. The Transfer of Property Act (Central Law Agency Ed. 2016). Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)	• Lecture • Discussion • Case Laws • PPT • Research

Lingaya'sVidyapeeth

(Approved under section 3 of UGC Act. 1956)

SCHOOL OF LAW

LESSON PLAN

For the Session 2021-2022

Semester : **3rd Semester**

Subject : **INTERPRETATION OF STATUTES**

L	T	P	C
4	0	0	4

Course : **LL.B**

Sub Code : **LLB219**

Course Objectives:

In the construction interpretation of statutes, the principle aim of the court must be to carry out the Intention of Legislature. A statute is presumed to make no changes in the common law. For the Law student it is very necessary to know the fundamentals of interpretation, therefore, they are taught different principles of interpretation used by courts to find out the real intention and object of legislation. It is very helpful in legal profession.

Course Outcome:

On completion of this course, the students will be able to

CO1: To make student understand the meaning, principles of interpretation.
CO2: To familiarize students with external aid, interpretation of penal and taxing statues.
CO3: To analyze the key provision of rule of Ejusdem Generis and Noscitur-a-sociis.
CO4: To analyze the conceptual framework Rule of Pari Materia, and Stare Decisis.
CO5: To make aware of Legislation and Relationship between Law and Public Opinion.

Catalog Description

Interpretation of statutes deals with the general principles of the Interpretation of statutes. The subject basically revolves around Interpretation methods . The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

LLB219	**INTERPRETATION OF STATUTES**

Course Contents:

It has 5 units which are as follows:

UNIT I: **12 Lectures**

1. Statute: Meaning and Classification,

2. Interpretation-Meaning, Object, Purpose

3. Basic Principles of Interpretation, Difference between Interpretation and Construction, Rule of

Construction-Literal, Golden and Mischief Rules,

4. Limitations of the Court

UNIT II: **9 Lectures**

1. Internal Aid,

2. External Aid,

3. Interpretation of Mandatory and Directory Provisions,

4. Interpretation of Penal and Taxing Statutes

UNIT III: **7**
Lectures

1. Interpretation of Indian Constitution

2. Rule of Ejusdem Generis

3. Rule of Noscitur-a-sociis

UNIT IV: **12**
Lectures

1. Rule of Pari Materia,

2. Rule of Stare Decisis

3. Contemporanea Expositio eat optima Et Fortissima in Lege

4. Bentham's Theory of Legislation

5. Pains and Pleasure,

6. Greatest Happiness of Greatest Number,

7. Utilitarianism

UNIT V: **8**
Lectures

1. What is Legislation

2. Who Legislate,

3. Restriction on the Legislature,

4. Legislation is a Science,

5. The Method of Law Reform,

6. Principles of Legislation, Relationship between Law and Public Opinion.

Reference Books

1 G.P.Singh. Principles of Statutory Interpretation, (Lexis Nexis 14th Edition, 2016)

2. Avtar Singh. Introduction to Interpretation of Statutes, (Lexis Nexis 4th Edition, 2014)

3. V.P. Sarathi. Interpretation of Statutes, (E.B.C. 5th Edition, 2010)

4. Kafaltiya A.B. Interpretation of Statutes, (E.B.C 2016 Latest Ed.)

5. D.N.Mathur. Interpretation of Statutes, (Central Law Publication 2013 Latest Ed.)

6. R.D. Srivastava. Interpretation of Statutes and Legislation, (Central Law Publication 6th Edition, 2013) .

Note: Latest edition of text books may be used.

Modes of Evaluation:

Components	Internal Examination	End term written Exam
Weightage (%)	40%	60%

Internal Examination

Components	Assignment/ Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	40

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	2	-	2	2
CO2	-	2	2	1	-	2	-	-	-
CO3	-	2	2	1	-	-	-	-	-
CO4	-	3	2	2	2	-	-	-	2
CO5	-	2	2	1	-	2	-	-	2

Details of class Schedules

Lecture Plan No.	TOPIC	Reference Book	Pedagogy
1	**UNIT- I** Introduction of the chapter	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
2	Statute: Meaning and classification	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
3	Interpretation-meaning, object, purpose	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
4	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
5	Basic principles of Interpretation	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction	• Lecture • Discussion • Debate

		to Interpretation of Statutes	• PPT • Research
6	Difference between Interpretation and construction	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
7	Rule of Construction	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
8	Rule of Literal	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
9	Golden rule	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
10	Mischief Rule	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction	• Lecture • Discussion • Debate • PPT • Research

		to Interpretation of Statutes	
11	Limitation of the court	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
12	continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
13	**UNIT-II** Introduction of the chapter	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
14	Internal Aid	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
15	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
16	External Aid	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of	• Lecture • Discussion • Debate • PPT

		Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Research
17	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
18	Interpretation of mandatory and directory provisions	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
19	continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
20	Interpretation of penal and taxing statutes	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
21	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research

22	**UNIT-III** Introduction of the chapter	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
23	Interpretation of Indian Constitution	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
24	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
25	Rule of Ejusdem Generis	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
26	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
27	Rule of Noscitur-a sociis	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research

28	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
29	**UNIT-IV** Introduction of chapter	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
30	Rule of Pari Materia	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
31	Rule of stare Decisis	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
32	Contemporanea Expositio eat optima Et Fortissima in Lege	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
33	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation	• Lecture • Discussion • Debate • PPT • Research

		3) Avtar Singh- Introduction to Interpretation of Statutes	
34	Bentham's Theory of legislation	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
35	Pains and pleasure	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
36	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
37	Greatest happiness of greatest number	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
38	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research

39	Utilitarianism	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
40	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
41	**UNIT-IV** Introduction of the chapter	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
42	What is legislation	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
43	Who legislate	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
44	Restriction on the legislature	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research

45	Legislation is a science	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
46	The method of law reform	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
47	Principles of legislation, Relationship between law and public opinion.	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research
48	Continue	1)B.M Gandhi-Interpretation of statutes 2) G.P.Singh- Principles of Statutory Interpretation 3) Avtar Singh- Introduction to Interpretation of Statutes	• Lecture • Discussion • Debate • PPT • Research

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

NACHAULI, JASANA ROAD, FARIDABAD

L	T	P	C
4	0	0	4

Subject : Legal ethics & Court Craft

SUBJECT CODE :LLB221

CLASS :LLB

SEMESTER : 3

CREDIT :4

Objective: It is an indispensible complementary part of our legal system without the studyof which no advocate is suitably equipped with the basic requisites required to go to the court.

COURSE OUTCOME:

At the end of the course, students should be able to:

C01 –to understand the basic rules of Delhi High court and Supreme Court

C02 –to explain the various rules regarding Limitation Act and Registration act

C03 –to apply and Evaluate the various themes in professional ethics , and be able to interpret what amounts to professional misconduct and what are its consequences

C04 – interpret the various duties an advocate has towards the court, client and society

C05 –to analyse what amounts to contempt of court and evaluate its procedure

Catalog Description

This subject curriculum has included multiple subjects which are essential for a law student to understand the importance of Professional Ethics and morality in the practice of law what are the various duties of an advocate and if the advocate does njot follow these ethics then what are the consequences.The teaching methodology will include both traditional classroom teaching and teaching by way of PPT. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able understand the importance of professional ethics in law profession the importance of Limitation act and Registration Act and apply all these rules in their practice of law.

Unit-I: Supreme Court Rules 1966 and Delhi High Court Rules 1967 (9 Lectures)

a. Supreme Court Rules 1966

i. Advocates and their Course of Conduct

ii. Role of Single Judge and Registrar of the Supreme Court

iii. Types of Petition Entertained by the Supreme Court, Writ petition, Election Petition

b. Delhi High Courts Rules

i. Advocates and their Course of Conduct

ii. Role and Power of Single Judge

iii. Civil and Criminal Jurisdiction of the Court

Unit-II: The Limitation Act, 1963 and the Registration Act, 1908 (22 Lectures)

a. Limitation

i. Procedural Law: Section 5 Condonation of Delay, Sections: 6-9 Legal

Disability, Sections 14-15 Exclusion of Time of Proceeding in Good

Faith in Wrong Court, Section 18-19 Acknowledgement

ii. Substantive Law: Section: 25 Law of Prescription and Section: 27

Adverse Possession, Section: 29 Saving Clause

b. Registration

i. Compulsory Registered Documents Section: 17

ii. Optional Registration Section: 18

iii. Time and Place for Registration Section: 23-31

iv. Effects of Registration and non-Registration Section: 47-50

UNIT: III The Bench-Bar Relations (8 Lectures)

a. The Advocates Act, 1961

b. State Bar Council and Bar Council of India: Duties and Functions

c. Professional Misconduct and Punishments Section:35

d. Role and power of Disciplinary Committee Section:36-42

UNIT: IV Legal Ethics (2 Lectures)

a. Duty to Court, Client, Opponent, Colleagues Section:7 and Section: 49 along with the Rules of the Bar Council India

b. Duty towards Society

UNIT: V Contempt of Court - Contempt of Courts Act, 1971 (7 Lectures)

a. Contempt- Meaning and Purpose Section:2(a), Civil Contempt 2(b), Criminal Contempt 2(c), Criminal Contempt- Mens Rea Principle in Contempt Cases Contempt by State Government

b. Defenses- Section:3 to 8

c. Contempt of Judges & Magistrates Section:16

d. Punishment for Contempt- Section:10 to 13

e. Procedure Section:14-15.,17-18

Text Books:

1. Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman

2. The Advocates Act, 1960

Modes of Evaluation:

Components	**Internal Examination**	**Mid-term written Examination**	**End term written Exam**
Weightage (%)	**15 %**	**25%**	**60%**

Internal Examination

Components	**Assignment**	**Project Work**	**Viva**	**Attendance**	**Total Marks**
Weightage (%)	**15% weightage**	**15% weightage**	**15% weightage**	**15% weightage**	**15**

Mapping

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1	**1**	**2**	**2**	**-**	**2**	**-**	**1**	**2**	**1**
CO2	**3**	**2**	**1**	**2**	**1**	**-**	**2**	**-**	**1**
CO3	**-**	**1**	**1**	**-**	**1**	**1**	**-**	**-**	**-**
CO4	**1**	**1**	**3**	**1**	**-**	**2**	**1**	**1**	**1**
CO5	**1**	**2**	**1**	**1**	**-**	**-**	**1**	**1**	**-**

Lecture No.	Topic to be covered	References	Pedagogy
49.	a. Supreme Court Rules 1966 i. Advocates and their Course of Conduct	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
50.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
51.	Role of Single Judge and Registrar of the Supreme Court	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
52.	Continued	Dr. Monica Singhania& Dr.	• Lecture • Discussion • Case Laws

		VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• PPT • Research
53.	Types of Petition Entertained by the Supreme Court, Writ petition, Election Petition	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
54.	b. Delhi High Courts Rules i. Advocates and their Course of Conduct	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
55.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research

56.	Role and Power of Single Judge	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
57.	Civil and Criminal Jurisdiction of the Court	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
58.	Procedural Law: Section 5 Condonation of Delay, Sections: 6-9 Legal Disability, Sections 14-15 Exclusion of Time of Proceeding in Good Faith in Wrong Court, Section 18-19 Acknowledgement	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
59.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates	• Lecture • Discussion • Case Laws • PPT • Research

		Act, 1960	
60.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
61.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
62.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
63.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws,	• Lecture • Discussion • Case Laws • PPT • Research

		Taxman 2. The Advocates Act, 1960	
64.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
65.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
66.	Substantive Law: Section: 25 Law of Prescription and Section: 27	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
67.	Continued	Dr. Monica Singhania& Dr.	• Lecture • Discussion • Case Laws

		VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• PPT • Research
68.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
69.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
70.	Adverse Possession, Section: 29 Saving Clause	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research

71.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
72.	Registration i. Compulsory Registered Documents Section: 17	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
73.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
74.	Optional Registration Section: 18	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates	• Lecture • Discussion • Case Laws • PPT • Research

		Act, 1960	
75.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
76.	Time and Place for Registration Section: 23-31	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
77.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
78.	Effects of Registration and non-Registration Section: 47-50	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws,	• Lecture • Discussion • Case Laws • PPT • Research

		Taxman 2. The Advocates Act, 1960	
79.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
80.	The Advocates Act, 1961	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
81.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
82.	Continued	Dr. Monica Singhania& Dr.	• Lecture • Discussion • Case Laws

		VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• PPT • Research
83.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
84.	State Bar Council and Bar Council of India: Duties and Functions	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
85.	Professional Misconduct and Punishments Section:35	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research

86.	Role and power of Disciplinary Committee Section:36-42	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
87.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
88.	Duty to Court, Client, Opponent, Colleagues Section:7 and Section: 49 along with the Rules of the Bar Council India	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
89.	Duty towards Society	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates	• Lecture • Discussion • Case Laws • PPT • Research

		Act, 1960	
90.	Contempt- Meaning and Purpose Section:2(a), Civil Contempt 2(b), Criminal Contempt 2(c), Criminal Contempt- Mens Rea Principle in Contempt Cases Contempt by State Government	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
91.	Defenses- Section:3 to 8	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
92.	Contempt of Judges & Magistrates Section:16	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
93.	Punishment for Contempt- Section:10 to 13	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws,	• Lecture • Discussion • Case Laws • PPT • Research

		Taxman 2. The Advocates Act, 1960	
94.	Procedure Section:14-15.,17-18	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
95.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research
96.	Continued	Dr. Monica Singhania& Dr. VinodSinghania, Students guide to Indirect Tax Laws, Taxman 2. The Advocates Act, 1960	• Lecture • Discussion • Case Laws • PPT • Research

SUBJECT: LABOUR AND INDUSTRIAL LAW-I (LLB 221)

SUBJECT: MOOT COURT (LLB 223)

IV TH Semester

LINGAYA'S VIDYAPEETH
NACHUALI, JASANA ROAD, FARIDABAD
BACHELOR OF BUSINESSN ADMINSTRATION AND BACHELOR OF LAW INTEGRATED

LLB 212: CRIMINAL PROCEDURE CODE, 1978
L-4, T-0 P-0 Credits–4

Objective: Of all the branches of law, criminal law is the most important branch of law, because it
closely touches and concerns man in his day-today affairs. The Criminal Procedure is an inseparable part of the penal law. Without the Criminal procedure code, the substantive criminal law will become
worthless and meaningless. Our law of criminal procedure is mainly contained in the Code of Criminal
Procedure 1973. It provides the machinery for the detection of crime, apprehension of suspected
criminals, collection of evidence, determination of the guilt or innocence of the suspected person and the imposition of suitable punishment on the guilty person. With this perspective this subject is designed to make the student understand how the Criminal Procedure Code controls and regulates the working of the machinery set up for the investigation and trial of offence

Course Outcome

CO1:To make students understand the constitution, power and function of the criminal courts in India and distinguish between cognizable, non-cognizable, bailable and non-bailable offence and power and functioning of the police
CO2:To make students understand with law related to maintenance, investigation by police and jurisdiction of courts
CO3:To familiarise students with composition, working and jurisdiction of the LokAdalat.
CO4:To make students understand meaning, importance of Para Legal Services and its role in social transformation
CO5: To make student able to understand composition, functioning and power of National, State and District Legal Services Authority

UNIT-I

1. Constitution of Criminal Courts and Offices (Section 6-25),
2. Power of Courts (Section 26-35),
3. Power of Superior Officers of Police (Section-36),
4. Arrest of Persons (Section 41-60),
5. Difference between Summons and Warrant,
6. Difference between cognizable and non-cognizable offences,
7. Rules regarding Proclamation and attachment(Section 82-86),
8. Difference between Bailable and non-bailable offence,
9. Difference between compoundable and non-compoundable offences

UNIT-II

1. Provisions as to Bail and Bonds (Section 436-450),
2. Order for maintenance of wives, children and parents (Section 125-128),
3. Information to the Police and their powers to Investigate (Section154-176),
4. Jurisdiction of Criminal Courts in Inquiries and Trials (Section 177-189),

UNIT-III

1. The Charge (Section 211-224),
2. Trial Before a Court of Session (Section 225-237),
3. Trial of Warrant cases by Magistrates(Section 238-250),
4. Trial of Summons Cases by Magistrate (Section 251-259),
5. Summary Trials (Section 260-265), Plea Bargaining (Section 265-A, 265-L
6. Pleas of Autrefois Acquit and Autrefois Convict (Section 300),

UNIT-IV

The Juvenile Justice (Care and Protection of Children) Act 2015 Section (1-55)

UNIT-V

1. The Judgement (Section 353-365),
2. Submission of Death Sentence for confirmation Section (366-371),
3. Appeals (Section 372-394),
4. Reference and Revision (Section 395-405),
5. Transfer of criminal Cases (Section 406-412),
6. Limitation for taking cognizance of Certain Offences (Section 467-473),
7. The Probation of Offender Act 1958, Section (1-5 and 12-14)

BOOKS RECOMMENDED

1. C. K. Thakker "Takwani' & M.C. Thakker, Criminal Procedure (Lexis Nexis, New Delhi, 4th Ed.
2014)
2. K. N. Chandrasekhar Pillai, Criminal Procedure (Eastern Book Company, Lucknow, 16h Ed.
2016)
3. RatanLal&Dhirajlal, The Code of Criminal Procedure, (Lexis Nexis, New Delhi, 22nd Ed. 2017)
4. N. V. Paranjape, The Code of Criminal Procedure, (Central Law Agency, Allahabad, 6th Ed.2017)
Law Commission Reports
5. Forty first Report of the Law commission of India on the Code of Criminal Procedure, 1898
6. Thirty seventh Report of the Law commission of India on the Code of Criminal Procedure, 1898
7. Fourteenth Report of the Law commission of India on the Reform of Judicial Administration

MAPPING WITH COs WITH Pos AND Cos.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	2	1	-	-	-	-	-	1
CO2	3	2	1	1	-	-	-	-	1
CO3	1	3	1	-	-	1	-	-	1
CO4	1	1	1	2	-	1	1	-	1
CO5	1	-	-	2	1	2	1	-	1

LINGAYAS VIDYAPEETH
SCHOOL OF LAW

LLB 214	**Law Relating to Right to Information**	L	T	P	C
Version 1.0		4	0	0	4
Pre-requisites/Exposure	Basic awareness & understanding of Domestic legislations.				
Co-requisites					

Course Objectives

The course aims to give knowledge about provisions of the Act - How Right to Information Law is bringing transparency and accountability in the working of the government and to study the role of judiciary on RTI and also about Media & Law.

Course Outcomes

On completion of this course, the students will be able to:

CO1: Understand &Conceptualize the evolution, meaning, scope & basics related with Right to Information & Free flow of Information.

CO2: Critically assess & analyze the provisions of "The Right to Information Act".

CO3: Understand & critically analyze the involvement & contribution of the Judiciary with regards to right to information.

O4: Critically analyze & evaluate the role media involving different aspects & rights to information.

CO5: Evaluate the multilateral aspects of the concepts related with right to information with media & constitutional framework related with them & evaluate the practical applicability of RTI Act.

Course Outline

UNIT-I

INTRODUCTION
1. Meaning and Scope of Right to Information
2. Media Access to Official Information
3. Right to Information and Human Rights Violations
4. Difference between Right to Information and Right to Obtain Information
5. Right to Information Law- Basic Elements
6. Factors Restricting Free Flow of Information

UNIT-II

THE RIGHT TO INFORMATION ACT, 2005

1. Preliminary (Section 1 to 2)
2. The Central Information Commission (Section 12 to 14)
3. Right to Information and Obligations of Public Authorities (Section 3 to 11)
4. The State Information Commission (Section 15 to 17)
5. Powers & Function of the Information Commission, appeals & penalties (Section 18 to 20)
6. Miscellaneous (Section 21 to 31)

UNIT-III

JUDICIARY ON RIGHT TO INFORMATION

1. Free flow of Information for Public Record
2. Right to information: Fundamental Right
3. Disclosure of Information
4. Right to know
5. Right to Acquire & Disseminate Information
6. Direction on Voter's Right to Information
7. Third Party Information
8. Public Authority under Art. 12 of the Indian Constitution

UNIT-IV

MEDIA & LAW

1. Media & Criminal Law (Defamation/obscenity/Sedition)
2. Media & Tort Law (Defamation and Negligence).
3. Media and Legislature-Privileges of the Legislature
4. Media and Executive Official Secrets Act, 1923
5. Media & Judiciary-contempt of Court

UNIT-V

MEDIA IN CONSTITUTIONAL FRAMEWORK

1. Freedom of Expression in Indian Constitution
2. Interpretation of Media Freedom
3. Issues of Privacy
4. Pre-Trial by Media and Free Expression
5. Media and Human Rights

RECOMMENDED BOOKS

1. J.N. Barowalia, Commentary on the Right to Information Act (University Law Publication,Delhi,Ed. 2016)
2. P.K. Das, Hand Book on the Right to Information Act (Universal Law Publication, Delhi,Ed.2016)
3. Dheera Khandelwal and K.K. Khandelwal, A Commentary and Digest on the Right toInformation Act 2005. (Vol-2, The Bright Law House, Delhi, Ed. 2014)
4. A.S. Yadav, Right to Information Act 2005: An Analysis (Central Law Publication, Allahabad,Ed. 2016)
5. N.V. Paranjape, Right to Information Law in India (Lexis Nexis, Ed. 2014).

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-
CO3	1	1	2	2	-	1	-	-	1
CO4	-	-	2	1	1	3	-	-	1
CO5	2	1	2	2	3	1	1	-	2

LINGAYA'S VIDYAPEETH

NACHUALI, JASANA ROAD, FARIDABAD

BACHELOR OFBUSINESS ADMISITRATIONS

LABOUR AND INDUSTRIAL LAW-II (LLB216)

L-4, T-0 P-0 Credits–4 Max Marks: 100

Objective-

1.To know the development and the judicial setup of Labour Laws.
2.To learn the salient features of welfare and wage Legislations.
3.To learn the laws relating to Industrial Relations, Social Security and Working conditions.
4.To understand the laws related to working conditions in different settings.

Course Outcome

On completion of this course, the students will be able to
CO1.Students will know the development and the judicial setup of Labour Laws.
CO2.Students will learn the salient features of welfare and wage Legislations.
CO3.Students will learn the laws relating to Industrial Relations, Social Security and Working conditions
CO4.Students will also learn the enquiry procedural and industrial discipline.

It has 5 units which are as follows:

Unit-I: The Workmen's Compensation Act, 1923

1. Main Features of the Act,

2. Definitions Compensation, Dependent, Employer, Workman, Partial Disablement, Total

Disablement,

3. Employer's Liability for Compensation(section-8).

4. Notice and claims of the Accident (section-10),

5. Commissioner (Section 19 to 29).

6. Appeals (section 30).

7. Medical Examination (Section 11)

UNIT-II: The Minimum Wages Act, 1948

1. Objects and Constitutional Validity of the Act,

2. Salient Features of the Act

3. Definitions: Employer. Cost of Living Index, Scheduled Employment, Wages,

4. Minimum Wages, Fair Wage and Living Wage,

5. Fixation and Revision of Minimum Rates of Wages, Working Hours,

6. Determination of Wages and Claims (section 3,20 and 21).

UNIT-III: Payment of Wages Act, 1936

1. Definitions: Employer, Industrial and other Establishment, Wages,

2. Payment and Deduction from Wages (section 3-13).

3. Inspector (section 14).

4. Authority to Hear claims section 15),

5. Appeal (section-17)

UNIT-IV: The Industrial Employment (Standing Orders) Act, 1946,

1. Procedure for Certification & Adoption of Standing Orders.

2. Certifying Officer,

3. The Employees' State Insurance Act, 1948-

4. Employees State Insurance Corporation,

5. Standing Committee, Medical Benefit Council,

6. Contributions, Benefits, Employees Insurance Court

UNIT-V :The Equal Remuneration Act, 1976-

1. Definition Clause

2. Payment of Remuneration at Equal Rates section 4 to 7)

3. Inspector,

4. Penalities and Cognizance of Offences under the Act,

The Payment of Bonus Act, 1965-

1. Eligibility, Disqualification for Bonus (section 8,9)

2. Minimum & Maximum Bonus (5,10,11);

3. Proportionate Reduction (5, 13)

4. Recovery of Bonus Due (5,21)

5. Customary Bonus, Productivity Bonus

The Payment of Gratuity Act, 1972.

1. Definitions, Eligiblity, Payment, Determination,

2. Recovery and Protection of Gratuity, Sec. 2-A, 4, 7, 8, and 13

TEXTBOOKS:

1. CB Memoria and Satish Memoria. Dynamics of industrial Relations, (Himalaya Publishing

House-Mumbai Part II and III. Ed. 2007

2. Dr. V.G. Goswani. Labour and Industrial law. (Central Law Agency Allahabad, Part VI. Ed.2005)

3.Nirmal Singh and S.K. Bhatia. Industrial Relations and Collective Bargaining. (Deep and DeepPublications Pur. Lid. - Delhi, Ed. 2000.)

4. Srivastav K. Industrial Peace and Labour in India. (Kitab Mahal Allahabad, Ed. 2003)

5. Indian Law Institute. Labour Law and Labour Relations, (Ed. 2002)

6. KM Pillai Labour and Industrial Law, (Allahabad Law Agency, Faridabad Haryana, Part I. Ed.2005)

7. S.N. Mishra. Labour and Industrial Law, (Central Law Publications, Allahabad, Part I. Ed.2004)

8. HL Kumar. Labour problems and remedies. (Universal Book Traders, Delhi, Ed. 2006)

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	1	1	-	-	1	-	1	1	1	1
CO2	-	-	1	-	1	-	1	2	1	-
CO3	1	-	-	-	-	-	1	1	-	-
CO4	1	-	-	-	-	-	2	1	-	-
CO5	-	-	-	-	-	-	1	1	-	-
CO6	1	1	-	-	-	1	1	1	-	-

LLB 218	Code of Civil Procedure	L	T	P	C
		4	-	-	4
Pre-requisites/Exposure	Basic understanding of Law				
Co-requisites					

Course Objective:

1. To provide adequate knowledge about procedures/rules of litigation in the civil courts. The students ought to be aware of the procedural aspects of the enforcement of civil rights in the Indian courts.
2. To give an overview of law of limitation for institution of suit, appeal, review, reference etc. since the law assists the vigilant and not those who sleep over the rights.
3. To view some of the current problems arising out of the procedural technicalities like delay in getting order, Judgment and decree in civil litigations. In some civil cases, even generations pass but no final decision comes out from the court, which is now a point of discussion in the society. To apprise the students with latest amendments in the Code of Civil Procedure is also one of the main objects.
4. To discuss about the nuances of the Civil Procedure and inculcate in them the basic traits of civil practice.

Course Outcome:

After the completion of the subject, the students would be able to:

C3004.1 Conceptualize the basics of procedural law of the civil litigation in India.

C3004.2 Familiarize with the different stages in a civil procedureto enable the students to practice in the civil courts.

C3004.3 Familiarize with certain important concepts and practical skill development activity will provide insights into the actual working of the court procedures.

C3004.4 Conceptualize the hierarchal setup of civil courts in India along with the different stages of a suit filing, drafting, hearing and execution proceedings.

C3004.5 Comprehend the importance of the law of limitation as the law supports only vigilant and not the dormant, who sleeps over his rights.

Course Description:

In India, the law governing the procedure to be followed in the civil courts is provided under the Code of Civil Procedure 1908, which is read alongside laws such as the Limitation Act, 1963 and the Registration Act etc. The whole law of procedure is divided into two parts – CPC 1 and CPC 2 along with the Limitation Act 1963. The paper will focus on the civil procedures followed in instituting a suit. The course is designed to acquaint the students with the structure of the civil judiciary, its powers and jurisdiction, and the significance of various procedural steps stipulated for trial of civil litigation. The nature and significance of pleadings and practical aspects relating to it are studied. The course focuses on providing a theoretical framework for the rules of procedure and to identify the values and policies on which the rules are based. The course contains an overview of the entire body of rules of civil procedure ranging from commencement of proceedings, to defining issues for trial, to enforcement of judgments.This course will pursue civil litigation through appellate courts examining the corrective steps available in civil proceedings. Appellate litigation strategies and choice of grounds for appellate / revision petitions are studied in the context of provisions of the C.P.C. and rules of civil practice. Drafting exercises will form a major part of the course. This course also deals with the law of limitation as applicable to civil proceedings. Continuing the study of civil procedure, the course also involves the study on execution of decrees and orders of court and the procedures laid down for it.

Course Content

UNIT I: An Introduction to the Code of Civil Procedure: Key Concepts

Definitions and concepts –

- Need and Importance of Procedural Law
- Suit of a civil nature
- Decree, Judgment, Order
- Foreign Court,Foreign Judgment
- Mens Profits
- Affidavit
- Plaint
- Written Statement
- Legal Representative
- Caveat
- Jurisdiction of Civil Courts and Kinds of jurisdictions
    - Subject matter jurisdiction
    - Pecuniary jurisdiction
    - Territorial jurisdiction
- *Res subjudice S. 10*
- *Res judicata S.11*
- Joinder of parties O I R 1
- Joinder of cause of action O II R 2

UNIT II: Pleadings and Trial of the civil suit

- Rules of pleading
  - Signing of pleading
  - Verification of pleading
- Rules of writing plaint (O VI)
- Set off &Counterclaim
- Rejection of plaint (O VII R11)
- Return of plaint (O VII R10)
- Amendment of pleading (O VI R17)
- Interpleader suit (S.88 and O XXXV)
- Appearance and Non-appearance of parties (O IX)
- Examination of parties (OX)
- Alternate Dispute Resolution
- Settlement of issues (OXIV)
- Disposal of suit on the first hearing (O XV)
- Withdrawal and Adjustment of suit (OXXIII)
- Interim Orders,
- Trial of the civil suit

UNIT III: Appeal, Reference, Review and Revision

- Appeal, Reference, Review and Revision
- Appeals from Original Decree
- Appeals from Appellate Decrees : Second appeal, Appeal to the Supreme Court
- General Provisions relating to Appeals
- Reference to High Court
- Review
- Revision

UNIT IV: Execution Proceedings

- Meaning and Purpose of execution
- Stay of execution
- Restitution
- Decree court and executing court
- Questions determined by executing court
- Garnishee order
- Mode of Execution: Arrest, Attachment, Sale

UNIT V: Law of Limitation

- Meaning, nature and scope of law of limitation
- Bar of Limitation and its efficacy
- Sufficient Cause its meaning and applicability
- Continuous running of time: General principle, meaning, scope
- Difference between prescribed period and period of limitation (S.3 Limitation Act)
- When court is closed on the last day (S.4 Limitation Act)
- Condonation of delay (S.5 Limitation Act)
- Exclusion of time proceeding *bona fide* in court without jurisdiction (S.14 Limitation Act)

UNIT VI: Particular Suits and Miscellaneous

- Suit by or against government O XXVI
- Suit by or against Minors
- Suit by an Indigent person
- Summary Suit (OXXXVII CPC)
- Caveat (S.148A CPC)
- Inherent powers of the court (S.151 to S.153 CPC)

TEXTBOOKS:

1. The Code of Civil Procedure, Justice CK Thakkar, 2016, Esatern Book Company. 7th Edition.
2. Code of Civil Procedure, Dr. Avtar Singh, 2015, 4th Edition, Central Law Publication
3. The Code of Civil Procedure, M.P. Jain, 2016, 4th Edition, Lexis Nexis.
4. The Code of Civil Procedure, TP Tripathi, 2006, Allahabad Law Agency.
5. Code of civil procedure, P.C. Sarkar, 2017, 12th Edition, Lexis Nexis

REFERENCE BOOKS/STATUTES

1. The Code of Civil Procedure, 1908
2. The Limitation Act, 1963
3. Mulla -The Code of Civil Procedure, B.M. Prasad, 2008, 17th Edition, Lexis Nexis
4. Code of Civil Procedure 1908, B.V. Viswanatha. Aiyer, 2016, 8th Edition, Thomson Reuters
5. Law of limitation & prescription, UN Mitra, 2009, 12th Edition, Lexis Nexis

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Internal Assessment	Mid Semester	End Term Examination	ESE
Weightage (%)	30%	20%	50%	100%

Mapping between COs and POs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
C131.1	3	-	-	-	-	-	3	3	3	-
C131.2	-	-	-	1	-	-	-	-	-	-
C131.3	-	3	-	3	-		3	-	-	-
C131.4	-	-	3	-	3	3	-	-	-	-
C131.5	2	-	-		3	2	3	-	-	1

1=weakly mapped
2= moderately mapped
3=strongly mapped

LINGAYA'S VIDYAPEETH

NACHUALI, JASANA ROAD, FARIDABAD

BACHELOR OF LAWS

LLB220: LAW OF CRIMES-II

L-4, T-0 P-0 **Credits–4** **Max Marks: 100**

Objective- This paper will focus on the study of substantive crimes under the Indian Penal Code.

Course Outcome
Students will be able to:

CO1: understand the basic philosophy underlying the concept of crime, and categories of as well as parties to crime.

CO2: Analyze lacunas within the criminal justice system and suggest the amendments have to make to provide the justice according to the changing needs of the society.

CO3: Summarize the process of judicial review and identify criteria used by courts to evaluate the constitutionality of criminal law of India.
CO4: Understand and describe areas of criminal justice, law and society through a critical analysis of the subject
CO5: Problem-solve complex issues in the criminal justice system and society related to policy, law enforcement, vulnerability, and marginalization

COURSE OUTLINE

UNIT I: Offences against the Human Body-I

a) Culpable Homicide and Murder
b) Rash and Negligent Act
c) Dowry Death
d) Attempt to murder
e) Attempt and Abetment to suicide

UNIT II: Against Human Body- II

a) Hurt and Grievous hurt
b) Criminal force and assault
c) Wrongful restraint and wrongful confinement
d) Kidnapping and Abductions

UNIT III: Offences against Women

a) Outraging the modesty of women, voyeurism, stalking, Acid Attack
b) Rape and Unnatural offences
c) Cruelty and offences relating to marriage

UNIT IV: Offences against property

a) Theft, Extortion, Robbery and Dacoity
b) Criminal Misappropriation and Criminal Breach Of Trust
c) Cheating and Forgery
d) Mischief

UNIT V: Offence of Defamation, Criminal Intimation, Insult and Annoyance

a) Defamation(section 499-502)
b) Criminal intimidation
c) Word, gesture or act intended to insult the modesty of a woman

RECOMMENDED BOOKS

1. K.D. Gaur, Textbook on Indian Penal Code, Universal Law Publishing Co., New Delhi, 2012.
2. Ratanlal Dhiraj Lal, The Indian Penal Code, Lexis Nexis, Butterworths Wadhwa, Nagpur, 2012.
3. K.I. Vibhuti, PSA Pillai's Criminal Law, Lexis Nexis, Butterworths Wadhwa, Nagpur, 2012
4. Glanville Williams, Text Book of Criminal Law, Universal Law Publishing Co., New Delhi, 2012.
5. Dr. H.S. Gaur, Penal Law of India, Law Publishers , Allahabad, 2013
6. John Dawson Mayne, Mayne's Criminal law of India, Gale, Making of Modern Law, 2013.
7. J.W. Cecil Turner, Russel on Crime, Vol I &2, Universal Law Publishing Co., New Delhi, 2012.

POs COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	3	1	2	-	1	-	-
CO2	3	2	2	1	2	-	-
CO3	1	2	1	1	2	-	-
CO4	2	2	2	1	1	-	-
CO5	1	2	1	1	2	-	-

LINGAYA'S VIDYAPEETH
NACHUALI, JASANA ROAD, FARIDABAD
BACHELOR OF LAW

LLB 222 : ARBITRATION CONCILIATION &ALTERNATIVE DISPUTE RESOLUTION SYSTEM (THEORY)

L-4, T-0 P-0 **Credits–4** **Max Marks: 100**

Objective- To find out the various Dispute Resolution Techniques used at International and National level. To trace out the differences between most prominent dispute resolution methods including traditional litigation, arbitration in many forms including International Commercial Arbitration mediation and conciliation etc. The system of ADR is less time consuming as well as informal. Therefore cost of litigation is also subsequently reduce. With the help of this paper, the students learn new techniques of resolution of disputes in certain cases.

Course Outcome

CO1: To make student understand the domestic and international commercial arbitration.
CO2: To familiarize students with difference between ADR and other dispute mechanism.
CO3: To analyze the key provision of Arbitration and conciliation Act 1996.
CO4: To analyze the conceptual framework related to various ADR process.
CO5: To make aware of various convention related to Arbitration dispute resolution.

UNIT 1
1.Evolution of ADR, ADR in India,
2.Advantages & disadvantages of ADR,
3.ADR Processes Pretrial Mediation,
4.Mediation,Negotiation,Conciliation,
5. ADR in family disputes, Conciliation under CPC,

UNIT 2
1. Concept ,Meaning & Growth of LokAdalats,
2.LokAdalats under Legal Services Authorities Act,1987,
3.NyayaPanchayats-HistoricalPerspectives,
4.AdvantagesofNyayaPanchayats,
5. Composition & Jurisdiction of Nyaya Panchayats

UNIT 3
1.Arbitration & Conciliation Act (Section 1-43);
2.Definition of Arbitration,
3.InternationalCommercialArbitration,
4.Objectives of the Act,
5. Arbitration Agreement
6. Composition and jurisdiction of Arbitral Tribunal,
7. Conduct of Arbitral Proceedings,

UNIT 4

1. Making of Arbitral Awards and Termination of Proceedings,
2Recourse Against Arbitral Award,
3. Finality and Endorsement of Arbitral Award,
4. Appealable orders,
5. Lion on Arbitral Awards and Deposits as to costa,
6. Effect on Arbitration Agreement of Death and of parties insolvency

UNIT 5

1.Arbitration& Conciliation Act (Section 44-60).
2. Foreign Awards-Definition,
3. Enforcement of Certain Foreign Awards,
4. New York Convention Awards,
5. Geneva Convention Awards,
6. Convention on Recognition and Enforcement of Foreign Arbitral Awards (Schedule 1), Protocol
on Arbitration Clauses (Schedule II).
7. Convention on Execution of Foreign Arbitral Awards (Schedule III),
8. Conciliation under Arbitration and Conciliation Act, 1996(Sections 61-81).
9. Role of Conciliator, Confidentiality in conciliation.

RECOMMENDED BOOKS

1. Anupam Kurlwal, An Introduction to Alternative Dispute System (ADR), (Central Law
Publication, Allahabad, Ed. 2014).
2. S.C. Tripathi, Arbitration and Conciliation Act, 1996 with Alternative means of settlement of
dispute, (Central Law Publication, Allahabad, Ed. 2015).
3. Avtar Singh, Law of Arbitration and conciliation, (Eastern Book Company, Lucknow, Ed. 2017
4. Ashwinie Kumar Bansal, International Commercial Arbitration Practice and Procedure,
(Universal Law Publishing Co., New Delhi, Ed. 2012)
5. G.K. Kwatra, Arbitration and conciliation Law of India, (Universal Law Publication Co. New
Delhi, Ed. 2014).

MAPPING Cos WITH POs AND PSOs.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	1	-	-	-	-	2	-
CO2	-	1	-	1	-	-	-	-	-
CO3	2	-	1	-	-	-	-	1	2
CO4	3	1	2	-	1	1	-	1	1
CO5	1	1	2	-	-	-	-	-	-

LINGAYA'S VIDYAPEETH
SCHOOL OF LAW
SYLLABUS
LL.B. 3 YEARS PROGRAMME

SUBJECT: SUMMER INTERNSHIP
SUBJECT CODE : LLB 226

CREDIT : 4

Course Objectives

Through internship a law student gains practical experience and contemporaneously inculcates work ethics by interning either under a lawyer or a law firm or a government body participating in legal sphere or a research organisation or any other legally-oriented institution. Prime objective is to prepare student to demonstrate desirable qualities & professional ethics to be employable in different fields related with legal profession.

Course Outcomes

On completion of this course the students will be able to:

CO1: Understand &conceptualize the procedural laws of the domestic Courts.

CO2: Gain useful background in the way a legal professional thinks and works in a legal professional workplace and the way that workplace operates.

CO3: Work under professional supervision with regards to legal matters.

O4: Exercise critical thinking and judgment in the context of developing advanced professional knowledge

CO5: Evaluate &analysemultilateral aspects related with the working of Judicial System of our country.

LINGAYA'S VIDYAPEETH
NACHUALI, JASANA ROAD, FARIDABAD
BACHELOR OF LAW

LLB 252 : ARBITRATION CONCILIATION &ALTERNATIVE DISPUTE RESOLUTION SYSTEM (PRACTICAL)

L-4, T-0 P-0 **Credits–4** **Max Marks: 100**

Objective- To taught partly through class room lectures including simulating exercise and partly through extension programme like Lok-Adalat, etc. The Course will be taught in association with practicing lawyers / retired Judges / retired Law Teachers. The Class room instructions shall include lessons on the concepts and practice of Arbitration, Conciliation and Alternate Dispute Resolution. Students shall be required to maintain the Diary of the Sessional Work for this paper in which they shall record the written exercises assigned to them by the subject teacher during the session and their observations about the field work / training work of Lok Adalat etc. organized by the Law Department of the College / University and attended by them. The course shall comprise the followings:

Course Outcome

CO1: To make student understand the meaning, advantage, disadvantage of ADR.
CO2: To develop understanding of the arbitration as a method of dispute resolution.
CO3: To make understand the legal framework enforcement of arbitral award .
CO4: To acquire theoretical understanding of arbitral process.
CO5: To demonstrate effective communication skill and practical problem solving approach in complex legal and factual scenario in ADR .

UNIT 1

1. Existing Justice Delivery System in India - Effectiveness and Menaces.
2. Reforms in the Legal System for Achieving Effective and Speedy Resolution of Disputes - Public Interest Litigation,

UNIT 2

1. Alternate Dispute Resolution System - Objectives, Meaning and Advantages.
2. Types of ADR System - Mini Trial, Mediation - Arbitration, Neutral Fact Finding Expert, Early Neutral Evaluation, Court-annexed Arbitration, Mediation and Hybrid Process, Judicial Settlement Conferences etc., Multi-Door Court House.

UNIT 3

1. Other Amicable Settlement Process - LOK ADALAT
2. Arbitration Agreement, International Commercial Arbitration, Composition and Jurisdiction of Arbitral Tribunals.

UNIT 4

1. Conduct of Arbitral Proceedings and its Termination and Making of Arbitral Award
2. Finality and Enforcement of Arbitral Award - Recourse Against Arbitral Award, Enforcement of Foreign awards (New York Convention Awards and Geneva Convention Awards).

UNIT 5

1.Conciliation - Commencement of Proceedings, Appointment and Role of Conciliators, Submission of Statement to Conciliators, Settlement Agreement, Termination, Cost and Deposits of Proceedings, Protection for Conciliation Pro ngs.

2. Mediation - Meaning, Advantages, Techniques, Common Errors of Mediation Advocacy.

RECOMMENDED BOOKS

(a) Rao P.C., Alternative Dispute Resolution.
(b) Basu N.D., Law of Arbitration and Conciliation
(c) Kwatra G.K., The Arbitration and Conciliation Law of India.
(d) Bansal A.K, Law of International Commercial Arbitration.
(e) Saraf B.P.& Jhunjhnuwala M., Arbitration and Conciliation
(f) Malhotra O.P., The Law and Practice of Arbitration and Conciliation
(g) Shaffer Thomas L., Legal Interviewing and Counseling in Nutshell
(h) Binder David A. & Bergman Paul et al. Lawyers as Counselors.
(1) Law Commission of India Report : Law Commission of India Report on Grama Nyayalayas Law Commission
of India Report on Urban Litigation- Mediation.

MAPPING Cos WITH POs AND PSOs

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	1	1	-	-	-	1	-
CO2	2	1	1	2	-	-	-	2	1
CO3	1	-	3	1	-	1	-	2	2
CO4	2	-	-	1	2	-	-	2	-
CO5	1	3	1	-	3	1	1	1	2

5th SEMESTER

LINGAYA'S VIDYAPEETH
SCHOOL OF LAW
LL.B. 3 YEARS PROGRAMME
SUBJECT: LAW OF EVIDENCE
SUBJECT CODE: LLB 311
CLASS: LL.B. 3rd YEAR
SEMESTER: V

CREDIT:4

L	T	P	C
4	0	0	4

Course Objective :
The law of evidence is one of the most important branches of adjective law. Evidence is the pivot on which the whole edifice of administration of justice rests. It involves several questions, such as what is evidence, typology of evidence, how it is produced before a Judicial Authority and what is the role of the evidence in the administration of justice. The study of the law of evidence is most important in the field of legal education

- To acquaint the students with basic principles of the law of evidence;
- To enable them to understand the importance of evidence in the system of administration of justice.
- To enable them to analyze critically the rules of evidence and its application to a given fact situation.

Course Outcome

On completion of the course students will be able to :

CO1: To understand the fundamental rule of Law of Evidence.

CO2: To understand the relevant fact under Indian Evidence Act 1872.

CO3: To understanding the admission, confession, dying declaration and expert opinion.

CO4: To analyse the character in civil and criminal cases, admissibility of oral and document evidence.

CO5: To analyse the provision of burden of proof, estoppels, privileged of communication and examination of witness.

Catalog Description

The present course approaches the subject of Evidence law from a doctrinal as well as practical perspective. It will cover the principles upon which the subject matter has developed, and its application through the Indian Evidence Act, 1872. Care has been taken to ensure that students are introduced to both theoretical and historical themes of the subject matter, as well also to ensure sufficient understanding and expertise develops through this course to be able to apply the law. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

COURSE OUTLINE

It has **5 modules** which are as follows:

UNIT-I **(Lecture: 7)**

1. History of Law of Evidence
2. Meaning Nature, Scope and Object of Evidence,
3. Types of Evidence,
4. Fundamental Rules of Law of Evidence,
5. Fact in issue and relevant facts, Fact Proved, not proved, disproved (S. 3),
6. Presumption(S-4), Relevancy of Facts (S-5-16),

UNIT-II **(Lecture: 9)**

1. Res Gestate (Section - 6), Occasion, cause & effect of fact in Issue (Section7),
2. Motive, Preparation &Conduct (S-8),
3. Identification (S-9),
4. Conspiracy (S-10),
5. Facts not otherwise Relevant (S-11),
6. Relevancy of State of Mind & State of Body & Bodily feeling (Section-14),
7. Evidence of similar occurrences (Section-15)

UNIT-III **(Lecture: 12)**

1. Meaning of Admission & Confession (17-31),
2 Difference between Admission & Confession,
3. Circumstances under which confession is admissible and not admissible,
4. Evidentiary value of admission & confession,
5. Dying Declaration, Expert Opinion,

UNIT-IV **(Lecture: 11)**

1. Evidence of Character in Civil & Criminal Cases
2. Principles relating to direct evidence (S-60),
1. Law relating to admissibility of documentary evidence (S. 61-66),
4. Proof as to genuineness of document i.e. execution & attestation(S 63-67),
5. Public Document and Private documents(S 74-78),
6.Exclusion of oral by documentary evidence(S-91-99),

UNIT-V **(Lecture: 9)**

1. Meaning of Proof & Presumption,
2. On whom burden of proof lies, Standard of Proof in Civil & Criminal Cases
3. Estoppel: Meaning & Scope (115-117), Principles Governing Doctrine of Estoppel,
4. Witness: Meaning, Types (126-127), Who may be a Witness,
5. Privileges of certain witnesses & Communication (135-136),
6. Examination of Witness (137-166)

BOOKS RECOMMENDED

- S. Sarkar Ahmed Ejaz, Law of Evidence, (Ashoka Law House, Delhi, 6th Ed. 2002)
- Vepa P Sarathi, Law of Evidence, (Eastern Book Company, 6th Ed. 2006)
- Ranchhoddas Ratanlal Thakore and Dhiraj Lal, The Law of Evidence, (Wadhwa &Wadhwa, Nagpur, 22nd Ed. 2006)
- MC. Sarkar, 8.C. Sarkar, Law of Evidence in India, Pakistan, Bangladesh, Burma and Ceylon, (Wadhwa & Wadhwa, Nagpur, 15th Ed. 2000)
- Wigmore John Henary, Wigmore on Evidence, (Aspen Law & Business Publications 4th Ed. 1983)
- .Adrian Zuckerman, The Principles of Criminal Evidence, (Oxford University Press, London, 1989)

Modes of Evaluation:

Components	Internal Examination	Mid-term written Examination	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination

Components	Assignment/ Case Comment	Project Work Court Room Exercise	Subject Grand Viva	Attendance	Total 15 Marks
Weightage (%)	25% weightage	25% weightage	25% weightage	25% weightage	
		Report / Viva /PPT			

MAPPING

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	-	-	-	1	-
CO2	1	3	1	-	-	-	-	1	-
CO3	2	2	-	2	-	1	-	1	1
CO4	1	1	-	1	-	2	-	2	-
CO5	1	1	-	1	-	1	-	1	-

Details of class schedules

LECTURE NO	TOPIC	REFERENCE BOOK	PEDAGOGY
1	**UNIT- I** History of Law of Evidence	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
2	Continue.	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
3	Meaning nature, scope and object of evidence	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT

4	Types of evidence	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
5	Fundamental rules of Law of Evidence.	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
6	Fact in issue and relevant facts, Fact Proved, not proved, disproved (S. 3),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
7	Presumption(S-4), Relevancy of Facts (S-5-16)	• Bare Act of Indian Evidence Act 1872 • Takwani Law of	• Lecture • Discussion • Debate • PPT

		Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	
8	**UNIT II** Res Gestate (Section - 6), Occasion, cause & effect of fact in Issue (Section7),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
9	Continue..	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
10	Motive, Preparation &Conduct (S-8),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT

11	Identification (S-9),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
12	Conspiracy (S-10)	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
13	Facts not otherwise Relevant (S-11),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
14	Relevancy of State of Mind & State of Body & Bodily feeling (Section-14),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of	• Lecture • Discussion • Debate • PPT • Presenatation

		Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	
15	Evidence of similar occurrences (Section-15)	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
16	Continue.....	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
17	**UNIT III** Meaning of Admission & Confession (17-31),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • presentation

18	Difference between Admission & Confession,	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
19	Continue....	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
20	Circumstances under which confession is admissible and not admissible,	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presenatation
21	Continue…	• Bare Act of Indian Evidence Act 1872 • Takwani Law of	• Lecture • Discussion • Debate • PPT

		Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	
22	Evidentiary value of admission & confession,	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
23	Continue..	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
24	Continue...	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT

25	Dying Declaration, Expert Opinion	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
26	Continue…	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
27	Continue…	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
28	Continue...	• Bare Act of Indian Evidence Act 1872 • Takwani Law of	• Lecture • Discussion • Debate • PPT • Presentation

		Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	
29	**UNIT IV** Evidence of Character in Civil & Criminal Cases	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
30	Principles relating to direct evidence (S-60),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
31	Law relating to admissibility of documentary evidence (S. 61-66),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation

32	Continue...	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
33	Proof as to genuineness of document i.e. execution & attestation(S 63-67),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
34	Continue..	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
35	Public Document and Private documents(S 74-78),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of	• Lecture • Discussion • Debate • PPT

		Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	
36	Continue...	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
37	Exclusion of oral by documentary evidence(S-91-99),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
38	Continues..	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT

39	Continue..	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
40	**UNIT V** Meaning of Proof & Presumption,	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
41	On whom burden of proof lies, Standard of Proof in Civil & Criminal Cases	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT
42	Continue…	• Bare Act of Indian Evidence Act 1872 • Takwani Law of	• Lecture • Discussion • Debate • PPT • Presentation

		Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	
43	Estoppel: Meaning & Scope (115-117), Principles Governing Doctrine of Estoppel,	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
44	Witness: Meaning, Types (126-127), Who may be a Witness,	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
45	Privileges of certain witnesses & Communication (135-136),	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT

46	Continue..	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
47	Examination of Witness (137-166)	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Lecture • Discussion • Debate • PPT • Presentation
48	Continue…	• Bare Act of Indian Evidence Act 1872 • Takwani Law of Evidence • S. Sarkar Ahmed Ejaz, Law of Evidence	• Discussion • Debate • Presentation

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

NACHAULI, JASANA ROAD, FARIDABAD

L	T	P	C
4	0	0	4

Subject : Law of Trust Equity & Fiduciary Relationship
SUBJECT CODE :LLB 313

CLASS :LLB

SEMESTER : V

CREDIT :4

Objective: Objective: The objective of the course is to provide students with an overall understanding of the law of equity with special emphasis on fiduciary obligations, trusts, equitable assignment of property and equitable remedies. The paper is useful for students to understand and compare the role of Equity in ancient and modern legal system.

COURSE OUTCOME:

At the end of the course, students should be able to:

C01 –identify and state a clear understanding of the law of trust, equity and fiduciary relationship and how it applies to whole of civil law in India.

C02 –identify the different types of principles of equity and equitable remedies.

C03 – distinguish between different types of trust and analyse the powers rights and duties of a trustee

C04 –critically analyse the theoretical and philosophical underpinnings of the law of equity and trust

C05 –critique the societal impact of the law of equity and trust

Catalog Description

The course deals with acquainting the students with the fundamentals of equity trsut and fiduciary relationship.. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-1 (8 lectures)

1. History, nature and principles of Equity-Emergence of law of trust from Equity
2. The making of Indian Law of Trust and provisions of law of Trust-Religious Trusts
3. Principles of Equity and Equitable Remedies
4. Equitable Relief in different branches of law with special reference to property law.

UNIT-2 (9 lectures)

1. Nature of Equity
2. History of Courts of Equity
3. Relations of law of Equity
4. The maxims of equity
5. Different Equitable remedies.
6.

UNIT – 3

(8lectures)

1. Essentials of Trust
2. Fiduciary Relationship Concept, kinds vis-a-vis Trusteeship
3. Trust and contract, Power, condition, charge and personal obligations- distinguished
4. Classification of Trust and its importance

UNIT – 4 **(10 lectures)**

1. Private Trusts
2. Public Trusts
3. Appointments, Retirement and removal of Trustee
4. Rights, Power, Discretion and control of Trustees
5. Duties of trustee in relation to:
6. (i) Trust property; and (ii) Beneficiary

UNIT – 5 **(13 lectures)**

1. The Administration of Trust
2. Liability for Breach of Trust
3. Rights and Remedies of the Beneficiary
4. Constructive Trusts
5. Appointment and Discharge of Trustees

BOOKS RECOMMENDED:

1. Ahmad Aquil, Equity, Trusts and Specific Relief.
2. Desai S.T., Equity, Trusts and Specific Relief.
3. Hansbury&Mousley, Modern Equity.
4. Jhabwala N.H, Elements of Equity, Trusts and Specific Relief.
5. Rao GCV Subha, Equity, Trust and Fiduciary Relation.
6. Singh G.P., Principles of Equity. Snell, Principles of Equity.
7. Tondon M.P., Principles of Equity and Trusts

Modes of Evaluation:

Components	Internal Examination	Mid-term written Examination	End term written Exam
Weightage (%)	15 %	25%	60%

Internal Examination

Components	Assignment	Project Work	Viva	Attendance	Total Marks
Weightage (%)	15% weightage	15% weightage	15% weightage	15% weightage	15

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	1	-	1	-	-	-	1	-
CO2	3	3	2	2	1	-	-	1	2	-
CO3	2	1	1	-	1	1	-	-	-	-
CO4	3	1	3	2	2	2	1	2	-	-
CO5	3	1	2	1	2	-	-	-	-	-

Lecture No.	Topic to be covered	References	Pedagogy
2.	History, nature and principles of Equity-Emergence of law of trust from Equity		• Lecture • Discussion • Debate • PPT • Research
3.	Continued		• Lecture • Discussion • Debate • PPT • Research
4.	The making of Indian Law of Trust and provisions of law of Trust-Religious Trusts		• Lecture • Discussion • Debate • PPT • Research
5.	Continued		• Lecture • Discussion • Debate • PPT • Research
6.	Principles of Equity and Equitable Remedies		• Lecture • Discussion • Debate • PPT • Research

7.	Continued		• Lecture • Discussion • Debate • PPT • Research
8.	Equitable Relief in different branches of law with special reference to property law.		• Lecture • Discussion • Debate • PPT • Research
9.	Continued		• Lecture • Discussion • Debate • PPT • Research
10.	Nature of Equity		• Lecture • Discussion • Debate • PPT • Research
11.	History of Courts of Equity		• Lecture • Discussion • Debate • PPT • Research
12.	Continued		• Lecture • Discussion • Debate • PPT • Research

13.	Relations of law of Equity		• Lecture • Discussion • Debate • PPT • Research
14.	Continued		• Lecture • Discussion • Debate • PPT • Research
15.	The maxims of equity		• Lecture • Discussion • Debate • PPT • Research
16.	Continued		• Lecture • Discussion • Debate • PPT • Research
17.	Different Equitable remedies.		• Lecture • Discussion • Debate • PPT • Research
18.	Continued		• Lecture • Discussion • Debate

			• PPT • Research
19.	Essentials of Trust		• Lecture • Discussion • Debate • PPT • Research
20.	Fiduciary Relationship Concept, kinds vis-a-vis Trusteeship		• Lecture • Discussion • Debate • PPT • Research
21.	Continued		• Lecture • Discussion • Debate • PPT • Research
22.	Trust and contract, Power, condition, charge and personal obligations-distinguished		• Lecture • Discussion • Debate • PPT • Research
23.	Continued		• Lecture • Discussion • Debate • PPT • Research

24.	Continued		• Lecture • Discussion • Debate • PPT • Research
25.	Classification of Trust and its importance		• Lecture • Discussion • Debate • PPT • Research
26.	Continued		• Lecture • Discussion • Debate • PPT • Research
27.	Private Trusts		• Lecture • Discussion • Debate • PPT • Research
28.	Public Trusts		• Lecture • Discussion • Debate • PPT • Research
29.	Appointments, Retirement and removal of Trustee		• Lecture • Discussion • Debate • PPT • Research

30.	Continued		• Lecture • Discussion • Debate • PPT • Research
31.	Appointments, Retirement and removal of Trustee		• Lecture • Discussion • Debate • PPT • Research
32.	Rights, Power, Discretion and control of Trustees		• Lecture • Discussion • Debate • PPT • Research
33.	Continued		• Lecture • Discussion • Debate • PPT • Research
34.	Duties of trustee in relation to: (i) Trust property; and (ii) Beneficiary		• Lecture • Discussion • Debate • PPT • Research
35.	Continued		• Lecture • Discussion • Debate

			• PPT • Research
36.	Continued		• Lecture • Discussion • Debate • PPT • Research
37.	The Administration of Trust		• Lecture • Discussion • Debate • PPT • Research
38.	Continued		• Lecture • Discussion • Debate • PPT • Research
39.	Continued		• Lecture • Discussion • Debate • PPT • Research
40.	Liability for Breach of Trust		• Lecture • Discussion • Debate • PPT • Research

41.	Continued		• Lecture • Discussion • Debate • PPT • Research
42.	Rights and Remedies of the Beneficiary		• Lecture • Discussion • Debate • PPT • Research
43.	Continued		• Lecture • Discussion • Debate • PPT • Research
44.	Constructive Trusts		• Lecture • Discussion • Debate • PPT • Research
45.	Appointment and Discharge of Trustees		• Lecture • Discussion • Debate • PPT • Research
46.	Revision of Unit I and II		• Lecture • Discussion • Debate • PPT • Research

47.	Revision of Unit III		• Lecture • Discussion • Debate • PPT • Research
48.	Revision of Unit IV		• Lecture • Discussion • Debate • PPT • Research
49.	Revision of Unit V		• Lecture • Discussion • Debate • PPT • Research

LINGAYA'S VIDYAPEETH
SCHOOL OF LAW
LL.B. 3 YEARS PROGRAMME
SUBJECT: Principles of Taxation
SUBJECT CODE: LLB 315
CLASS: LL.B. 3rd YEAR
SEMESTER: V

CREDIT:4

Course Objective :

1.Taxation is a general law made by governments to collect revenue from people and organizations.
2. A tax formula contains at least three elements: the definition of the base, the rate structure, and the identification of the legal taxpayer.
3. The base multiplied by the appropriate
rate gives a product, called the tax liability, which is the legal obligation that the taxpayer must
meet at specified dates.
4. A tax is identified by the characteristics of its base, such as income in the case of an income tax.
5.The paper is helpful to the students in understanding the theoretical as well as practical aspects of Taxation Policy of the Government.

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4	0	0	4

Course Outcome

On completion of the course students will be able to :

CO1: To understand the basic concept of Income Tax

CO2: To understand the calculation of different head of Income.

CO3: To understanding the deduction, rectification and assessment procedure.

CO4: To analyse the appeal, references, revision, penalties and Liability in special cases

CO5: To analyse the rebate, Relief, double taxation relief.

Catalog Description

No government can run a country without revenue. One of the major sources of revenue is taxation. Taxes can be classified as Direct and Indirect Tax. Direct taxes encompass those taxes where impact and incidence falls on the same person. Income Tax Act, 1961 is the prime legislation in the area of direct taxes in India. It is very interesting to know various facets of this Act. The Act makes ample scope for tax planning and tax management by utilizing various provisions which are enshrined therein. A tax payer can reduce her tax liability by taking advantage of various incentives that are provided in the Act.The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

COURSE OUTLINE

It has **5 modules** which are as follows:

UNIT-I **(Lecture: 7)**

1. Definition: Income-Meaning, Concept, Application and Diversion of Income, Agricultural Income, Assessee, Assessment year and Previous Year, Residential Status and Tax Liability of Assessee
2. Distinction between Capital Receipt and Revenue Receipt;
3. Capital Expenditure and revenue

UNIT-II **(Lecture: 29)**

1. Heads of Income

(a) Salary
(b) Income from house property
(c) Capital gains

2. Income of other persons included in Assesssee's Total Income
3. Set out and Carry Forward of Losses

UNIT-III **(Lecture: 5)**

1. Assessment Procedure
2. Rectification of Mistakes
3. Deductions under Section 80 C, 80 D, 80 CCE, 80 G, 80 U

UNIT-IV **(Lecture: 4)**

1. Appeal, Reference and Revision
2. Penalties (Section 271 to 275)
3. Income Tax Authorities
4. Liability in Special Cases (Sec 159-181)

UNIT-V **(Lecture: 3)**

1. Rebate of Income Tax (Sec 87-88)
2. Relief from Income Tax (Sec 89)
3 Double Taxation Relief (Sec 90-91)
4. Collection, Recovery and Refund (Sec 190 to 234 and Sec 237-245)

BOOKS RECOMMENDED

1. Kailash Rai, Taxation Law, (Allhabad Law Agency 16th Ed. 2017)
2. V.K. Singhania. Students Guide to Income Tax (Taxman Publication Pvt. Ltd. Ed. 20152
3. Kanga & Palkiwala. The Law and Practice of Income Tax (N.M. Tripathi Pvt. Ltd. Latest Ed.)
4. Sampath Iyengar. Law of Income Tax (Bharat Law House Pvt. Ltd. New Delhi, Ed. 2014)gt

Modes of Evaluation:

Components	**Internal Examination**	**Mid-term written Examination**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination

Components	Assignment/ Case Comment	Project Work Court Room Exercise	Subject Grand Viva	Attendance	Total 15 Marks
Weightage (%)	25% weightage	25% weightage	25% weightage	25% weightage	
		Report / Viva /PPT			

MAPPING

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	-	-	-	1	-
CO2	1	3	1	-	-	-	-	1	-
CO3	2	2	-	2	-	1	-	1	1
CO4	1	1	-	1	-	2	-	2	-
CO5	1	1	-	1	-	1	-	1	-

Details of class schedules

LECTURE NO	TOPIC	REFERENCE BOOK	PEDAGOGY
1	**UNIT- I** Definition: Income-meaning,concept	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
2	Application and Diversion of Income.	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
3	Residential Status	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
4	Continue..	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
5	Tax liability of Assessee	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
6	Capital and Revenue Receipt.	• V.K Sighania • Kailash Rai • Sampath	• Lecture • Discussion • Debate • PPT

		Iyenger	
7	Capital and Revenue Expenditure.	• V.K Sighania • Kailash Ra • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
8	**UNIT II** Salary	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
9	Continue..	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
10	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
11	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
12	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT

13	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
14	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presenatation
15	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
16	Continue.....	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
17	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • presentation
18	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
19	Continue....	• V.K Sighania • Kailash Rai	• Lecture • Discussion • Debate • PPT

		• Sampath Iyenger	
20	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presenatation
21	Income from House Property	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
22	Continue..	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
23	Continue..	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
24	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
25	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT

26	Capital Gain.	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
27	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
28	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
29	Continue..	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
30	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
31	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
32	Continue...	• V.K Sighania • Kailash Rai • Sampath	• Lecture • Discussion • Debate • PPT

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33	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
34	Income of other person included in assessee total Income	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
35	Set out and Carry Forward of losses	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
36	Continue...	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
37	**UNIT III** Assessment Procedure	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
38	Continues..	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT

39	Rectification of Mistake..	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
40	Continue..	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
41	Deduction under section 80C,80D,80 CCE, 80 G,80 U..	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT
42	**UNIT IV** Appeal, References and Revision	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
43	Penalties.	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
44	Income Tax Authorities and Income Tax Authorities.	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
45	Liability in some Special cases	• V.K Sighania • Kailash Rai • Sampath	• Lecture • Discussion • Debate • PPT

		Iyenger	
46	**UNIT V** Rebate and Relief of Income Tax	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
47	Double Taxation relief	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Lecture • Discussion • Debate • PPT • Presentation
48	Collection , recovery and Refund	• V.K Sighania • Kailash Rai • Sampath Iyenger	• Discussion • Debate • Presentation

BBA LLB 109 / LLB317	**Land Laws including ceiling and other Local Laws**	L	T	P	C
Version 1.0		4	0	0	4
Pre-requisites/Exposure					
Co-requisites					

LINGAYAS VIDYAPEETH
SCHOOL OF LAW

COURSE OBJECTIVES

The students will have an understanding of the laws which are related with the land & tenancy. This course will help the students to have the understanding about the practical issues & aspects related to the land & other related aspects. They will acquire the ability to identify legal issues and principles underlying any given factual situation, to undertake and present research on such issues and be able to synthesize such sources and use them to formulate arguments in their research.

COURSE OUTCOMES

On completion of this course, the students will be able to:

CO1: Understand and analyze legislative power to make laws relating to land and land ceiling is in the state list.

CO2: Understand & analyze different states enactment on tenancy & ceiling of Punjab & Haryana respectively.

CO3: Understand & critically analyze the regulation related to rent & other aspects of Haryana.

O4: Critically analyze & evaluate the working & functions of panchayats with regards to land related matters.

CO5: Evaluate & Criticalanalysis the multilateral aspects of the panchayat samities & revenue sources.

CATALOG DESCRIPTION

This course will discuss important features of the local laws and statutory provisions relating to property, with a focus on land law. The principal aim is to acquaint students with the fundamental proprietary interests and to teach students how to apply the relevant laws and concepts to practical situations where such interests are in dispute. The course will include some national & other local laws majorly from two states like Haryana & Punjab.

COURSE OUTLINE

UNIT-I No. of Lectures -09

PUNJAB LAND REVENUE ACT 1887

1. Definition of Key Words,

2. Revenue Officers: Their Power and Functions, Preparation of Revenue

3. Records

4. Arbitration (Sections 127-135), Concepts & Procedure of Partitions

Unit-IINo. of Lectures -11

A. THE PUNJAB TENANCY ACT-1887

1. Definition of Key Words under the Act,

2. Class of Tenants, Law relating to Rent, Law relating to

3. Occupancy of Tenant,

4. Law of Ejectment of Tenants

B. HARYANA CEILING OF LAND HOLDING ACT 1972

1. Definition of Key Words(Section-3),

2. Concept of Permissible Area and Surplus Area (Ss-4 to 6),

3. Ceiling on Land, Acquisition and Disposal of Surplus Area(SS 7 to 15),

4. Aggrieved Party (Section-18)

Unit-III:**No. of Lectures -08**

HARYANA RENT CONTROL ACT, 1973

1. Definitions (SS 1-4),

2. Rights & Duties of Tenants,

3. Rights and Duties of Landlords,

4. Grounds of Ejectment of Tenants.

Unit-IV **No. of Lectures -10**

HARYANA PANCHAYATI RAJ ACT 1994 (Sec. 1 to 54) (Chapter 1 to 6)

1. Definition of Key Words,

2. Constitution of Gram Sabha and Gram Panchayat,

3. Gram Panchayat's Duties,

4. Functions and Powers, Finance and Taxation,

5. Control of Gram Panchayat,

6. Sources of Income and Expenditure of Gram Panchayat.

Unit-V **No. of Lectures -08**

HARYANA PANCHAYATI RAJ ACT 1994, PANCHAYATI SAMITI

(CHAPTER 7 TO 11) AND SECTION 55 TO 116)

1. Definition of Key Words,

2. Conduct of Business of Panchayat Samities,

3. Servant of Panchayat Samities,

4. Duties and Powers of Panchayat Samiti, Finance and Taxation,

5. Sources of Income of Panchayat Samiti, Control of Panchayat Samiti

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	2	2	3	-	1	-	1
CO2	2	2	2	2	3	-	1	-	-
CO3	2	2	-	1	2	1	1	1	-
CO4	-	2	1	-	1	2	1	-	1
CO5	-	2	1	-	1	2	-	-	-

S.NO	TOPIC	NO. OF LECTURE	REFERENCE BOOK	PEDAGOGY
1	**Unit-I** PUNJAB LAND REVENUE ACT 1887	2	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
2	Definition of Key Words	2	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
3	Revenue Officers: Their Power and Functions, Preparation of Revenue	3	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
4	Records	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT

5	Arbitration (Sections 127-135), Concepts & Procedure of Partitions.	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
6	**Unit-II** THE PUNJAB TENANCY ACT-1887 1. Definition of Key Words under the Act, 2. Class of Tenants, Law relating to Rent, Law relating to 3. Occupancy of Tenant, 4. Law of Ejectment of Tenants	5	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
7	HARYANA CEILING OF LAND HOLDING ACT 1972 1. Definition of Key Words(Section-3), 2. Concept of Permissible Area and Surplus Area (Ss-4 to 6), 3. Ceiling on Land, Acquisition and Disposal of Surplus Area(SS 7 to	6	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT

	15), 4. Aggrieved Party (Section-18)			
8	HARYANA RENT CONTROL ACT, 1973	2	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
9	Definitions (SS 1-4)	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
10	Rights & Duties of Tenants	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
11	Rights and Duties of Landlords	2	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT

12	Grounds of Ejectment of Tenants	2	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
13	**Unit-IV** HARYANA PANCHAYATI RAJ ACT 1994 (Sec. 1 to 54) (Chapter 1 to 6).	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
14	Definition of Key Words	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
15	Constitution of Gram Sabha and Gram Panchayat	2	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
16	Gram Panchayat's Duties	2	1. HarshaliChowdhary 2. NeetyKaul	Lecture Discussion Debate PPT

			3. P. Narula 4. Badruddin	
17	Functions and Powers, Finance and Taxation	2	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
18	Control of Gram Panchayat	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
19	Sources of Income and Expenditure of Gram Panchayat	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
20	**Unit-V** HARYANA PANCHAYATI RAJ ACT 1994, PANCHAYATI SAMITI (CHAPTER 7 TO 11) AND SECTION 55 TO	2	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT

	116)			
21	Definition of Key Words	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
22	Conduct of Business of Panchayat Samities	2	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
23	Servant of Panchayat Samities	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT
24	Duties and Powers of Panchayat Samiti, Finance and Taxation	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT

25	Sources of Income of Panchayat Samiti, Control of Panchayat Samiti	1	1. HarshaliChowdhary 2. NeetyKaul 3. P. Narula 4. Badruddin	Lecture Discussion Debate PPT

BOOKS RECOMMENDED

1. HarshaliChowdhary, Punjab & Haryana Land Laws, (Central Law Publications, Allahabad, 1st Ed. 2016)

2. Badruddin, Commentary on Revenue Laws, Panchayat Laws and Rent Laws, (The Law House, Rohtak, 4th Ed. 2015)

3. NeetyKaul, Land Laws in Punjab and Haryana, (Chawla Publications (P) Ltd., Chandigarh, 6th Ed. 2014)

4. P. Narula, Punjab and Haryana Land Laws, (Allahabad Law Agency, Ed. 2012)

ARTICLES

1. R.S. Gae, *Land Law in India: With Special Reference to the Constitution*, Cambridge University Press, https://www.jstor.org/stable/758169.

2. https://www.scconline.com/blog/post/2017/03/03/no-application-can-be-filed-under-section-28-a-of-land-acquisition-act-1894-subsequent-to-the-same-being-filed-under-section-18-of-the-act/

3.https://www.aaptaxlaw.com/land-acquisition-act/section-18-19-20-land-acquisition-act-reference-to-court-collectors-statement-to-the-court-service-of-notice-section-18-19-20-of-land-acquisition-act-1894.html

4. https://www.satara.gov.in/en/notice/under-section-18-of-the-land-acquisition-act-1894-list-of-the-following-cases/

LINGAYAS VIDYAPEETH
SCHOOL OF LAW

LLB 319	**MEDIA LAW & CENSORSHIP**	L	T	P	C
Version 1.0		4	0	0	4
Pre-requisites/Exposure					
Co-requisites					

COURSE OBJECTIVES

The students will have an understanding of the debates around media & related dimensions. This course will introduce students to the study of legal and ethical issues in the media. Students will develop an understanding and appreciation of these issues and the ability to analyze the important legal and ethical issues involved with the mass media industry

COURSE OUTCOMES

On completion of this course, the students will be able to:

CO1: Understand & conceptualize the evolution, meaning & scope of Media & related dimensions.

CO2: Understand & critically analyze the constitutional framework & laws related to the Media & ethics.

CO3: Understand & critically analyze other local laws related to media & other related issues.

CO4: Critically analyze & evaluate the ethical issues related to the media sector.

CO5: Evaluate & Critical Analysis of the censorship laws of our nation.

CATALOG DESCRIPTION

This course examines the various media law, policy and regulatory frameworks in India that affect media establishments and how they enhance or constrain media institutions and the public in their communication activities. It will also examine the media regulatory frameworks. The course will examine the success or failure of existing media policy and regulations in a technologically dynamic media environment.

COURSE OUTLINE

UNIT-I **No. of Lectures -10**

Different facets of Media and introduction to basic Ethics

Concept of Media

Theories of communication

Evolution of media

Media Ethics

Basic ethical theory

Unit-II **No. of Lectures -08**

Media in Constitutional Framework

Freedom of expression in Indian Constitution

• Right to Privacy

• Right to information under constitution of India

Unit-III: **No. of Lectures -14**

Legal dimensions of media

Media criminal law (defamation/obscenity/sedition)

Media and law of Torts(Defamation and Negligence)

Media and Legislature(privileges of legislature)

Media and Human Rights

Media and Judiciary: Contempt of Court

Media and Executive-Official Secret Act

Media and Journalists-Working Journalists(Conditions of Service Act)

.

Unit-IV **No. of Lectures -08**

News

Getting Information

Free Press/ Fair Trial

Ethical Issues In news

1. Business Pressure

2. Truth Telling and Objectivity

3. Social Justice

4. Sources and Reporters

5. Privacy

Unit-V **No. of Lectures -10**

Censorship in India.

Cinematograph Act, 1952

An extensive study on the CBFC

Censorship - A restriction of speech by the government?

Censorship in film and TV industry

Film Broadcast Regulations

Defamation, Blasphemy, Sedition & Obscenity in Media

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Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	2	2	-	2	1	-	-
CO2	3	2	2	1	2	1	-	-	1
CO3	1	3	1	1	2	3	-	1	-
CO4	2	3	1	1	2	2	1	-	-
CO5	3	2	2	1	-	-	-	-	1

S.NO	TOPIC	NO. OF LECTURE	REFERENCE BOOK	PEDAGOGY
1	**Unit-I** Different facets of Media and introduction to basic Ethics	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
2	Concept of Media	1	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
3	Theories of communication	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
4	Evolution of media	1	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
5	Media Ethics	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate

				PPT
6	Basic ethical theory	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
7	**Unit-II** Media in Constitutional Framework	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
8	Freedom of expression in Indian Constitution	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
9	Right to Privacy	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT

10	Right to information under constitution of India	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
11	**Unit-III** Legal dimensions of media	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
12	Media criminal law (defamation/obscenity /sedition)	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
13	Media and law of Torts(Defamation and Negligence)	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
14	Media and Legislature(privileges of legislature)	1	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT

15	Media and Human Rights	1	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
16	Media and Judiciary: Contempt of Court	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
17	Media and Executive-Official Secret Act	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
18	Media and Journalists-Working Journalists(Conditions of Service Act)	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
19	**Unit-IV** News	1	1. NayyarShamsi 2. Vakul Sharma 3. S.R. Bhansali	Lecture Discussion Debate PPT

20	Getting Information	2	1. NayyarShamsi 2. Vakul Sharma 3. S.R. Bhansali	Lecture Discussion Debate PPT
21	Free Press/ Fair Trial	2	1. NayyarShamsi 2. Vakul Sharma 3. S.R. Bhansali	Lecture Discussion Debate PPT
22	Ethical Issues In news 1. Business Pressure 2. Truth Telling and Objectivity 3. Social Justice 4. Sources and Reporters 5. Privacy	3	1. NayyarShamsi 2. Vakul Sharma 3. S.R. Bhansali	Lecture Discussion Debate PPT

23	**Unit-V** Censorship in India.	1	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
24	Cinematograph Act, 1952	1	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
25	An extensive study on the CBFC	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
26	Censorship - A restriction of speech by the government?	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
27	Censorship in film and TV industry	1	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT
28	Film Broadcast Regulations	1	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT

29	Defamation, Blasphemy, Sedition & Obscenity in Media	2	1. Basu D.D. 2. McQuil Denis 3. Vakul Sharma	Lecture Discussion Debate PPT

BOOKS RECOMMENDED

1. Basu D.D. Law of Press, Wadhwa and Company, Nagpur.

2. McQuil Denis, McQuil's Mass Com theory, Sage Publication, London

3. NayyarShamsi, Journalism : Ethics and Code, Anmol Publication, New Delhi

4. Vakul Sharma, Law & Practice of Cyber Crime, (Universal Publishing, New Delhi. S'h Ed. November 2016)

5. S.R. Bhansali, Information Technology Act, (Universal Law Publishing in print of Lexis Nexis, New Delhi January 2015.)

ARTICLES

1. Purushraj. *Media Trails*. Legal Service India E-Journal.https://www.legalserviceindia.com/legal/article-5893-media-trails.html

2. DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS. Social Justice in an Open World The Role of the United Nations ISBN 92-1-130249-8by United Nations, New Yorkhttps://www.un.org/esa/socdev/documents/ifsd/SocialJustice.pdf

3. Priyanka Ghai, & Dr. Arnind P Bhanu (2020), CENSORSHIP IN INDIA VIS-À-VIS FREEDOM OF SPEECH: COMPARISON OF THE EXTENT OF CENSORSHIP LAWS IN INDIA AND ABROAD. Vol 7, Issue 13, 2020. ISSN- 2394-5125, Journal of Critical Reviews. http://www.jcreview.com/fulltext/197-1593082708.pdf

4. Jhumur Ghosh (2014), ETHICS OF INDIAN NEWS MEDIA: ABERRATIONS AND FUTURE CHALLENGES. Winter Issue/December 2014/Vol. 5/No. 2. ISSN 2249 - 5835, Global Media Journal-Indian Edition. https://www.caluniv.ac.in/global-mdia-journal/ARTICLE-GMJ-DEC%202014/ARTICLE-%203.pdf

5. Nitish Rai (2019), INDIAN CONSTITUTIONALISM AND PRESS FREEDOM IN INDIA SINCE INDEPENDENCE. Indian J. Soc. & Pol. 06 (02):05-10:2019. ISSN: 2348-0084(P) ISSN: 2455-2127(O) https://www.ijsp.in/admin/mvc/upload/60202%20INDIAN%20CONSTITUTIONALISM%20AND%20PRESS%20FREEDOM%20IN%20INDIA%20SINCE%20INDIPENDENCE.pdf

Lingaya's Vidyapeeth

(Approved under section 3 of UGC Act. 1956)

SCHOOL OF LAW

COURSE PLAN

For the Session 2021-2022

Semester : **5th Semester**

Faculty Name : **Ms. Divya**

Subject : **JURISPRUDENCE**

Course :**LLB**

Sub Code : **LLB319**

L	T	P	C
4	0	0	4

Course Objectives: It includes sources of Law, Administration of Justice, Law and Morality, Schools of Jurisprudence, Legal Rights and Duties, Ownership and Possessions, Legal Personality, Obligation and Liability etc. The subject is very important for Law Students as it helps in understanding the evolution and nature of Law and the fundamental functions of Law from different perspectives. Moreover, the students are also exposed to the information relating to functioning of various legal systems. This helps in making laws and tackling socio-legal problems prevalent in our country by studying the remedial measures in India.

Course Outcome:

On completion of this course, the students will be able to

CO1: learn meaning, definitions and different theories of law.

CO2: Discuss different school of law.

CO3: Develop the idea of administration of justice, public interest litigation, legal aid etc.

CO4: Familiarize with the idea of different sources of law.

CO4. Learn about rights and duties, possession and ownership etc.

Catalog Description

Jurisprudence is the theoretical study of law. Scholars of jurisprudence seek to explain the nature of law its most general form and provide a deeper understanding of legal reasoning and analogy, legal system, legal institutions and the role of law in the society.

The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalization and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation

Course Content

LLB319	**JURISPRUDENCE**

Course Contents:

It has 5 units which are as follows:

Unit I: (10 Lectures)

Definition, nature and province/scope of Jurisprudence

1. Theory of Natural Law and jurisprudence,
2. Analytical school-

Austin's theory of Law
Kelson's pure theory of Law
Bentham's theory of Law

Unit II: (12 Lectures)

1. Historical school
2. Sociological School
3. Realist school

Unit III: (13 Lectures)

1. Administration of Justice
2. Socio-Economic Approach and Philosophy

Law and Social Change
Legal Aid
Public Interest Litigation

Unit IV: (9 Lectures)

Sources of law —

1. Custom,
2. Precedent
3. Legislation

Unit V: (7 Lectures)

1. Rights and Duties
2. Possession and Ownership
3. Persons

Books recommended-

1. B.S: Mani Tripathi, The Legal Theory, (Allahabad Law Agency, Allahabad, 18th Ed. 2012)
2. N.V. Paranjapai, Studies in Jurisprudence and Legal Theory, (Central Law Agency, Allahabad 7thEd.2013)
3. Nomita Aggarwal, Jurisprudence, (Central Law Agency, Allahabad, 10th Ed. (rep)2016)
4. S.P: Dwivedi, Jurisprudence & Legal Theory, (Central Law Agency, Allahabad 7th Ed. 2017)
5. Salmond, John William, Sir, Jurisprudence or the theory of the law, (Hard Press Publishing (2013)
6. R.W.M. Dias, Jurisprudence, (Jain Law Book Agency, Delhi, 12th Edition, 20 14)
7. Edgar Bodenheimer, Jurisprudence, (Harvard University Press, 1974 (Revised Ed.)
8. Amartya Sen, The Idea of Justice, (Cambridge, Mass.: Belknap Press/Harvard University Press,Ed. 2009)
9. Granville Austin, Indian Constitution, (The Cornerstone of a Nation, New Delhi, OxfordUniversity Press, Ed. 2007)

Note: Latest edition of text books may be used.

Modes of Evaluation:

Components	Internal Examination	End term written Exam
Weightage (%)	40%	60%

Internal Examination

Components	Assignment/ Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	40

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	2	-	2	2
CO2	-	2	2	1	-	2	-	-	-
CO3	-	2	2	1	-	-	-	-	-
CO4	-	3	2	2	2	-	-	-	2
CO5	-	2	2	1	-	2	-	-	2

Details of class schedules

Lecture Plan No.	TOPIC	Reference Book	Pedagogy
1	**UNIT- I** Introduction of the Chapter	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
2	Meaning and definition	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
3	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
4	Nature and scope of jurisprudence	• Studies in Jurisprudence and legal theory by N.V Paranjape	• Lecture • Discussion • Debate • PPT

		• Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Research
5	Theory of natural law and jurisprudence	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
6	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
7	Analytical school	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
8	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape	• Lecture • Discussion • Debate

		• Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• PPT • Research
9	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
10	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
11	**Unit-II Introduction to the chapter**	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
12	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape	• Lecture • Discussion • Debate

		• Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• PPT • Research
13	Historical School	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
14	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
15	Sociological school	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
16	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape	• Lecture • Discussion • Debate

		• Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• PPT • Research
17	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
18	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
19	Realist School	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research

20	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
21	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
22	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
23	**Unit-III Introduction to the chapter**	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research

24	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
25	Administration of Justice	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
26	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
27	Socio economic Approach and Philosophy	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research

28	Law and social change	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
29	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
30	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
31	Legal aid	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research

32	Public Interest Litigation	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
33	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
34	**Unit-IV Introduction to the chapter**	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
35	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research

36	Sources of law	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
37	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
38	Custom	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
39	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research

40	Precedents	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
41	Legislations	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
42	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction to Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
43	**Unit-V Introduction to the chapter**	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research

44	Rights and duties	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
45	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
46	Possession and ownership	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research
47	Persons	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research

48	Continue	• Studies in Jurisprudence and legal theory by N.V Paranjape • Jurisprudence by Prof. Nomita Aggarwal • Introduction t Jurisprudence by Dr. Avtar singh • Jurisprudence the legal theory by B.N Mani Tripathi	• Lecture • Discussion • Debate • PPT • Research

SUBJECT: DRAFTING, PLEADING & CONVEYANCE THEORY (LLB 321)

SUBJECT: DRAFTING, PLEADING & CONVEYANCE PRACTICAL (LLB 351)

VIth SEMESTER

LINGAYA'S VIDYAPEETH

NACHUALI, JASANA ROAD, FARIDABAD

LL.B

LLB 312: Intellectual Property Law

L-4, T-0 P-0

Credits–4

Max Marks: 60

Objective- The understanding of human rights is the foundation for the development of a good citizen and a responsible legal professional. The main objective of this course is to provide an insight into the meaning and significance of various human rights in the contemporary era and the mechanisms developed at the international and national level for protection and promotion of such rights. This course attempts to increase the knowledge of law students with respect to human rights; to focus their attention on the underlying values of human rights and to explore various international and national legal frameworks which embody human rights and promote them in practice.

Course Outcome
On completion of the course students will be able to:

CO1: Understand the significance and basic concept intellectual property law,
CO2: Develop sound understanding of procedural knowledge relating to intellectual property
CO3: Apply knowledge towards solving complex intellectual property problems in real life
CO4: Recognise and interpret new emerging issues in the field of intellectual property related to information technology, internet, international trade etc.
CO5: Evaluate what constitutes infringement of intellectual property and what are the remedies available to a person
CO6: Find the loopholes in current intellectual property law and suggest changes.

LÍNGAYA'S VIDYAPEETH

SCHOOL OF LAW

SYLLABUS

LL.B. 3 YEARS PROGRAMME

SUBJECT: INTELLECTUAL PROPERTY LAW

SUBJECT CODE: LLB 312

CLASS: LL.B. 3RD YEAR

SEMESTER: VI

CREDIT: 4

Objective: To create awareness about the concept of Intellectual Properties, various conventions, provisions of Copy Right Act, 1957, The Trade Mark Act 1999 and The Patents Act 1970. The students can understand the process of Registration of Copyright work, trade mark and patents with the help of this paper.

UNIT-1

- Concept of Property vis-a-vis Intellectual Property

Basic concepts of Intellectual Property Law

Nature of Intellectual Property

Origin and Development of Intellectual Property - Copy Right, Trade Mark

Commercial Exploitation of Intellectual Property

Enforcement of Rights and Remedies Against Infringement

Patent

UNIT-2

International Character of Intellectual Property

Intellectual Property and Economic Development

International Protection of Intellectual Property - overview of International Conventions

-Berne Convention - WIPO Treaties 1996, Paris Conventions, TRIPS Agreements etc.

India's Position vis-a-vis International Conventions and Agreements

UNIT-3

- Object of Patent Law Inventions-
-Patentable and Non-Patentable
- Process Patent and Product Patent
- Procedure for obtaining a Patent
- Rights and Obligations of a Patentee
- Revocation and Surrender of Patents
- Infringement of Patent.

UNIT-4

- What is a Trade Mark

-Functions of a Trade Mark

-Trade Mark Registry and Register of Trade Mark

-Registration of Trade Marks

-Effects of Registration

-Assignment and Transmission of Trade Marks

-Rectification and Correction of Register

-Passing Off and Infringement Action

UNIT -5

- Meaning and Basis of Copyright
- Copyright Office and Copyright Board
- Subject Matter of Copyright
- Ownership, Assignment and Infringement of Copyright
- Remedies for Infringement
- Abridgement of the Work and Term of Copyright
- Rights of Broadcasting Authorities

BOOKS RECOMMENDED:

- David A. Einhorn. Intellectual Property Law in Cyberspace (3rd Ed. 2017)
- Xuan-Thco N. Nguyen, Robert W. Gomulkiewicz, and Danielle M. Conway. Intellectus
- Property, Software, and Information Licensing: Law and Practice (Cumulative
- Supplement Ist Ed. 2017)
- Jerey A. Maine and Xuan-Thao N. Nguyen. Intellectual Property Taxation: Transacti.
- and Litigation Issues (Cumulative Supplement 2nd Ed. 2017)
- Aline C. Flower. Intellectual Property Technology Transfer (Supplement 2nd Ed. 201

Mapping of COs with Pos and PSOs

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	1	1	1	1	-	3	1
CO2	1	3	2	1	2	1	1	3	2
CO3	-	3	2	2	3	-	1	2	1
CO4	-	1	-	-	1	1	1	2	2
CO5	2	-	2	1	2	2	-	2	2
CO6	-	1	1	1	-	-	-	1	-

LINGAYA'S VIDYAPEETH
NACHUALI, JASANA ROAD, FARIDABAD
BACHELOR OF LAW

LLB 314 : CYBER LAW

L-4, T-0 P-0 **Credits–4** **Max Marks: 100**

Objective-
To regulate framework for the control of Cyber crimes as they are in contact with the public at large and provide remedial measures for the public problems.

Both the personal and professional worlds are extremely dependent today or the Cyber World. The world is increasingly dependent on networked information and communication technologies (ICT). However, with growing dependency, new threats to network and information security have emerged and there is ever-growing vulnerability to Cyber Crime. This is also true for India where the number of internet users is growing rapidly and where ICT are of crucial importance for its economy. Thus, an effort to spread awareness of Cyber Security is the need of the hour and particularly among the law fraternity as these are the persons who handle the cases of cybercrime. Lawyers, Police, Govt. Officers, Law students and the NGO's must know about the details of the Information Technology.

Course Outcome

CO1: To make student aware the various kinds of cyber crime.
CO2: To familiarize students with intellectual property issues in cyber space and grow the development of law in this regard.
CO3: To analyze the various provision of Information technology act .
CO4: Student will able to gather knowledge about electronic contract.
CO5: To make student understand the cyber world and cyber law in general.

UNIT 1
Basic concept of Technology and Law
i. Understanding the Technology
ii. Scope of Cyber Laws
iii. Cyber Jurisprudence
Understanding Electronic Contracts
i. The Indian Law of Contract
ii. Types of Electronic Contracts
iii. Construction of Electronic Contracts.

UNIT 2

1. **Copyright in Information Technology**

i. Copyright in internet
ii. Software Piracy
iii. Multimedia and copyright issues

2.**Patents**

i. Indian position on computer related patents
ii. International context of patents

3.**Trademarks**

i. Trade mark Law in India
ii. Infringement and passing off

UNIT 3

INFORMATION TECHNOLOGY ACT 2000

i. Digital Signature
ii. E-Governance
iii. Regulation of Certifying Authorities
iv. Duties of Subscribers
V. Penalties and Adjudication
vi. Offences under the Act
vii. Making of Rules and Regulation

UNIT 4

1. Understanding Cyber Crimes

I. Crime in context of Internet
II. Types of Crime in Internet

2. Indian Penal Law & Cyber Crimes

I. Fraud,
II Hacking
III Mischief
IV. Trespass
V. Defamation
VI. Stalking
vii Spam

UNIT 5

Issues of Internet Governance

i. Issues of Internet Governance,
ii. Freedom of Expression in Internet,
iii. issues of Censorship
iv. Hate Speech,
v. Sedition,
vi. Libel
vii. Subversion
viii.Privacy Issues
ix. International position on Free Speech in Internet.

RECOMMENDED BOOKS

1. Information technology act 2000 bare act
2. Indian penal code bare act
3. Dr. V.K Ahuja books

MAPPING WITH COs WITH Pos AND Cos.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	-	-	-	-	-	2	1
CO2	2	3	1	-	1	2	-	1	1
CO3	1	1	-	1	-	-	-	2	2
CO4	-	-	1	-	1	-	-	-	1
CO5	1	1	1	-	-	1	-	1	1

LINGAYA'S VIDYAPEETH

NACHUALI, JASANA ROAD, FARIDABAD

BACHELOR OF LEGISLATIVE LAWS

LLB 316: BANKING AND INSURANCE

L-4, T-0 P-0 **Credits–4** **Max Marks: 100**

Objective- To apprise the students about the functioning of banks as the same is covered as general utility service. The students are imparted instructions so as to enable them to understand the multi-dimensional functional issues relating to banking system in India. The subject covered customer-banker relationship, as well as issue relating to money laundering etc. further, the importance and relevance of ombudsman in banking is specially highlighted in the instruction imparted to the students. The objectives and structural aspects of RBI, Monopoly of notes Issues, credit control and determination of bank rate policy are also discussed with the students. Moreover, a comprehensive knowledge regarding the law of Negotiable instruments is also given to the students.

CO1: The students will be able to identify the kinds of Negotiable Instruments and its features
CO2: to understand the relationship between Banker and customer through general and special relationships.
CO3: to familiarize students with services provided by the Commercial Banks, RRB and Cooperative banks.
CO4: to analyze the latest trends and regulations in Commercial banks
CO5: to make students understand the importance of RBI

COURSE OUTLINE

UNIT 1

a) Banking definition and meaning
b) Bank, banker, banking company
c) Commercial banks and essential functions
d) Agency services, general utility services, information service
e) Emergence of multi functional dimensions
f) System of banking-unit banking, branch banking, group banking and chain banking
g) Banking companies in India

UNIT 2

a) Customer: meaning, legal character of banker-customer relationship
b) Rights and obligation of banks
c) Right to set off, bankers lien
d) Duty of confidentiality and exceptions to the duty
e) Current account, deposits accounts, joint accounts and trust accounts
f) Special type of customers: lunatics, minors, agents, administrators and executors, partnership firm and companies

UNIT 3

a) Control by government and its agencies
b) Need for elimination of systematic risk
c) Avoidance of money laundering
d) Control by ombudsman

UNIT-4

a) R.B.I as central bank of India and its evolution
b) Characteristics and functions of central banks
c) Central bank as banker and advisor of the state
d) Central bank as bankers bank
e) Objectives and organizational structure of R.B.I
f) Regulations of the money system, Monopoly over Non- banking financial Institutions
g) Control and supervision of other banks

UNIT-5

a) Negotiable instruments and its kinds
b) Holder and holder in due course
c) Parties, payment in due course
d) Negotiation, presentment and discharge from liability
e) Dishonor
f) Civil liability, procedure for prosecution, extent of penalty
g) The paying bankers, duty to honour customer cheques, exceptions to the duty to honour cheques, money paid by mistake, good faith and statutory protection to the collecting banker

RECOMMENDED BOOKS

1. L.C. Goyle, The Law of Banking and Bankers (1995) Eastern.
2. M.L. Tannan, Tannan‟s Banking Law and Practice in India (1997) India Law House, New Delhi,2. Volumes
3. Singh, Avtar, laws of banking and negotiable instruments (easten book cco., 2007)
4. Paget, Law of banking, 13th Edition, (UK: Lexis Nexis,2007)

POs COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	2	2	1	-	1	2	-
CO2	2	2	1	1	-	1	-
CO3	2	3	2	2	1	1	2
CO4	2	3	1	-	-	2	1
CO5	2	-	1	-	-	1	1

LINGAYA'S VIDYAPEETH
NACHUALI, JASANA ROAD, FARIDABAD
BACHELOR OF LAW

LLB 318: CRIMINOLOGY

L-4, T-0 P-0 **Credits–4** **Max Marks: 100**

Objective- To determine the root causes of criminal behavior and to develop effective and humane means for addressing and preventing it. Criminology is related to but not identical to the field of criminal justice.

Course Outcome

CO1: To make student understand the theoretical and historical perspectives of criminology.
CO2: To familiarize students with White collar crime, Crime against Women and Children, Terrorism.
CO3: To analyze the key provision of juvenile delinquency.
CO4: To analyze the conceptual framework related to Indian crime reality.
CO5: To make aware of various punishments and its justification.

UNIT 1: Theoretical and Historical Perspectives of Criminology

1. Perspective of Crime and Criminal – Sin, Wrong and Crime – Changing concept of crime in varying social formations – Crime viewed through consensus or conflict perspectives
2. Relationship between Criminal Policy, Criminal Law and Criminology

UNIT 2: **Crime causation generally**

1. Prominent criminological thought currents – Classicalism, Positivism and Radicalism
2. Learning Theories of Causation – Differential Association Theory of Sutherland
3. Social Disorganization Theories – Durkheim, Merton
4. Psychodynamic Theory – Freud
5. Economic Theory of Crime

UNIT 3: INDIAN CRIME REALITY

1. Organized Crimes
2. Cyber Crime
3. Trafficking
4. Narcotic Trade
5. Money Laundering
6. Privileged Class Deviance

UNIT 4: **Juvenile Delinquency**

1. Concept of Juvenile Delinquency
2. Legal Position in India.

UNIT 5: PUNISHMENT AND ITS JUSTIFICATION

1. Theories of Punishment – Retribution, Deterrence, Reform and Prevention
2.Kinds of Punishment – with a special emphasis on Capital Punishment.
3. Probation as a form of Punishment.

RECOMMENDED BOOKS

1. David Garland, "Of Crimes and Criminals: The Development of Criminology in Britain", in Mike Maguire, Rod Morgan, Robert Reiner (ed.), The Oxford Handbook of Criminology (2nd ed., 1997) 09
2. George B. Vold, Thomas J. Bernard, Jeffrey B. Snipes, "Classical and Positivist Criminology", Theoretical Criminology (5th ed., 2002) 38 ii
3. Edwin H. Sutharland and Donald R. Cressey), "A Sociological Theory of Criminal Behavior", Criminology (10th ed.). 47
4. 1 The Juvenile Justice (Care and Protection of Children) Act, 2000 as amended by THE JUVENILE JUSTICE (CARE AND PROTECTION OF CHILDREN) AMENDMENT ACT,
2006 (No, 33 OF2006)
5. S.S. Srivastava, "Capital Punishment", Criminology and Criminal Administration (2nd ed. 2002) 89-99 123
6. Bushan Tilak Kaul, "Criminal Law", XXXVIII Annual Survey of Indian Law 181-226, 195-20 (2002)
7. The Probation of Offenders Act, 1958

MAPPING Cos WITH POs AND PSOs.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	1	-	-	2
CO3	1	-	1	-	-	-	-	-	-
CO4	1	2	1	1	1	1	-	-	-
CO5	-	1	-	-	-	-	-	-	-

LINGAYA'S VIDYAPEETH

NACHUALI, JASANA ROAD, FARIDABAD

B.B.A. LL.B

LLB 320 Human Rights Law

L-4, T-0 P-0

Credits–4

Max Marks: 60

Objective- The understanding of human rights is the foundation for the development of a good citizen and a responsible legal professional. The main objective of this course is to provide an insight into the meaning and significance of various human rights in the contemporary era and the mechanisms developed at the international and national level for protection and promotion of such rights.
This course attempts to increase the knowledge of law students with respect to human rights; to
focus their attention on the underlying values of human rights and to explore various international and national legal frameworks which embody human rights and promote them in
practice.

Course Outcome
On completion of the course students will be able to:

CO1: Understand the significance and basic concept of human rights,
CO2: Form linkage between human rights, fundamental rights and fundamental duties.
CO3: Learn different causes of human rights violation and how can justice be given to victims.
CO4: Learn about international treaties, conventions related to human rights.
CO5: Evaluate the relationship between international and municipal law on human rights.
CO6: Find the loopholes in human rights system and suggest changes.

LINGAYA'S VIDYAPEETH
SCHOOL OF LAW
SYLLABUS
LL.B. 3 YEARS PROGRAMME

SUBJECT: HUMAN RIGHTS LAW
SUBJECT CODE: LLB 320
CLASS: LL.B. 3RD YEAR
SEMESTER : VI

CREDIT: 4

Objective of the course:

The understanding of human rights is the foundation for the development of a good citizen and a responsible legal professional. The main objective of this course is to provide an insight into the meaning and significance of various human rights in the contemporary era and the mechanisms developed at the international and national level for protection and promotion of such rights.
This course attempts to increase the knowledge of law students with respect to human rights; to
focus their attention on the underlying values of human rights and to explore various
international and national legal frameworks which embody human rights and promote them in
practice.

UNIT I:
Introduction -
1. Meaning and Concept of Human Rights
2. History and Development of Human Rights
3. Basis of Protection and need for Protection of H.R.

UNIT II:
1. Universal Protection of Human Rights
2. U.N. Charter and Human Rights
3. U.N. bodies primarily concerned with Human Rights
4. Human Rights Council

5. The Universal Declaration of Human Rights
6. Key International Convention on Human Rights

UNIT III:

1. Regional System for Protection of Human Rights
2. The European Convention on Human Rights, 1950
3. The American Convention on Human Rights, 1969
4. Asian Human Rights Charter, 1998

UNIT IV:

1. Human Rights under Indian Law
2. Human rights and Indian Constitution
3. Role of Indian Judiciary

UNIT V:

1. National Human Rights
2. National Human Rights Commission
3. The Protection of Human Rights Act, 1993- Establishment, Powers and Functions of NHRC - Role of NHRC

BOOKS RECOMMENDED:

1. Bajwa, G.S. and D.K. Bajwa, Human Rights in India: Implementation and Violations, D.K. Publishers, New Delhi (1996).
2. Basu, D.D., Human Rights in Constitutional Law, Prentice Hall, New Delhi (1994).
3. Sehgal, B.P.Singh, ed., Human Rights in India: Problems and Perspectives, Deep and Deep Publications, New Delhi (1999).
4. S.K.Avesti and R.P.Kataria, Law Relating to Human Rights, Orient Publications, New Delhi (2000)
5. SK Kapoor, Human Rights under International and Indian Law, Central Law Agency, Allahabad. (1999)
6. HO Agarwal Human Rights, Central Law Publications, Allahabad, (12th Edn. - 2012)
7. Justice Palok Basu, Law Relating to Protection of Human Rights, Modern Law Publications, Allahabad (2002).
8. Sircar, V.K., Protection of Human Right in India, Asia Law House, Hyderabad (2004-05.)

TIL

Mapping of COs with Pos and PSOs

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	-	1	1	3	-	2	2
CO2	2	2	1	1	-	3	1	3	2
CO3	1	3	2	2	1	2	1	2	2
CO4	3	-	-	-	1	1	1	2	2
CO5	2	-	-	1	-	2	-	2	2
CO6	-	-	2	1	-	1	-	1	-

LINGAYA'S VIDYAPEETH
SCHOOL OF LAW
SYLLABUS
LL.B. 3 YEARS PROGRAMME
SUBJECT: DISSERTATION

SUBJECT CODE: LLB 352
CLASS: LL.B. 3RD YEAR
SEMESTER: VI

Course Objective:

The objective of the dissertation is to enable students to undertake Doctrinal/Empirical Research to acquire an in depth understanding of the problem identified and to suggest legal solutions for the same.

Course outcomes:

Students will be able to
CO1: Identify research methods.
CO2: State research questions.
CO3: Identify literature for review.
CO4: Critically analyze and evaluate the knowledge and understanding in relation to the agreed area of study.
CO5: Apply knowledge and understanding in relation to the agreed area of study.

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW
SYLLABUS
LL.B. 3 YEARS PROGRAMME
SUBJECT: INTERNSHIP
SUBJECT CODE: LLB 354

CREDIT: 4

Course Objectives

Through internship a law student gains practical experience and contemporaneously inculcates work ethics by interning either under a lawyer or a law firm or a government body participating in legal sphere or a research organization or any other legally-oriented institution. Prime objective is to prepare student to demonstrate desirable qualities & professional ethics to be employable in different fields related with legal profession.

Course Outcomes

On completion of this course the students will be able to:

CO1: Understand &conceptualize the procedural laws of the domestic Courts.

CO2: Gain useful background in the way a legal professional thinks and works in a legal professional workplace and the way that workplace operates.

CO3: Work under professional supervision with regards to legal matters.

O4: Exercise critical thinking and judgment in the context of developing advanced professional knowledge

CO5: Evaluate &analyze multilateral aspects related with the working of Judicial System of our country.

SCHEME FOR BBA-LL. B – 5 YEARS COURSE

BBA-LL.B			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BBALLB 101	Law of Contract-I	4	0	0	4
2	BBALLB 109	Legal Method (jurisprudence-I)	4	0	0	4
3	BBALLB 111	Principles of Management	4	0	0	4
4	BBALLB 112	Financial accounting	4	0	0	4
5	BBALLB 113	Business Economics	4	0	0	4
6	BBALLB 401	Business Statistics	4	0	0	4
7	PDG 101	Professional Development& Grooming	4	0	2	1
		Total	24		2	25

BBA-LL.B			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BBA LLB 102	Law of Contract-II	4	0	0	4
2	BBA LLB 104	Law of Torts and Consumer Protection Act	4	0	0	4
3	BBA LLB 121	Cost accounting	4	0	0	4
4	BBA LLB 124	Business Organization & Environment	4	0	0	4
5	bba llb 108	Financial Management	4	0	0	4
6	BBA LLB 122	legal English -I	4	0	0	4
7	BBA LLB 114	Social Service: Legal Awareness	0	2	0	1
		Total	24	2	0	25

SCHEME FOR BBA-LL. B – 5 YEARS COURSE

BBA-LL.B			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BBA LLB 212	Marketing Management	4	0	0	4
2	BBA LLB 214	Human Resource Management	4	0	0	4
3	BBALLB 201	Family Law-I	4	0	0	4
4	BBA LLB 203	Constitutional law-I	4	0	0	4
5	BBA LLB 205	Law of crimes-I (IPC-I)	4	0	0	4
6	BBA LLB 207	Integrated Disaster Management	4	0	0	4
7	BBA LLB 241*	Comprehnsive Viva	0	0	2	1
		Total	24		2	25

BBA-LL.B			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BBALLB 212	Financial Management	4	0	0	4
2	BBA LLB 222	Strategic Management	4	0	0	4
3	BCS 201	Management Information System	4	0	0	4
4	BBA LLB 202	Family Law -II	4	0	0	4
5	BBA LLB 204	Constitutional law-II	4	0	0	4
6	BBA LLB 206	Public International Law	4	0	0	4
7	PDP 201	Personality development & Grooming	0	2	0	1
		Total	24	2	0	25

SCHEME FOR BBA-LL. B – 5 YEARS COURSE

BBA-LL.B			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BMA 403	Operation Management	4	0	0	4
2	BBALLB 311	Service Marketing	4	0	0	4
3	BBA LLB 301	Law of Crime -I: Indian Penal Code	4	0	0	4
4	BBA LLB 303	Corporate Law	4	0	0	4
5	BBA LLB 305	Labour & Industrial Law-II	4	0	0	4
6	BBA LLB 307	Professional Ethics, Lawyer's Accountability & Bar-Bench Relation (Theory)	4	0	0	4
7	BBA LLB 351*	Professional Ethics, Lawyer's Accountability & Bar-Bench Relation (Practical)	0	2	0	1
		Total Credit	24	2	0	25

BBA-LL.B			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BBA LLB 223	Entrepreneurship Deveelopment	4	0	0	4
2	BBALLB 225	Sales and Distribution Management	4	0	0	4
3	BBA LLB 302	Law of Crime-II: Criminal Procedure Code	4	0	0	4
4	BBA LLB 304	Law relating to Right to Information	4	0	0	4
5	BBALLB 306	Labour & Industrial Law-II	4	0	0	4
6	BBA LLB 308	Arbitration, Conciliation & Alternative Dispute Resolution Systems(Theory)	4	0	0	4
7	BBA LLB 352*	Arbitration, Conciliation & Alternative Dispute Resolution Systems(Practical)	0	2	0	1
		Total	24	2	0	25

SCHEME FOR BBA-LL. B – 5 YEARS COURSE

BBA-LL.B			Semester			VII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BBALLB 313	Project Management	4	0	0	4
2	BBA LLB 401	Property Law	4	0	0	4
3	BBA LLB 403	Law of Evidence	4	0	0	4
4	BBALLB 405	Principles of Taxation	4	0	0	4
5	BBA LLB 407	Land Laws including Ceiling and other Local Laws	4	0	0	4
6	BBA LLB 409	Drafting, Pleading and Conveyancing (Theory)	4	0	0	4
7	BBA LLB 451	Drafting, Pleading and Conveyancing (Practical)	0	2	0	1
		Total	24	2	0	25

BBA-LL.B			Semester			VIII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BBA LLB 315	Goods and Services tax (GST)	4	0	0	4
2	BBA LLB 402	Civil Procedure Code. 1908 (Including Limitation act 1963 &specific Relief act 1963)	4	0	0	4
3	BBA LLB 404	Intellectual Property Law	4	0	0	4
4	BBA LLB 406	Information Technology and Cyber Laws	4	0	0	4
5	BBA LLB 408	Administrative Laws	4	0	0	4
6	BBA LLB 452*	Moot Cour, Pre-Trial preparation an Participation in Trial Proceeding (including Interviewing Techniques)	2	6	0	5
		Total	22	6		25

SCHEME FOR BBA-LL. B – 5 YEARS COURSE

BBA-LL.B			Semester			IX
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BBA LLB 501	Banking & insurance Laws	4	0	0	4
2	BBA LLB 503	Investment Law	4	0	0	4
3	BBA LLB 505	Financial mrket Regulation	4	0	0	4
4	BBA LLB 507	Foreign Trade	4	0	0	4
5	BBA LLB 509	Transportation Laws	4	0	0	4
6	BBA LLB 551*	Internship (lawyer/law firms)	0	10	0	5
		Total	20	10	0	25

BBA-LL.B			Semester			X
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	**BBA LLB 502**	**Bankruptcy & Insolvency**	**4**	**0**	0	4
2	**BBA LLB 504**	**Corporate Governance**	**4**	**0**	0	4
3	**BBA LLB 506**	**Mergers and Acquisitions**	**4**	**0**	0	4
4	**BBA LLB 508***	**Equity and Trust**	**4**	**0**	0	4
5	**BBA LLB 510***	**Law of Project Finance**	**4**	**0**	0	4
6	**BBA LLB 552**	**Dissertation and Viva Voce**	**0**	**10**	0	5
		Total	**20**	**10**		**25**

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BBA LL.B. 5 YEARS

IST SEMESTER

Program Educational Objectives (PEO)

PEO 1: Students will be able to acquire basic knowledge and expertise necessary for law practices for higher studies and research

PEO 2: Students will be able to attain and practice technical skills to identify, analyze and solve complex problems and issues related to law and society.

PEO 3: Students will be able to possess a professional attitude as an individual or a team member with consideration for society, professional ethics, environmental factors and motivation for life-long learning

B.B.A. LL.B (5 years course)

PROGRAM OUTCOMES

Program Outcome 1

Students will demonstrate conceptual knowledge in core areas of law.

Program Outcome 2

Students will effectively apply their learnings to practical legal issues

Program Outcome 3

Students will be able to exhibit effective law professional skills, employing oral and written communication, legal research, analysis, rationalization and critical-thinking.

Program Outcome 4

Students will show sensitivity towards ethical, moral and social issues arising in their professional career.

Program Outcome 5

Students will exhibit commitment, teambuilding, networking, leadership and lifelong learning skills to excel in legal world.

PROGRAM SPECIFIC OUTCOMES:

PSO 1: Students will be able to demonstrate conceptual knowledge of law and develop legal reasoning.

PSO 2: Students will be able to demonstrate integrated knowledge of legal principles and social science.

PSO 3*:* Students will be able to exhibit skills in practices and procedures of law.

Mapping of Program Outcomes with Program Educational Objectives

	PEO1	PEO2	PEO3
PO1	3	3	3
PO2	2	2	2
PO3	3	3	2
PO4	3	3	3
PO5	2	2	2
PSO1	2	3	2
PSO2	3	3	3
PSO3	2	2	3

1=weakly mapped
2= moderately mapped
3=strongly mapped

Mapping of PEOs with Mission Statements

PEO Statements	School Mission 1	School Mission 2	School Mission 3	School Mission 4	School Mission 5	School Mission 6
PEO1:	3	3	3	3	3	3
PEO2:	3	2	2	2	2	3
PEO3:	3	3	2	2	2	2

1=weakly mapped, 2= moderately mapped, 3=strongly mapped

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Principles of Management
Subject Code : BBALLB 111
Class : BBA LL.B. I YEAR
Semester : I
Credit : 4

Course Objectives: The course aims at providing fundamental knowledge and exposure to the concepts, theories and practices in the field of management.

Outcomes: At the completion of the course the students will be able to integrate management principles into management practices. It will also help them to evaluate the global context for taking managerial actions of planning, organizing and controlling.

Course Contents

Unit I: Lectures: -14
Introduction: Concept, Nature, Process and Significance of Management; Managerial levels, skills, Functions and Roles; Management vs. Administration; Coordination as Essence of Management; Development of Management Thought: Classical, Neo-Classical, Behavioral, Systems and Contingency Approaches.

Unit II: Lectures: -16
Planning: Nature, Scope and Objectives of Planning; Types of plans; Planning Process; Business Forecasting; MBO: Concept, Types, Process and Techniques of Decision-Making; Bounded Rationality.
Organizing: Concept, Nature, Process and Significance; Principles of an Organization; Span of Control; Departmentation; Types of an Organization; Authority-Responsibility; Delegation and Decentralization; Formal and Informal Organization.

Unit III: Lectures: -16
Staffing: Concept, Nature and Importance of Staffing.
Motivating and Leading: Nature and Importance of Motivation; Types of Motivation; Theories of Motivation: Maslow, Herzberg, X, Y and Z; Leadership: Meaning and Importance; Traits of a leader; Leadership Styles – Likert's Systems of Management, Tannenbaum & Schmidt Model and Managerial Grid.

Unit IV: Lectures: -6

Controlling: Nature and scope of Control; Types of Control; Control Process; Control Techniques – Traditional and Modern; Effective Control System.

Text Books

1. *Robbins, (2009). Fundamentals of Management: Essentials Concepts and Applications, 6th edition, Pearson Education.*
2. *Stoner, Freeman and Gilbert Jr. ((2010) Management, 8th Edition, Pearson Education.*
3. *Koontz, H. (2008), Essentials of Management, McGraw Hill Education.*
4. *Gupta, C.B. (2008), Management Concepts and Practices, Sultan Chand and Sons, New Delhi.*
5. *Ghilyer, A, W., (2008) Management- A Real World Approach, McGraw Hill Education.*

Mukherjee, K, (2009), Principles of Management, 2nd Edition, McGraw Hill Education

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3
CO1	1	-	2	-	-	1	-	-	2
CO2	2	-	-	-	-	-	-	-	2
CO3	1	2	1	1	1	1	1	-	3
CO4	2	3	1	3	3	2	1	-	3
CO5	2	2	2	1	-	-	-	-	3

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Business Statistics
Subject Code : BMA401
Class : BBA LL.B.
Semester : I
Credit : 4

Course Objective: The central **objective** of the undergraduate major in **Statistics** is to equip students with consequently requisite quantitative skills that they can employ and build on in flexible ways.

UNIT 1
Population and Sample: Definition of Statistics, Scope of Statistics in Economics, Management Sciences and Industry. Concept of population and sample with illustration. Methods of Sampling – SRSWR, SRSWOR, Stratified, Systematic. (Description of sampling procedures only)

UNIT II
Data Condensation and graphical Methods: Raw data, attributes and variables, classification, frequency distribution, cumulative frequency distributions; Graphs - Histogram, Frequency polygon. / Diagrams - Multiple bar, Pie Subdivided bar.
Measures of Central Tendency: (6)
Criteria for good measures of central tendency, Arithmetic mean, Median and Mode for grouped and ungrouped data, combined mean.

UNIT III
Measures of Dispersion: Concept of dispersion, Absolute and relative measure of dispersion, Range, Variance, Standard deviation, Coefficient of variation, Quartile Deviation, Coefficient of Quartile deviation.

UNIT IV
Correlation and Regression (for ungrouped data): Concept of correlation, positive & negative correlation, Karl Pearson's Coefficient of correlation, meaning of regression, Two regression equations, Regression coefficients and properties.

Recommended Books:

1. S.C. Gupta – Fundamentals of Statistics - Sultan chand & Sons, Delhi.
2. D.N. Elhance – Fundamentals of Statistics – Kitab Mahal, Allahabad.
3. Satayanarayana, Lalitha Raman- Management opertions Research.

Course Outcome

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	1	-	-	-	-	2	-
CO2	-	1	-	1	-	-	-	-	-
CO3	2	-	1	-	-	-	-	1	2
CO4	3	1	2	-	1	1	-	1	1
CO5	1	1	2	-	-	-	-	-	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Financial Accounting
Subject Code : BBALLB 112
Class : BBA LL.B.
Semester : I
Credit : 4

Objectives: The objective of this subject is to give understanding of the basic accounting principles and techniques of preparing the accounts for users of accounting information.

Course Contents

Unit I **Hours: -10**

Meaning and Scope of Accounting: Objectives and nature of Accounting, Definition and Functions of Accounting, Book Keeping and Accounting, Interrelationship of Accounting with other Disciplines, Branches of Accounting, Limitation of Accounting,
Accounting Principles and Standards: Accounting Principles, Accounting Concepts and Conventions, Meaning and relevance of GAAP, Introduction to Accounting Standards Issued by ICAI.

Unit II **Hours: -10**

Journalizing Transactions: Journal Entries, compound Journal entries, Opening Entry.
Ledger Posting and Trial Balance: Preparation of Ledger, Posting, Cash book, Sales and Purchase book and Trial Balance.
Company Final Accounts: Preparation of Final Accounts with adjustments, Trading Account, Profit & Loss Account, Balance Sheet.

Unit III **Hours: -12**

Depreciation Provisions and Reserves: Concept of Deprecation, Causes of Depreciation, Basic Features of Depreciation, Meaning of Depreciation Accounting, Objectives of Providing Depreciation, Fixation of Depreciation Amount, Method of Recording Depreciation, Methods of Providing Depreciation, Depreciation Policy, AS-6 (Revised) Provisions and Reserves, Change of method of Depreciation (by both current and retrospective effect).

Contemporary Issues &Challenges in Accounting: Human Resource Accounting, Green Accounting, Inflation Accounting, Price level Accounting, Social Responsibility Accounting

Unit IV **Hours: -12**

Shares and Share Capital: Introduction to Joint Stock Company, Shares, Share Capital, Accounting Entries, Under Subscription, Oversubscription, Calls in Advance, Calls in

Arrears, Issue of Share at Premium, Issue of Share at Discount, Forfeiture of Shares, Surrender of Shares, Right Shares.

Issue and Listing of Securities: Stock Exchange of India, Control of SEBI, Regulating business in stock exchange (Elementary Knowledge only).

Text Books

1. Tulsian, P.C., (2012) Financial Accountancy, Pearson Education.
2. Maheshwari, S.N. and Maheshwari, S. K., (2012) An Introduction to Accountancy, Vikas Publishing House

Reference Books

1. Bhattacharyya, Asish K., (2010) Essentials of Financial Accounting, Prentice Hall of India.
2. Rajasekran, (2012), Financial Accounting, Pearson Education.
3. Bhattacharya, S.K. and Dearden, J., (2010) Accounting for Manager – Text and Cases. VKP

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Business Economics
Subject Code : BBALLB 113
Class : BBA LL.B. I YEAR
Semester : I
Credit : 4

Objectives: The objective of this subject is to give understanding of the basic concepts and issues in business economics and their application in business decisions.

Learning Outcomes-

1. Make decisions using marginal analysis and opportunity costs.
2. Use supply and demand to determine changes in market equilibrium (price and output), changes in welfare, and analyze the impact of government policies.
3. Understand the relationship between marginal utility and price in equilibrium.
4. Develop cost functions from production functions.
5. Be able to determine the profit maximizing price and output for a firm operating in a competitive environment.
6. Develop and evaluate the impact of government regulations.
7. Be able to apply the concepts of supply and demand to markets with external costs and benefits (understand market failure, implications for regulation, optimal pollution level).

Course Contents

Unit I **Hours: -10**

Introduction to Business Economics and Fundamental concepts: Nature, Scope, Definitions of Business Economics, Difference between Business Economics and Economics, Contribution and Application of Business Economics to Business. Micro vs. Macro Economics. Opportunity Costs, Time Value of Money, Marginalism, Incrementalism, Market Forces and Equilibrium, Risk, Return and Profits.

Unit II **Hours: -12**

Consumer Behavior and Demand Analysis:

Cardinal Utility Approach: Diminishing Marginal Utility, Law of Equi-Marginal Utility. Ordinal Utility Approach: Indifference Curves, Marginal Rate of Substitution, Budget Line and Consumer Equilibrium. Theory of Demand, Law of Demand, Movement along vs. Shifting Demand Curve, Concept of Measurement of Elasticity of Demand, Factors affecting Elasticity of Demand, Income Elasticity of Demand, Cross Elasticity of Demand, Advertising Elasticity of Demand. Demand Forecasting: Need, Objectives and Methods (Brief)

Unit III **Hours: -12**

Theory of Production: Meaning and Concept of Production, Factors of Production and Production function, Fixed and Variable Factors, Law of Variable Proportion (Short Run Production Analysis), Law of Returns to a Scale (Long Run Production Analysis) through the use of ISOQUANTS.

Unit IV **Hours: -10**

Cost Analysis &Price Output Decisions: Concept of Cost, Cost Function, Short Run Cost, Long Run Cost, Economies and Diseconomies of Scale, Explicit Cost and Implicit Cost, Private and Social Cost. Pricing under perfect competition, Pricing under Monopoly, Control of Monopoly, Price Discrimination, Pricing Under Monopolistic Competition, Pricing Under Oligopoly.

TextBooks:

1. *Samuelson, P &Nordhaus, W. (2010) Economics, McGraw Hill Education.*
2. *Dwivedi, D.N.(2010) Managerial Economics, Vikas Publishing House.*

Reference Books:

1. *Salvatore, D. (2014) Managerial Economics in a Global Economy, Oxford University Press.*
2. *Kreps, D. (2010) Microeconomics for Managers, Viva Books Pvt. Ltd.*
3. *Mankiw, NG, (2011), Principles of Economics, Cengage Learning.*
4. *Peterson, L. and Jain (2012), Managerial Economics, Pearson Education.*

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Law of Contract I
Subject Code : B.B.A LL.B 101
Class : BBA LL.B. I YEAR
Semester : I
Credit : 4

Objective: -The objective of this paper is to make students familiar with various principles of contract formation enunciated in the Indian Contract Act, 1872.

UNIT-I

1. Definition of Contract, Agreement, Offer, Acceptance and Consideration (Section-2)
2. Communication and Revocation of Offer and Acceptance (Section 3-9),
3. Essentials of Contract (Section 10).
4. Competency to Contract (Section 11-12)
5. Leading Case: Lalman Shukla V. Gauri Dutt (1913) 11 ALL L.J. 489

UNIT-II

1. Consent, Free Consent, Consent by Coercion, Undue Influence, Fraud, misrepresentation and mistake (Section 14-22),
2. Legality of object and consideration (section 23-24),
3. Void Agreements (Section 25-30),
4. Contingent Contracts (Section 31-36)
5. Leading Case: Mohiri Bibee Vs. Dharmodas Ghose (1903) 30 I.A. 114 (PC)

UNIT-III

1. Contract which must be performed (Section 37-39),
2. By whom contract must be performed (Section 40-45),

UNIT-IV

1. Time and Place for performance of Contract (Section 46-50)
2. Performance of Reciprocal Promises (Section 51-55),
3. Discharge or Contract (Section 56-57).

UNIT-V

1. Certain Relations resembling to those created by Contract (Section 68-72)
2. Certain Relations resembling to those created by Contract (Section 73-75).
3. Privity of contract.
4. Contract which can be enforced.
5. Alternation and Enovation of contract
6. Remedies against breach of contract.

BOOKS RECOMMENDED

1. *AS. Dalal. Law of Contract, The Specific Relief Act (Bright Law House, Ist Ed. 2015)*
   pollock &Mulla, 1ne maan Contract Ac, 1872, (Lexis Nexis, Nagpur, 14th Ed. 201 3)
2. *S K. Kapoor, Law Contract-I & The Specific Relief Act, (Central Law Agency, Allahabad, 13th Ed. 2013)*
3. *Avatar Singh, Law of Contract and Specific Relief Act, 1963, (Eastern Book Company, Lucknow, 12th Ed. 2017)*
4. *R. K. Bangia, Indian Contract Act, (Allahabad Law Agency, Allahabad, 14th Ed. 2015*
   Ritu Gupta, Law of Contract includes The Specific Relief Act, 1963, (LexisNexis, New Delhi, Ist Ed. 2015)

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO3
CO1	3	-	-	-	-	2	2
CO2	-	2	2	1	-		2
CO3	-	2	2	1	-	-	3
CO4		3	2	2	2	-	3
CO5	-	2	2	1	2	2	3

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Jurisprudence (Legal methods, Indian Legal systems and Basic Theory of Laws)
Subject Code : LLB 109
Class : B.B.A LL.B. I YEAR
Semester : I
Credit : 4

Objectives: -It includes sources of Law, Administration of Justice, Law and Morality, Schools of Jurisprudence, Legal Rights and Duties, Ownership and Possessions, Legal Personality, Obligation and Liability etc. The subject is very important for Law Students as it helps in understanding the evolution and nature of Law and the fundamental functions of Law from different perspectives. Moreover, the students are also exposed to the information relating to functioning of various legal systems. This helps in making laws and tackling socio-legal problems prevalent in our country by studying the remedial measures in India.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understand &Conceptualize the evolution, meaning & scope of the legal systems.

CO2: Understand & Critically analyze the concept related to various sources of law.

CO3: Understand & Critically analyze the concept related with Socio-Economic Approach and philosophy.

O4: Critically analyze & Evaluate the concepts related with legal aid & Lok Adalat.

CO5: Evaluate & Comparative Analysis of the multilateral aspects of the Legal system of India, U.K. & U.S.A.

Course Outline

Unit I:

3. Definition, nature and province/scope of Jurisprudence
4. Theory of Natural Law and jurisprudence,
5. Analytical school- Austin's theory of Law, Kelson's pure theory of Law, Bentham's theory of Law.

Unit II:

4. Historical school
5. Sociological School
6. Realist school

Unit III:

3. Administration of Justice
4. Socio-Economic Approach and Philosophy: Law and Social Change, Legal Aid & Public Interest Litigation

Unit IV:

Sources of law —

4. Custom
5. Precedent
6. Legislation

Unit V:

4. Rights and Duties
5. Possession and Ownership
6. Persons

BOOKS RECOMMENDED-

10. *B.S: Mani Tripathi, The Legal Theory, (Allahabad Law Agency, Allahabad, 18th Ed. 2012)*
11. *N.V. Paranjapai, Studies in Jurisprudence and Legal Theory, (Central Law Agency, Allahabad 7thEd.2013)*
12. *Nomita Aggarwal, Jurisprudence, (Central Law Agency, Allahabad, 10th Ed. (rep)2016)*
13. *S.P: Dwivedi, Jurisprudence & Legal Theory, (Central Law Agency, Allahabad 7th Ed. 2017)*
14. *Salmond, John William, Sir, Jurisprudence or the theory of the law, (Hard Press Publishing (2013)*
15. *R.W.M. Dias, Jurisprudence, (Jain Law Book Agency, Delhi, 12th Edition, 20 14)*
16. *Edgar Bodenheimer, Jurisprudence, (Harvard University Press, 1974 (Revised Ed.)*
17. *Amartya Sen, The Idea of Justice, (Cambridge, Mass.: Belknap Press/Harvard University Press, Ed. 2009)*
18. *Granville Austin, Indian Constitution, (The Cornerstone of a Nation, New Delhi, Oxford University Press, Ed. 2007)*

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3
CO1	1	-	2	-	-	1	-	-	2
CO2	2	-	-	-	-	-	-	-	2
CO3	1	2	1	1	1	1	1	-	3
CO4	2	3	1	3	3	2	1	-	3
CO5	2	2	2	1	-	-	-	-	3

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Professional Development and grooming
Subject Code : PDG101
Class : B.B.A LL.B. I YEAR
Semester : I
Credit : 1

Objectives

1. To develop the skills of the professional undergraduate students for proper self expression, social communication, spoken English, correct pronunciation, voice modulation and business etiquettes.
2. The students should improve their personality, communication skills and enhance their self-confidence.

Course Contents

Unit-I **Lectures:-12**

Fundamental of Grammar and their Usage: How To Improve Command Over Spoken and Written English with Stress on Noun, Verb, Tense and Adjective. Sentence Errors, Punctuation, Vocabulary Building to Encourage the Individual to Communicate Effectively, Common Errors in Business Writing.

Unit-II **Lectures:-14**

Introduction to Business Communication: Basic Forms of Communication, Process of Communication, Principles of Effective Business Communication, 7Cs; Media of Communication: Types of Communication: Barriers of Communication (Practical exercise in communication)

Unit-III **Lectures:-14**

Business letter writing: Need, Functions and Kinds, Layout of Letter Writing, Types of Letter Writing: Persuasive Letters, Request Letters, Sales Letters, Complaints and Adjustments; Departmental Communication: Meaning, Need and Types: Interview Letters, Promotion. Letters, Resignation Letters, News Letters, Circulars, Agenda, Notice, Office Memorandums, Office Orders, Press Release.

Unit-IV **Lectures:-12**

Business Etiquettes and Public Speaking:

Business Manners. Body Language Gestures, Email and Net Etiquettes, Etiquette of the Written Word, Etiquettes on the Telephone, Handling Business Meetings; Introducing Characteristic, Model Speeches, Role Play on Selected Topics with Case Analysis and Real Life Experiences.

Text Books:

1. *Boove, C.L., Thill, J.V., and Chaturvedi, M., (2009) Business Communication Today, Pearson Education.*
2. *Murphy and Hildebrandt, (2008) Effective Business Communication, McGraw Hill Education.*

Reference Books:

1. *Krizan, A. C. Buddy, and Merrier, Patricia (2008) Effective Business Communication, 7th Edition, Cengage Learning.*
2. *Lesikar, (2009), Business Communication: Making Connections in a Digital World, McGraw Hill Education.*
3. *McGraw, S. J., (2008) Basic Managerial Skills for Al, 8th edition, Prentice Hal of India.*
4. *Wren & Martin, (2008), English Grammar and Composition, Sultan chand & Sons.*

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

B.B.A.L.L.B 5 YEARS

II SEMESTER

LINGAYA'S UNIVERSITY

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

SUBJECT : Law of contract-II
SUBJECT CODE : BBALLB102
CLASS : B.B.A LL.B. I YEAR
SEMESTER : II
CREDIT : 4

Objective:- This paper will impart comprehensive information on indemnity, guarantee, agency, partnerships, sale of Goods Act and Negotiable instrument.

Course Outcome
On completion of this course, the students will be able:

CO1: To analyze the concept and nature of Indemnity and Guarantee.
CO2. To Differentiate between Pledge and Bailment.
CO3. To familiarize Kinds of Agency, Rights and duties of agent.
CO4. To analyze the concept of Contract of sale.
CO5. To analyze the Formation of Partnership, Rights and Duties of partners.

Unit-1:

(A)Indemnity

A) The concepts
B) Need for indemnity to facilitate commercial transactions.
C) Definition of Indemnity
D) Nature and extent of liability of the indemnifier
E) Commencement of liability of the indemnifier
F) Situations of various types of indemnity creations.
G) Agreements of indemnity

(B) Guarantee

A) Definitions of guaranted as distinguished from indemnity
B) Basic essentials for, a valid guarantee contract.
C) Continuing guarantee.
D) Nature of surety's liability -Duration and termination of such liability
E) Creation and identification of continuing guarantees.
F) Rights of surety
G) Co-surety and manner of sharing liabilities and rights.
H) Extent of surety's liability.
I) Discharge of surety's liability

Unit-2:

A) Bailment

1. Manner of creation of Bailment contracts
2. Commercial utility of bailment
3. Definition of Bailment
4. Kinds of Bailees
5. Duties of Bailor and Bailee towards each other
6. Rights of bailor and bailee
7. Finder of goods as a bailee

a. Liability towards the true owner
b. Obligation to keep the goods safe
c. Right to dispose off the goods.

(B)Pledge

1. Pledge comparison with bailment
2. Commercial utility of pledge transactions
3. Definition of pledge under the Indian contract Act
4. Other statutory regulations(State & Centre)regarding pledge, reasons for the same
5. Rights of the pawner and pawnee.
6. Pledge by certain specified persons mentioned in the Indian Contract Act.

Unit: 3: Agency

1. Identification of different kinds of agency transactions in day to day life in the commercial world
2. Kinds of agents and agencies Distinction between agent and servant.
3. Essentials of a agency transaction
4. Various methods of creation of agency
5. Delegation
6. Duties and rights of agent
7. Scope and extent of agent's authority.
8. Liability of the principal tor acts of the agent including misconduct and tort of the agent.
9. Liability of the agent towards the principal
10. Personal liability towards the parties
11. Methods of termination of agency contract

Unit-4 : Sale of Goods

1. Concept of sale as a contact
2. Illustrative instances of sale of goods and the nature of such contracts.
3. Essentials of contract of sale

4. Essential conditions in every contract of sale
5. Implied terms in contract of sale
6. The rule of caveat emptor and the exceptions thereto under the Sale of Goods Act.
7. Changing concept of caveat emptor
8. Effect and meaning of implied warranties in a sale
9. Transfer of title and passing of risk
10. Delivery of goods various rules regarding delivery of goods
11. Unpaid seller and his rights
12. Remedies for breach of contract

Unit-V Partnership:

1. Nature of partnership: definition
2. Distinct advantages and disadvantages vis-a-vis partnership and private limited company
3. Mutual relationship between partners
4. Authority of partners
5. Admission of partners.
6. Outgoing of partners.
7. Registration of Partnership
8. Dissolution of Partnership

Referred Case Laws:

1. United India Insurance Company v M/s Aman Singh Munshilal AIR 1994 P& H 206
2. State Bank of India MulaSahakari Sakharkarkhana Ltd, AIR 2007 SC 2361
3. Bank of Bihar vs Damodar Prasad, AIR 1969 SC 297
4. Syndicate Bank v ChannaveerappaBaleri AlR 2006 SC 1874
5. Sita Ram Gupta v Punjab National Bank. AIR 2008 SC 2416
6. AmritLal v State Bank of Travancore AIR 1968 SC 1432
7. State of M. P. v Kaluram AIR 1967 SC 1105
8. Mahadeodas y Gherulal Parekh AIR 1958 Cal 703
9. Cox v Hickman (1860) S H.L.C. 268

Book Recommendation:

- *Avtar Singh. Law of Contract and Specific Relief, Eastern Book company, 2013 (11thEdn)*
- *Pollock &Mulla, Indian Contract and Specific Relief Act, Lexis nexis, @013 (14thEdn)*
- *S.K. Kapoor, Contract- II, Central Law Agency, 2015*
- *B.M. Prasad and Manish Mohan, Khergamvala on the Negotiable Instrument Act, 2013, Lexis Nexis, 2013 (21stEdn)*
- *P. Mulla, The Sale of Goods and Indian Partnership Act, Lexis, Nexis, 2013 (10 Edn)*
- *Bhashyam and Adiga, The Negotiable Instruments Act (19956), Bharath, Allahbad.*
- *M.S. Parthasarathy (ed.), J.S. Khergamvala, The Negotiable Instrument act.*
- *J.P. Verma (ed.), Singh and Gupta, The Law of partnership in India (1999), Orien Law House, New Delhi.*

MAPING COs WITH POs AND PSOs

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	**PSO3**
CO1	3	1	-	-	3	-	2	2	**2**
CO2	2	-		-	3	-	1	1	**2**
CO3	2	-	1	1	2	1	2	2	**3**
CO4	3	2	2	1	3	-	2	3	**3**
CO5	2	-	-	-	1	1	3	2	**3**

- **Modes of Evaluation:**

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

- **Internal Examination:**

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

LINGAYA'S UNIVERSITY

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

SUBJECT : Law of Torts & Consumer Protection
SUBJECT CODE : B.B.A LL.B104
CLASS : B.B.A LL.B. I YEAR
SEMESTER : II
CREDIT : 4

OBJECTIVE

The Law of Torts is primarily concerned with redressal of wrongful civil actions by awarding compensation. In a society where men live together, conflict interests are bound to occur and they may from time to time cause damage to one or the other. In addition with the rapid industrialization tortious liability has come to be used against manufacturers and industrial units. As the Law of Torts is basically a Judge made law, students are required to study it in the light of judicial pronouncements. They are required to equip themselves with the latest developments extending to the entire course.

This paper is to make students understand the nature of Torts and conditions of liability with established cases along with the Motor Vehicle Act,1988 and Consumer Protection Act 1986.

Course Outcome :

On completion of this course, the students will be able to

CO1: Analyse the foundational principles of law of tort and consumer protection act.

CO2: To make students aware of relevant cases relating to tort law.

CO3: To familiarize the students difference between civil wrong and criminal wrong

CO4: Students will be aware of basic procedure for handling consumer dispute

CO5: Students will have comprehensive undertaking about existing law on consumer protection in India.

UNIT-I:

1. Nature & Definition of Tort
2. Motive,
3. Capacity
4. Joint Tort feasors
5. General defences,

UNIT-II:

1. Vicarious liability,
2. Remoteness of Damage
3. Extinction of liability,
4. Strict liability and Absolute liability,

UNIT-III:

1. Negligence
2. Nervous shock
3. Nuisance

UNIT-IV:

1. Trespass to land and goods
2. Defamation,
3. Assault & Battery

UNIT-V:

1. Evolution of Consumer Law,
2. The Consumer Protection Act, 1986
3. Remedies under Motor Vehicle Act

TEXTBOOKS:

1) Ratanlal and Dhirajlal- Law of torts

2) RK Bangia-Law of torts

3) The Law of Torts (Lexis-Nexis, 10th Ed. 2007)

Catalog Description

Law of torts deals with the general principles of the Law of torts. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Cost Accounting
Subject Code : BBALLB 121
Class : BBA LL.B. Ist YEAR
Semester : II
Credit : 4

Objectives: The primary objective of the course is to familiarize the students with the basic cost concepts, allocation and control of various costs and methods of costing.

Course Contents

Unit I
Hours: 12
Meaning and Scope of Cost Accounting: Basic Cost Objectives and scope of cost accounting, Cost centers and cost units, Difference between financial, cost and management accounting. Basic Cost concepts - Cost classification and elements of cost.
Materials Control: Meaning, Steps Involved, Materials and Inventory, Techniques of Material/Inventory Control (EOQ, FSND, ABC, Stock Levels, JIT, VED), Valuation of Inventory (FIFO, LIFO, Weighted average); Practical's of EOQ, stock levels, FIFO, LIFO

Unit II
Hours: 12
Labour Cost: Attendance and payroll procedures, overtime, idle time and incentives, direct and indirect labour, remuneration systems and incentive schemes (Halsey, Rowan, Taylor, Merrick, Bedaux, Emerson plans practical).
Overheads: Functional analysis – factory, administration, selling, distribution, research and development, fixed, variable, semi variable and step cost; Factory overheads, Administration overheads and selling and distribution overheads (in brief about types of overheads). (Overhead rate, Machine rate, under & over absorption practical).

Unit III **Hours: 10**
Cost Sheet – Preparation of Cost Sheet (simple problems).
Process Costing - Meaning and computation of normal profits, abnormal effectives and abnormal loss.

Unit IV **Hours: 10**
Contract Costing: Progress payments, retention money, escalation clause, contract accounts, accounting for material, accounting for plant used in a contract, contract profit and balance sheet entries.
Operating Costing (basic problems related to transport only).

Text Books

1. Maheshwari, S. N. and Mittal, S. N. (2015), Cost Accounting – Theory and Problems, Shri Mahavir Book Depot.
2. Arora, M.N., (2012), Cost Accounting, Vikas Publishing House.

Reference Books

1. Lal, Jawahar and Srivastava, Seema, (2013), Cost Accounting, McGraw Hill Education.
2. Pandey, I.M., (2014), Management Accounting, Vikas Publishing House, Delhi.
3. R. Palaniappn & Hariharan;(2012),Cost Accounting Theory & Practices, I.K. International Publishing House, Delhi.

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Business Organization and Environment
Subject Code : BBALLB 124
Class : BBA LL.B. I YEAR
Semester : II
Credit : 1

Objective- To enable the students in terms of understanding the various concepts related to business organizations and administrative aspects

UNIT I

BUSINESS ORGANIZATION: Concept, nature and scope of business, business objectives, distinction between business, commerce and trade; Forms of business organization –Sole proprietorship, partnership, joint stock company, joint Hindu family; types of company-cooperative societies; multinational corporations.

UNIT II

BUSINESS COMBINATIONS & ASSOCIATIONS: Concept and causes of business combinations between government and business; Types and forms of combinations; chambers of commerce and industries in India – FICCI, CII Association, ASSOCHAM, AIMO etc..

UNIT III

BUSINESS ENVIRONMENT: Nature, components and determinants of business environment; basic nature of Indian economic system; growth of public and private corporate sector; social responsibility of business; economic reforms since 1991 – an overview. Review of industrial policy developments and pattern of industrial growth since 1991; Industrial licensing policy; public sector reforms; privatization and liberalization trends.

UNIT IV

OVERSEAS BUSINESS: Trend and pattern of India's foreign trade and balance of payments; latest foreign trade policy; India's overseas investments; policy towards foreign direct investment; globalization trends in Indian economy; role of MNCs; impact of multilateral institutions (IMF, World Bank and WTO) on Indian business environment.

RECOMMENDED BOOKS

1. *Vasishth, Neeru, Business Organization, Taxman, New Delhi*
2. *Talloo, Thelman J., Business Organizational and Management, TMH, New Delhi*
3. *Tulsian, P.C., Business Organization, Pearson Education, New Delhi*
4. *F. Cherunilum, Business Environment, Himalaya Publishing House, New Delhi*
5. *Biswanath Ghosh, Economic Environment & Business, Vikas Publishing House, New Delhi*
6. *N.K. Sengupta, Government and Business, Vikas Publishing House, New Delhi*
7. *K. Ashwathappa, Business Environment for Strategic Management, Himalaya Publishing House, New Delhi*

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

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LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Legal English & Business Communication
Subject Code : BBALLB 122
Class : BBA LL.B. I YEAR
Semester : II
Credit : 1

Objective- This course will focus on enhancement of student's thought, ideas and vision for practical application in their professional life. Combined with communication skills, the paper will help in developing critical and analytical skills among the among the students. Further business communication will make their professional communication effective.

Course Outcome

CO1: To introduce students to English legal resources in order to understand the legal language.

CO2: To enable the students to use legal vocabulary and terminology.

CO3: To enable successful and efficient communication (oral) appropriate to each situation.

CO4: To introduce students to various forms of legal writing appropriate to their specific needs.

CO5: To provide students with opportunities to develop basic English skills (written) in respect to topics dealt with in class.

COURSE OUTLINE
UNIT I

INTRODUCTION: Meaning, nature, objective, need and importance, 7 Cs of effective communication, process of communication, and its various components. Types of communication: verbal and non-verbal, formal and informal. Barriers to effective communication: physical and mental barriers, language or semantic barriers, socio-psychological barriers, organizational and personal barriers, overcoming barriers.

UNIT II

WRITING AND SPEAKING SKILLS: Sub-processes and effective of writing skills (unified and coherence writing skills), Importance of speaking skills, skills required in telephonic conversation. Business letters: Characteristics of a good business letter, structure/layout of a business letter (fully block, semi block, hanging intended and NOMA style). Types of business letters: sales, orders, complaint, adjustment, enquiry, follow ups, recommendation, acknowledge, cover letter of registration. Other types: business circulars, thank you, request, congratulatory.

UNIT III

E-COMMUNICATION: E-mail and its popularity, guidelines for writing e-mails, effective e-mail, limitations of e-mail. Official communication: Memorandum, minutes of meeting-objective, difference between agenda and minutes types (resolution and narration), contents and guidelines for writing minutes, writing resume, difference between resume and CV, modern tools of communication (WhatsApp, twitter, Facebook etc.)

UNIT IV

BUSINESS REPORTS: concept, importance, characteristics of a good report, types of reports (oral, written, formal, informal, informational, interpretive, routine), steps in writing a business report, layout/style of business report. Interview: Nature, types of interviews (personal, traditional, evaluation, telephonic, group, panel, lunch/dinner, case, structured, semi-structured, unstructured and stress interview), procedure of interview, and facing an interview. Do's and dont's of interview.

RECOMMENDED BOOKS

1. *Chhabra, T. N. Effective business communication. New Delhi: Sultan Chand & Sons.*
2. *Lesikar, R. V. Business communication. New Delhi: Tata McGraw Hill.*
3. *Pal, R., & Korlahalli, J. S. Essentials of business communication. New Delhi: Sultan Chand & Sons.*
4. *Sharma, R. C. & Mohan, K. Business correspondence & report writing. New Delhi: Tata McGraw Hill*

POs COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	**PSO3**
CO1	3	1	2	-	-	2	1	**2**
CO2	1	1	2	-	-	1	1	**2**
CO3	1	2	2	-	2	1	1	**3**
CO4	2	2	3	1	2	2	1	**3**
CO5	-	1	2	-	-	1	-	**3**

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

5. Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

LINGAYA'S UNIVERSITY

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

SUBJECT : Social Service
SUBJECT CODE : BBALLB 114
CLASS : B.B.A LL.B. I YEAR
SEMESTER : II
CREDIT : 4

OBJECTIVE

This course is for the empowerment of individuals regarding issues involving the law. Legal awareness
helps to promote consciousness of legal culture, participation in the formation of laws and the rule of law. This course aims to empower the youth of our country with the knowledge of their legal rights and duties, ultimately to be able to share power equally, gain full access to the means of development and to inspire a whole generation to work together towards achieving gender equality and justice.

Course Outcome

On completion of this course, the students will be able to
CO1.Learn about their rights and duties and basic features of the Indian constitution.
CO2.To create awareness about the various machineries/organs of the Justice delivery system available for redressal of their problems/grievances.
CO3.Learn about the procedure of approaching and utilizing various channels available for the 3 redressal of grievances i.e. the Police, the Executive and the Judiciary.
CO4.Discuss the basic concepts of labour law.
CO5. Learn the procedural guidelines mentioned under the criminal law system.

Catalog Description

This course aims to empower the youth of our country with the knowledge of their legal rights and duties, ultimately to be able to share power equally, gain full access to the means of development and to inspire a whole generation to work together towards achieving gender equality and justice.
The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis.
Class discussion will also take places in order to discuss the practical applicability of the Law.
The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability
An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

SOCIAL SERVICES (Any two PARTICI[PATION-Semester wise)				
S.NO	**CODE**	**Social Service**		**Credit**
1	**SS01**	**SWACCH BHARAT(SB)**		**1**
2	**SS02**	**GREEN BHARAT(GB)**		**1**
3	**SS03**	**COMMUNITY WELFARE(CW)**		**1**

B.B.A.L.L.B 5 YEARS

III SEMESTER

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Family Law-I
Subject Code : BBALLB 201
Class : B.B.A LL.B. II YEAR
Semester : III
Credit : 4

Objective: -Hindu law refers to the code of laws applied to Hindus, Buddhists, Janis and Sikhs. It also refers to the legal theory, jurisprudence and philosophical reflections on the nature of law discovered in ancient and medieval era. It gives us the base of the society i.e. family. It deals with different families' positions, traditions, rights and duties, family problems and legal solutions to them which directly relate to the society. The main objective of the subject is to resolve the socio-legal disputes arising in the society regarding marriage, divorce, property rights, partition, succession, maintenance, guardianship, adoption etc. It also sensitizes the students about Hindu society for their legal rights and duties.

Course Outcome

On completion of the course students will be able to :

CO1: Learn, appreciate and understand the sources and schools of Hindu Law.

CO2: Understand the basic concepts of Hind Law such as Hindu Joint family, Coparcener, Karta etc.

CO3: Understand the guiding principles of valid marriage and divorce followed under Hindu Law.

CO4: Gain knowledge of succession, partition, adoption, maintenance and guardianship.

CO5: Gain skills of thinking, analyzing, verbal and written presentation of ideas of argument.

CO6: Students will be able to put their acquired knowledge into practice in their research on contemporary constitutional law issues.

Catalog Description

Family Law I deals with the general principles of the Hindu Law . The subject basically revolves around Marriage , Adoption Guardianship and Succession among Hindus.

Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalization and critical-thinking ability. An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

Course Outline

UNIT-I

1. Application of Hindu Law,
2. Sources of Hindu Law,
3. Schools of Hindu Law,
4. Hindu Joint Family, Joint Families, Coparcenary, Classification of Property,
5. Karta of Joint Family, Position, Liabilities and Powers of Karta.,
6. Coparcener's Power of Alienation, Coparcener's Right to Challenge Improper Alienation,
7. Alienee's Rights and Remedies.

UNIT-II

1. The nature and concept of Hindu Marriage,
2. Essential Conditions for Valid Hindu Marriage, and Ceremonies of Marriage,
3. Registration of Hindu Marriages,
4. Remedy of Restitution of Conjugal Rights,
5. Void and Voidable Marriages,
6. Judicial Separation and Divorce,
7. Various Types of Grounds for Divorce and Judicial Separation,

UNIT-III

1. Nature and Scope of The Hindu Succession Act, 1956,
2. Effects of the Hindu (Succession) Amendment, 2005,
3. Rules of succession to the Property of Hindu Male, Succession to the Property of Hindu Female, Succession to the Mitakshara Coparcener's Interest,
4. General Rules of Succession, Partition, Subject matter of Partition, Persons who have a Right to Partition Right to Share.

UNIT-IV

1. Nature and Scope of The Hindu Minority and Guardianship Act, 1956,
2. Concept of Minority and Guardianship.
3. Types of Guardians-Natural Guardians and their Powers,
4. Testamentary Guardian: Appointment and Powers,
5. Certified Guardian,
6. Defacto Guardian
7. Guardian By Affinity,

UNIT-V

1. The Hindu Adoption & Maintenance Act, 1956,
2. Nature of Adoption,
3. Essential Conditions for Valid Adoption,
4. Effects of Adoption,
5. Registration of Adoption,
6. Personal Obligation,
7. Maintenance of Dependents,
8. Quantum of Maintenance,
9. Maintenance As a Charge on Property

BOOKS RECOMMENDED

1. *Ranganath Misra, Mayne's Treatise on Hindu Law & Usage (16th ed., 2008)*
2. *Satyajeet A. Desai, Mulla Principles of Hindu Law, (Vol. I & II 21st ed., 2010)*
3. *Paras Diwan and Peeyushi Diwan, Modern Hindu Law (Allahabad Law Agency, Reprint 2018)*
4. *Duncan M. Derrett, A Critique of Modern Hindu Law (1970)*
5. *Basant K. Sharma. Hindu Law. (Central Law Publication Sth Ed. 2017)*

Mapping

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	**PSO3**
CO1	3	-	1	-	-	-	-	2	**2**
CO2	3	1	-	1	1	2	-	2	**2**
CO3	2	2	1	2	2	3	-	3	**3**
CO4	2	2	1	2	2	-	-	3	**3**
CO5	-	3	2	2	2	-	-	1	**3**
CO6	-	3	2	2	2	-	-	1	1

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Constitutional law-I
Subject Code : BBA LLB 203
Class : B.B.A LL.B. II YEAR
Semester : III
Credit : 4

Objective: - Constitution of India is the pillar on which the governance of our country rests. The course aims to examine the political, social and economic value structure of the Constitution of India. The balancing of positive responsibility of the state to establish a economy of growth, social justice and political aspiration of all sections of the Indian society through Constitutional Governance. The objective of this course is to make students understand the basic concepts of Indian constitution.

Course Outcome

On completion of the course students will be able to :

CO1: Learn, appreciate and understand the fundamental features of the Constitution.

CO2: Critically evaluate the role of fundamental rights and the correlation between fundamental rights and duties.

CO3: Understand the guiding principles of state policy in governance of the country.

CO4: Become a responsible citizen after being aware of their fundamental rights and duties

CO5: Understand the process of judicial review and how judiciary actively plays a role in protection of human rights.

Catalog Description:

Constitutional law: is a body of law which defines the role, powers, and structure of different entities within a state, namely, the executive, the parliament or legislature, and the judiciary; as well as the basic rights of citizen. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-I

1. Nature, Silent features and Preamble of the Constitution of India
2. Union and its Territory
3. Citizenship

UNIT-II

1. Fundamental Rights in general (Article-12 and 13.
2. Right to Equality (Art. 14),
3. Special Provision for Weaker Sections of the Society,
4. Reservation Policy.

UNIT-III

1. Fundamental Freedoms under Art.19,
2. Freedom of Press.
3. Protection in respect of conviction of offence (Act-20),
4. Right to Life and Personal Liberty Article 21).
5. Protection against Arrest and Detention (Art 22),

UNIT-IV

1. Right against Exploitation (Art-23 & 24),
2. Right to Religion (Art 25-28).
3. Cultural & Educational Rights of Minorities (Art.29 & 30),

UNIT-V

1. Right to Constitutional Remedies (Art, 32), 226
2. Directive Principles of State Policy,
3. Fundamental Duties.

BOOKSRECOMMENDED

1. Kagzi, M.C. Jain. The Constitutional of India, Vol. 1 & 2, New Delhi, India Law House, 2001)
2.Pylee, MV. Constitutional Amendments in India (Delhi, Universal Law, 2003)
3.Hasan, Zoya& E. Sridharan. India's Living Constitution: Ideas, Practices, Controversies (Delhi, Permanent Black, 2002 ed.)
4. Basu, Durga Das. Commentary on the Constitution of India, (Calcutta, Debidas Basu, 1989 Ed.)
5. Seervi, H.M. Constitutional Law of India (Vol. I & II, III, Bombay N.M. Tripathi, 1991)
6. Chaube, Shibanikinkar. Constituent Assembly of India (New Delhi, Wadhwa and Com. Pvt. Ltd. 2002 ed.)
7. Bakshi, P.M. The Constitution of India (Delhi Universal Law Publishing, 2002)
8. Jain Subhash C. The Constitution of India; Select Issues &Percetpions (New Delhi Taxmann Publications, 2000)

MAPPING

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	-	1	-	-	2	1
CO2	3	1	2	1	1	3	-	2	2
CO3	2	2	-	1	1	3	-	3	3
CO4	2	2	1	-	1	-	1	1	1
CO5	1	3	-	-	-	-		1	2

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

Subject : Law of Crime -I: Indian Penal Code
Subject Code : BBALLB 205
Class : B.B.A LL.B. III YEAR
Semester : III
Credit : 4

Objectives: - This paper will deal with the basic principles of criminal law determining Criminal liability and punishment.

Course Outcome
Students will be able to:

CO1: understand the basic philosophy underlying the concept of crime, and categories of as well as parties to crime.

CO2: Analyze lacunas within the criminal justice system and suggest the amendments have to make to provide the justice according to the changing needs of the society.

CO3: Summarize the process of judicial review and identify criteria used by courts to evaluate the constitutionality of criminal law of India.
CO4: Understand and describe areas of criminal justice, law and society through a critical analysis of the subject
CO5: Problem-solve complex issues in the criminal justice system and society related to policy, law enforcement, vulnerability, and marginalization

COURSE OUTLINE:

Unit I: Introduction

1. Extent and operation of the Indian Penal Code
2. Definition of Crime
3. Fundamental elements of crime
4. Punishment Theories: Deterrent, Retributive, Preventive, Expiatory and Reformative Theory.
5. Stages in commission of a Crime- Intention, Preparation, Attempt, Essentials of the Attempt, Impossible Attempt, Attempt & Preparation distinguished) etc.
6. Punishment under the IPC: Fine, Life Imprisonment, Death Sentence.
7. Commutation of Sentence, Solitary Confinement.
8. Common Intention, Same Intention, Unlawful Assembly
9. Constructive Joint Family

Unit II: General Exceptions

1. Mistake
2. Judicial and Executive acts
3. Accident
4. Necessity
5. Infancy
6. Insanity
7. Intoxication
8. Consent
9. Good Faith
10. Private Defence against Body and Property

Unit-III: Abetment, Criminal Conspiracy & Attempt

1. Abetment
2. Criminal Conspiracy
3. Attempt

Unit-IV: Offences affecting the Human Body

1. Offences affecting life, causing of miscarriage or injuries to unborn children
2. Offences of Hurt, Wrongful restraint & Wrongful Confinement.
3. Offences of Criminal Force & Assault, Offences of Kidnapping and Abduction.
4. Offences against women
5. Obscene Acts & Songs
6. Outraging the modesty of a women
7. Rape
8. Offences relating to marriage: Cruelty by Husband or relative of husband
9. Defamation

Unit V: Offences against Property

1. Theft, Extortion, Robbery & Dacoity
2. Criminal Misappropriation & Criminal Breach of Trust
3. Cheating
4. Mischief

Text Book References:-

1. *K.D. Gaur, Criminal Law-Cases & material, Universal Law Publishing Co.*
2. *R.C. Nigam, Law of Crimes- Principles of Criminal Law, Asia Publication House.*
3. *K.I. Vibhute (Rev.), P.S.A Pillai's Criminal Law, Lexis Nexis Butterworths India 2008*
4. *V.B. Raju, Indian Penal Code, 1860, State Mutual book & Periodical Service Ltd.*
5. *K.N.C. Pillai & Shabistan Aquil (Rev.) Essays on the Indian Penal Code (The Indian Law Institute, 2005)*
6. *K.T. Thomas & MA Rashid, Ratanlal & Dhirajlal, The IPC, Lexus Nexis,2015*

POs COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	3	1	2	-	1	-	-
CO2	3	2	2	1	2	-	-
CO3	1	2	1	1	2	-	-
CO4	2	2	2	1	1	-	-
CO5	1	2	1	1	2	-	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Organizational Behaviour

Course Code: BBALLB 213

Class: BBALLB 2nd year

Semester: II

Credit: 4

L	T	P	C
4	0	0	4

Objectives: The course aims at providing fundamental knowledge and exposure to the concepts, theories and practices in the field of management.

Unit I **Lectures:- 10**

Management: Concept, Nature, Process, Significance; Managerial levels, skills, Functions and Roles; Management vs. Administration; Coordination as Essence of Management.
Development of Management Thought: Classical, Neo-Classical, Behavioral, Systems and Contingency Approaches.
Planning: Nature, Scope and Objectives of Planning; Types of plans; Planning Process; Business Forecasting; MBO: Concept, Types, Process and Techniques of Decision-Making; Bounded Rationality. **Organising:** Concept, Principles of an Organization; Span of Control; Departmentation; Types of an Organization; Authority-Responsibility; Delegation and Decentralization;

Unit II **Lectures: - 12**

Staffing: Concept, Nature and Importance of Staffing. Motivating and Leading: Nature and Importance of Motivation; Types of Motivation; Theories of Motivation: Maslow, Herzberg, X, Y and Z; Leadership: Meaning and Importance; Traits of a leader; Leadership Styles – Likert's Systems of Management, Tannenbaum & Schmidt Model and Managerial Grid.
Controlling: Nature and Scope of Control; Types of Control; Control Process; Control Techniques – Traditional and Modern; Effective Control System.

Unit III **Lectures: - 12**

Organisational Behaviour-1: Concept and nature of Organizational behavior, O.B. Models, Importance, Challenges and Opportunities,
Individual & Interpersonal Behaviour: Personality – Determinants and Traits; Emotions; Learning-Theories, Perception –Process and Errors, Attitudes- Formation, Theories, Relationship between Attitude and Behavior; **Interpersonal Behaviour:** Johari Window; Transactional Analysis – Ego States, Types of Transactions, Life Positions, Applications of T.A

Unit IV **Lectures: - 10**

Group Behaviour & Team Development: Concept of Group and Group Dynamics, Stages of Group Development, Theories of Group Formation; Concept of Team Vs. Group; Types of Teams; Building and Managing Effective Teams.

Organization Culture and Change Management: Concept of Organizational Culture, Managing Conflict, Managing Change; Resistance to Change, Managing cross Cultures.

Text Books

1. Robbins, (2011). Fundamentals of Management: Essentials Concepts and Applications, Pearson Education.
2. Robbins, S.P. and Sanghi, S., (2009), Organizational Behaviour; 13th edition, Pearson Education.
3. Stoner, Freeman and Gilbert Jr. ((2010)) Management, 8th Edition, Pearson Education.

Reference Books

1. Koontz, H.(2014), Essentials of Management, McGraw Hill Education.
2. Ghillyer, A, W., (2008) Management- A Real World Approach, McGraw Hill Education.
3. Mukherjee, K, (2009), Principles of Management, 2nd Edition, McGraw Hill Education.
4. Luthans, Fred, (2008), Organizational Behavior, 11th Edition, McGraw Hill Education.

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

SUBJECT : Human Resource Management
SUBJECT CODE : BBA LLB 214
CLASS : B.B.A LL.B. II YEAR
SEMESTER : III
CREDIT : 4

Objectives: The objective of this course is to make students familiarize with basic concepts of human resource management and people related issues.

Course Content :
Unit I
Hours: -10
Human Resource Management: Concept and Functions, Role, Models, Status of HR, HR Policies, Evolution of HRM. Emerging Challenges of Human Resource Management; workforce diversity, empowerment, Downsizing; VRS; Human Capital; HRIS.

Unit II
Hours: -12
Human Resource Planning: Human Resource Planning- Quantitative and Qualitative dimensions; **Recruitment** – Concept and sources; (E-recruitment, recruitment process outsourcing etc.); **Selection** – Concept and process; test and interview; placement induction. Job analysis – job description and job specification; job design; Job Enlargement; Job Enrichment and flexi-time; Carrier Planning; Succession Planning.

Unit III
Hours: -12
Training and Development: Concept and Importance; Identifying Training and Development Needs; Designing Training Programs; Role Specific and Competency Based Training; Evaluating Training Effectiveness; Management Development; Career Development;

Performance appraisal: Nature and objectives; Techniques of performance appraisal; potential appraisal and employee counseling; Internal mobility – promotions, demotion, transfers and separation. Compensation: concept and policies; job evaluation.

Unit IV
Hours: -10
Maintenance: Employee health and safety; employee welfare; social security; Industrial relations- an overview. Grievance handling and redressal Industrial Disputes causes and settlement machinery.
Strategic HRM: HRD audit, managing globalization; technology and HRM.

Text Books

1. Gary Dessler. (2013) A Framework for Human Resource Management. Pearson.
2. David A. Decenzo, Stephen P. Robbins, Susan L. Verhulst, Human Resource Management", (2015), Wiley India Private Limited.

Reference Books

1. Bohlendar and Snell, Principles of Human Resource Management, (2013) Cengage Learning.
2. K. Aswathappa, Human Resource Management (2013), McGraw Hill Education (India) Private Limited.
3. Chhabra, T.N. Essentials of Human Resource Management. (2014) Sun India Publication New Delhi.
4. Robert L. Mathis and John Jackson, Human Resource Management (2011), South-Western Publisher.

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Integrated Disaster Management

Course Code: BBALLB 207

Class: BBALLB 2nd year

Semester: III

Credit: 4

L	T	P	C
4	0	0	4

Course Objective:

The course is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards
induced by human activities with emphasis on disaster preparedness, response and recovery.

Course Outcome

On completion of the course students will be able to :

CO1: To understanding the Disaster and its Types.

CO2: To understand Disaster management cycle and risk and Vulnerability analysis.

CO3: To understand the Disaster management in India.

CO4: To analyse the Applications of Science and Technology for Disaster Management

CO5: To analyse the Rehabilitation, Reconstruction and Recovery.

Catalog Description

Disaster Management ensures the safety of people during the times of emergency, and natural and man-made calamity. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

COURSE OUTLINE

It has **5 modules** which are as follows:

UNIT-I Understanding Disasters and its Types.(Lecture: 7)

(A) Understanding the Concepts and definitions of Disaster, Hiszard, Vulnerability, Risk, Capacity - Disaster and Development, and disaster management
(B). Different Types of Disaster
i. Natural Disaster: such as Flood, Cyclone, Earthquakes, landslides etc,
ii. Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea. Rail & Road).Structural failures (Building and Bridge), War & Terrorism etc. Causes, effects and practical examples for all disasters

UNIT-II Disaster Management Cycle and Risk and Vulnerability analysis (Lecture: 13)
(A) Disaster Management Cycle - Paradigm Shift in Disaster Management
(B) Risk: Its concept and analysis
(C). Risk Reduction
(D) Vulnerability: Its concept and analysis
(E)Strategic Development for Vulnerability Reduction

UNIT-III Disaster Management in India (Lecture: 14)
(A). Disaster Profile of India Mega Disasters of India and Lessons Learnt
(B) Disaster Management Act 2005 - Institutional and Financial Mechanism
(C) National Policy on Disaster Management,
(D) National Guidelines and Plans on Disaster Management,
(E) Role of Government (local, state and national), Non-Government and Inter Governmental
Agencies.

UNIT-IV Applications of Science and Technology for Disaster Management (Lecture: 8)
(A) Geo-informatics in Disaster Management (RS, GIS, GPS and RS)
(B) Disaster Communication System (Early Warning and Its Dissemination)

(C) Land Use Planning and Development Regulations
(D) Disaster Safe Designs and Construction Structural and Non Structural Mitigation of Disasters
(E) S&T Institutions for Disaster Management in India

UNIT-V Rehabilitation, Reconstruction and Recovery (Lecture: 6)

(A) Reconstruction and Rehabilitation as a Means of Development
(B) Damage Assessment
(C) Post Disaster effects and Remedial Measures.
(D) Creation of Long-term Job Opportunities and Livelihood Options
(E) Disaster Resistant House Construction
(F) Sanitation and Hygiene
(G) Education and Awareness,
(H) Dealing with Victims Psychology
(I)Long-term Counter Disaster Planning
(J) Role of Educational Institute.

BOOKS RECOMMENDED

1. Author Title Publication Dr. Mrinalini Pandey Disaster Management Videy India Pvt Ltd
2. Tushar Bhattacharya Disaster Science and Management McGraw Hill Education India) Pvt. Ltd
3. Jagbir Singh Disaster Management: Future Challenges and Opportunities Publishers Pvt. Ltd.
4. JP Singhal Disaster Management Laxmi Publications,
5. Shailesh Shukla, Shamna Hussain Biodiversity, Environment and Disaster Management Unique Publications C. K. Rajan. Navale Pandharinath Earth and Atmospheric Disaster Management: Nature and Manmade B S Publication
6. Disaster Management Act 2005

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	-	-	-	1	-
CO2	1	3	1	-	-	-	-	1	-
CO3	2	2	-	2	-	1	-	1	1
CO4	1	1	-	1	-	2	-	2	-
CO5	1	1	-	1	-	1	-	1	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Comprehensive Viva

Course Code: BBALLB 241*

Class: BBALLB 2nd year

Semester: III

Credit: 4

L	T	P	C
0	0	2	1

Practical subject

Modes of Evaluation:

Components	Internal Examination	End term written Exam
Weightage (%)	40%	60%

Internal Examination

Components	Assignment/ Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	40

Course Name: Family Law - II

Course Code: BBALLB 202

Class: BBALLB 2nd year

Semester: IV

Credit: 4

L	T	P	C
4	0	0	4

Objective: To overview of Muslim law in its historical and evolutional perspective. It includes a critical analysis of the history, development, and the schools of Muslim law, classical and modern theories, evolution of the law up to the present and its contemporary applications. It comprehensively covers the law of marriage, dissolution of marriages, guardianship, talaq, maintenance, paternity and the concept of legitimacy among Muslim and deals with debts and
bequest (wasiyat), hiba (gift) and Muslim law of inheritance, the family courts, the civil Marriage Law, the Special Marriage Act etc. The main objective of the subject is to sensitize the students about the Islamic society, their legal rights and duties.

Course Outcome

CO1: To make students understand the scope, sources and schools of muslim law in India.
CO2: To familiarize students with muslim marriage, marital right and dower.
CO3: To analyze the concept of divorce and maintenance under muslim law.
CO4: To analyze the concept of gift, bequests, inheritance under muslim law

UNIT 1

1. Status and Scope of Muslim Law in India,
2. Statutory Application of Muslim Law including the Muslim Personal Law (Shariat) Application
Act, 1937;
3. Sources of Muslim Law and their position in India
4. Schools of Muslims in India.

UNIT 2

1.Muslim Marriage (Nikah)- legal requirements including all forms of Marriage and Legal impediments thereon,
2. Effects of marriage
3. Marital Rights, including dower and its Characteristics and Enforcement;
4. Special terms and conditions in marriage and their enforcement;
5. Post Marriage Conversion to Islam
6. Post Marriage renunciation of Islam,

UNIT 3

1.Divorce and its Policy in Islam
2. Forms of divorce in Muslim Law of India, including divorce by wife outside and through courts
under the Dissolution of Muslim Marriages Act, 1939,
3. Post-Divorce Rights of parties including iddat period, remarriage,
4. Maintenance including the Muslim Women(Protection of Rights on Divorce) Act, 1986 and
Maintenance of Wife and Widow under Ss 125-128 Cr.P.C., 1973.

UNIT 4

1.Surviving Spouse- his or her right to inherit;
2. Deceased wife's dower, widow's lien/wife's right to retain,
3. Rights of deceased husband's heirs, transferability and inheritability of dower,
4. Parent Child relations including acknowledgement of paternity and concept of Legitimacy;
5. Concept of Minority and puberty including guardianship and custody of minor's person and/or
property; Parents maintenance under Muslim Law and Cr.P.C. (Ss 125-128),

UNIT 5

1.Disposition of property including gifts(hiba), debts and bequests (wasiyat);
2. Revocation and lapse of legacies,
3. Bequest to heirs, and bequeathable third and death-bed transactions,
4. Muslim Law of inheritance including Women's right to inherit and disqualification of heirs;
5. Muslim Law on Increase and return,
6. Muslim Law relating to wakfs and their administration including the Wakf Act, 1995.

RECOMMENDED BOOKS

1.M. Hidayatullah & Arshad Hidayatullah, Mulla, Principles of Mahomedan Law (19th ed., 1990)
(reprint 2010)
2. Asaf A.A. Fyzee, Outlines of Muhammadan Law (5th ed., 2008)
3. Tahir Mohmmad. Introduction to Muslim Law (Universal Law Publisher, 2nd Ed. 2014)
4.Paras Diwan.Muslim Law in India. (Allahabad Agency, Reprint 2017)
5. M.P. Tandon. Muslim Law in Modern India. (Allahabd Law Agency, Reprint 2012)
6. M.A. Qureshi. Muslim Law. (Central Law Publication, 5th Ed. 2015)
7. H.D. Kohli. Muslim Law Cases & Material. (Universal Law Publication, 1st Ed. 2012)
8. Tahir Mohmmad. Muslim Law in India and Abroad (Universal Law Publisher, 2nd Ed.2016

MAPPING WITH COs WITH Pos AND Cos.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	-
CO2	1	1	-	1	-	-	-	1	-
CO3	1	2	-	1	-	-	-	1	-
CO4	1	-	-	-	-	-	-	-	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Constitutional Law-II

Course Code: BBALLB 204

Class: BBALLB 2nd year

Semester: IV

Credit: 4

L	T	P	C
4	0	0	4

Objective-

1.This course introduce the students to a fundamental understanding of the term public law by contrasting with the realm of private law and the relationship between the two streams of law.
2.The study traces the evolution of the public law concept from the ancient times to the present and seeks to draw a distinction between the public law and private law
3.The purpose of this course is to equip the students with a broad spectrum of legal and judicial systems in the fast globalizing world
4.To give students brief knowledge about the various systems of governance and to draw a comparison between them.
5.The course intends to provide a comparative analysis about the structure of government, legislative process and the role of the judiciary to have better understanding of the Indian polity.

Course Outcome

On completion of this course, the students will be able to
1.Understand the Principles, objects and forms of Governance
2.Understand the concept, evolution and objects of governance
3.Understand the system of Constitutional Governance
4.Understand the Rule of Law & its application in Indian Context
5.Understand various systems of Governance – Unitary, federal etc.
6.Understand the forms of Democracy – Presidential & Parliamentary

It has 4 units which are as follows:

UNIT -I Public Law and It's Role in Governance

1. Rule of Law

2. Social and Economic rights as a part of rule of law

3. Nature of Public law

4. Distinction between Public and Private Law

5. Scope of Public Law- Constitutional Law, Administrative Law and Criminal Law

6. Basic concepts of Public Law

7. Principles of Accountability and Public Law

UNIT - II Basic Principles of organization of Government and Forms of Government

a) Presidential and Parliamentary forms of Government

b) Federal and Unitary Governments

c) Government under the U.S. Constitution

d) Basic principles underlying Government in U.K.

UNIT -III Nature and Role of Fundamental Rights in Public Law

a) Evolution of Fundamental Rights in U.K., U.S.A.,and India

b) Scope of Fundamental Rights in U.S.A.

c) Role of Fundamental Rights in U.K.

d) Limits to Fundamental Rights

UNIT-IV Organization of the Legislature, Executive and Judiciary

a) Structure of Executive, Legislature and Judiciary

b) Nature and Extent of Legislative and Judicial Powers

c) Relation between Legislative and Executive powers

TEXTBOOKS:

1. K.C. Wheare, Modern Constitutions.
2. Dauglus W.O, Studies in Indian and American Constitutional Law.
3. A.V. Dicey, Introduction to the Study of Constitution.
4. Rotunda and Nowak, Treatise on American Constitution.
5. Bernad Schwartz Commentary on American Constitution.
6. E.S. Venkataramaiah, Federalism Comparative Study
7. Mason and Beany, American Constitutional law
8. Rodney Brazier, Constitutional Practice.
9. Godfrey and Blondel, The French Constitution and Government.
10. Tom Ginsburg, Roslind Dixon, Comparative Constitutional Law
11. D.D. Basu, Comparative Constitutional Law (2nd ed., Wadhwa, Nagpur)
12. Mahendra P. Singh, Comparative Constitutional Law (Eastern Book Company, 1989).

ARTICLES:

1. Bostan College Law Review 1687 - 1732 (2011 November)
2. Chhavi Agarwal, "Rule of Law: Reflection upon we the People and Beyond" 252(1) Madras
Law Journal 8-16(2010)
3. Devi Prasad Singh
Sovereignity, Judical Review and Separation of Power", 7(5) Supreme Court
Cases 1-13(2012 September).
4. Vicki c. Jackson, Mark V. HYPERLINK
http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22MARK+V.+Tushnet%22Tush net, Comparative Constitutional Law 12. Bhagwan Vishonoo, Bhushan Vidya, World
Constitutions.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	1	1	-	-	1	-	1	2
CO2	1	3	1	-	1	-	1	1
CO3	1	1	-	1	-	2	1	-
CO4	2	1	-	-	-	-	2	1
CO5	2	1	-	1	-	1	1	2
CO6	1	2	2	1	1	2	1	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Law of Crimes-II (IPC - II)

Course Code: BBALLB 206

Class: BBALLB 2nd year

Semester: IV

Credit: 4

L	T	P	C
4	0	0	4

Objective- This paper will focus on the study of substantive crimes under the Indian Penal Code.

Course Outcome
Students will be able to:

CO1: understand the basic philosophy underlying the concept of crime, and categories of as well as parties to crime.

CO2: Analyze lacunas within the criminal justice system and suggest the amendments have to make to provide the justice according to the changing needs of the society.

CO3: Summarize the process of judicial review and identify criteria used by courts to evaluate the constitutionality of criminal law of India.
CO4: Understand and describe areas of criminal justice, law and society through a critical analysis of the subject
CO5: Problem-solve complex issues in the criminal justice system and society related to policy, law enforcement, vulnerability, and marginalization

COURSE OUTLINE

UNIT I: Offences against the Human Body-I

f) Culpable Homicide and Murder
g) Rash and Negligent Act
h) Dowry Death
i) Attempt to murder
j) Attempt and Abetment to suicide

UNIT II: Against Human Body- II

e) Hurt and Grievous hurt

f) Criminal force and assault
g) Wrongful restraint and wrongful confinement
h) Kidnapping and Abductions

UNIT III: Offences against Women

d) Outraging the modesty of women, voyeurism, stalking, Acid Attack
e) Rape and Unnatural offences
f) Cruelty and offences relating to marriage

UNIT IV: Offences against property

e) Theft, Extortion, Robbery and Dacoity
f) Criminal Misappropriation and Criminal Breach Of Trust
g) Cheating and Forgery
h) Mischief

UNIT V: Offence of Defamation, Criminal Intimation, Insult and Annoyance

d) Defamation(section 499-502)
e) Criminal intimidation
f) Word, gesture or act intended to insult the modesty of a woman

RECOMMENDED BOOKS

8. K.D. Gaur, Textbook on Indian Penal Code, Universal Law Publishing Co., New Delhi, 2012.
9. Ratanlal Dhiraj Lal, The Indian Penal Code, Lexis Nexis, Butterworths Wadhwa, Nagpur, 2012.
10. K.I. Vibhuti, PSA Pillai's Criminal Law, Lexis Nexis, Butterworths Wadhwa, Nagpur, 2012
11. Glanville Williams, Text Book of Criminal Law, Universal Law Publishing Co., New Delhi, 2012.
12. Dr. H.S. Gaur, Penal Law of India, Law Publishers , Allahabad, 2013
13. John Dawson Mayne, Mayne's Criminal law of India, Gale, Making of Modern Law, 2013.
14. J.W. Cecil Turner, Russel on Crime, Vol I &2, Universal Law Publishing Co., New Delhi, 2012.

POs COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	3	1	2	-	1	-	-
CO2	3	2	2	1	2	-	-
CO3	1	2	1	1	2	-	-
CO4	2	2	2	1	1	-	-
CO5	1	2	1	1	2	-	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Administrative Law

Course Code: BBALLB 208

Class: BBALLB 2nd year

Semester: IV

Credit: 4

L	T	P	C
4	0	0	4

Objective-

6) The objective of studying of administrative law is to understand the nature of administration and the rule of law.
7) To make students understand the nature, scope, concept, necessity and growth of Administrative law.
8) To familiarize the students with the conceptual and operational parameters of the general principles of the Administrative Law.
9) To make the students understand the difference between Constitutional law and administrative law.
10) To make the students aware of the working of Administration.

Course Outcome

On completion of this course, the students will be able to:

CO1: Define the objectives of Administrative law and the rule of Law
CO2. Explain the nature, scope, necessity and development of Administrative Law and action.
CO3. Identify the basic rules and principles followed to render administrative justice;
CO4. Identify distinction between the Constitutional Law and Administrative Law
CO5. Examine the functioning of the special bodies constituted as alternative means for administering justice viz., Administrative Tribunals, Ombudsman, Lokayukta, Lokpal

This course has 5 units:

Unit-1: Introduction

1. Meaning, Definition & Scope of Administrative Law
2. Sources & Development of Administrative Law
3. Relationship between Constitutional Law and Administrative Law
4. Separation of powers & Constitutional law
5. Rule of law & Constitutional law
6. Distinction between judicial, quasi-judicial and Administrative functions
7. Relationship between Constitutional law and Administrative Law

Unit-ll: Delegated Legislation

1. Delegated Legislation - Definition & Form
2. Necessity of Delegated Legislation
3. Reasons for the growth of Delegated Legislation
4. Types of Delegated Legislation
5. General Limitations upon Delegation of Powers - Principles:
    i. Subsidiarity
    ii. delegatus non potest delegare
6. Droit Administratif

Unit-III: Principle of Natural Justice and Rule of Law

1. Natural Justice & Legal Justice
2. Basic principles of natural law:

i. No man can be judge of his own cause (Dr. Bonham's Case)
ii. Audi alteram partem (right to fair hearing)

3. Exceptions to the rule of Natural Justice
4. Effects of non-compliance with principles of Natural Justice
5. Rule against Bias: Principle against arbitrariness: Wednesbury Rule

Unit-IV: Adjudication & Judicial Review Power under the Administrative law

1. Need for Administrative Adjudication
2. Modes of Administrative Decision making
3. Administrative Tribunals
4. Judicial Review of Administrative Actions: Constitutional Framework
5. Doctrine of ultra vires
6. Power to review own Decisions
7. Grounds for review:

i. Failure to exercise discretion
ii. Excess of discretionary authority
iii. Arbitrary exercise of discretion

8. Doctrine of proportionality
9. Doctrine of Legitimate Expectations

Unit-V: Administrative Discretion & Mechanism for Control of Administrative Actions

A. Meaning of Discretionary Power & its rationale

1. Scope of discretion & Grounds for challenging the exercise of Administrative Discretion
2. Abuse of discretion - Study of case-law:
    a. Non-application of mind
    b. Improper purpose
    c. Irrelevant considerations
    d. Fettering of discretion acting under dictation
3. Sovereign immunity in Administrative Law

B. Institutional controls on Administrative Actions

a. Public audit
b. Commissions of Enquiry
c. Ombudsman in India (Lokpal & Lokayuktha)
d. The Right to Information Act

C. Methods of judicial review

a. Statutory appeals
b. Writs
c. Declaratory judgments and injunctions
d. Civil Suits for Compensation

TEXTBOOKS:

1. K. Takwani, Lectures on Administrative Low, Eastern Books Co, Lucknow
2. P. Mittal, Natural Justice Judicial Review & Administrative Low
3. HWR Wade & CF Forsyth, Administrative Low, OUP, 2009.
4. MP Jain, Cases & Materials On Indian Administrative Low, LexisNexis, New Delhi, 1 st edn. 1994
5. Tushar Kanti Soha, Administrative Law, Kanishka, 2001

ARTICLES:

1.Ajoy P.B., Administrative Action and the Doctrine of Proportionality in India, http://www.iosrjournals.org/iosr-jhss/papers/Vol1-issue6/D0161623.pdf

2.Justice MarkandeyKatju., Administrative law and judicial review of administrative action, http://www.ebcindia.com/lawyer/articles/2005_8_25.htm

3.Anupa V. Thapliyal, Central Administrative Tribunals and Their Power to Issue Directions, Orders or Writs Under Articles 226 and 227 of the Constitution, http://www.ebc-india.com/lawyer/articles/92v4a4.htm

4.ShubhamManojKhare, Administrative Discretion & Limitation on Administrative Discretion By Article 14 & 16 of the Indian Constitution, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1465519

5. D.Y.Chandrachud,Constitutional and Administrative Law in India, http://scholarship.law.cornell.edu/cgi/viewcontent.cgi?article=1142&context=ijli

6. Prof. S.S. Vishweshwaraiah, Emerging Trends In Administrative Law, http://elearning.vtu.ac.in/P3/CIP71/5.pdf

7. A. T. Markose, 'Judicial Control of Administrative Action in India. A Study in Methods.'http://www.jstor.org/stable/pdfplus/1337434.pdf?acceptTC=true

8. Y Pardhasaradhi, Ravinder Kaur, Administrative Reforms for Good Governance, http://socialsciences.in/article/administrative-reforms-good-governance

15. 162nd Report of the Law Commission on Central Administrative Tribunal, http://lawcommissionofindia.nic.in/101-169/report162.pdf

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	-	2	1	2	1	2	2
CO2	2	3	1	-	1	-	1	1	2
CO3	1	2	-	1	-	2	-	1	2
CO4	2	1	2	-	-	-	1	2	1
CO5	1	1	-	1	-	1	-	1	2

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Strategic Management

Course Code: BBALLB 222

Class: BBALLB 2nd year

Semester: IV

Credit: 4

L	T	P	C
4	0	0	4

Objectives: The course aims to acquaint the students with the nature, scope and dimensions of Business Policy and Strategy Management Process.

Course Contents

UNITI

Introduction: Nature, Scope and Importance of Business Policy; Evolution; Forecasting, Long-Range Planning, Strategic Planning and Strategic Management.

Strategic Management Process: Formulation Phase–Vision, Mission, Environmental Scanning, Objectives and Strategy; Implementation phase–Strategic Activities, Evaluation and Control.

UNITII

Environmental Analysis: Need, Characteristics and Categorization of Environmental Factors; Approaches to the Environmental Scanning Process – Structural Analysis of Competitive Environment; ETOP a Diagnosis Tool.

Analysis of Internal Resources: Strengths and Weakness; Resource Audit; Strategic Advantage Analysis; Value-Chain Approach to Internal Analysis; Methods of Analysis and Diagnosing Corporate Capabilities–Functional Area Profile and Resource Deployment Matrix, Strategic Advantage Profile; SWOT analysis. Mckinsey's 7s Framework.

UNITIII

Formulation of Corporate Strategies: Approaches to Strategy formation; Major Strategy options– Stability, Growth and Expansion: Concentration, Integration, Diversification, Internationalization, Cooperation and Digitalization, Retrenchment, Combination Strategies.

UNITIV

Choice of Business Strategies: BCG Model; Stop Light Strategy Model; Directional Policy Matrix (DPM)Model, Product/Market Evolution Matrix and Profit Impact of Market Strategy (PIMS) Model.

Major Issues involved in the Implementation of strategy: Organizational Cultural and Behaviour factors, Organization Structure; Role of Leadership, Resource Allocation.

TextBooks

1. Kazmi,Azhar,(2014),StrategicManagementandBusinessPolicy,McGrawHill Education.
2. Ghosh,P.K.,(2012),Strategic Planning and Management, Sultan Chand& Sons,New Delhi.

ReferenceBooks

1. Hill, Charls WL and Jones Gareth R. (2011), An Integrated Approach to Strategic Management, Cengage Learning.
2. Walker, Gordon, (2012), Modern Competitive Strategy, McGraw Hill Education.
3. Weelen,(2012),ConceptsinStrategicManagementandBusinessPolicy,Pearson Education
4. Fred,David,(2011),Strategic Management: Concepts and Cases, Prentice hall of India

Note: Latest edition of text books may be used

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Public International Law

Course Code: BBALLB 210

Class: BBALLB 2nd year

Semester: IV

Credit: 4

L	T	P	C
4	0	0	4

Course Objectives

To apprise the students about the similarities and difference between Municipal law and International Law, various sources, explanation of the term State including types of states, Recognition of State, Extradition, Asylum, Diplomatic agents, Amicable and Coercive modes of settlement of dispute, War, Blockade, Evolution of human rights and its National and international perspective.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understand &Conceptualize the evolution, Sources & interconnection with domestic law related with International law.

CO2: Understand & Critically analyze the concept related with State Territory, State Jurisdiction, Recognition &Acquisition related with Public International Law.

CO3: Understand & Critically analyze the concept related with State Succession, Extradition, Asylum& Settlement of Disputes related with Public International Law.

O4: Critically analyze & Evaluate applicability of various laws which falls under the purview of Public International Law.

CO5: Evaluate the multilateral aspects of human rights & related enactment under the purview of Public International Law.

Course Outline

UNIT-I

1. Definition, Nature and Sanctions of International Law,
2. Relationship between International Law and Municipal Law,
3. Sources and subjects of International Law including position of individual

UNIT-II

1. State Territory,
2. State Jurisdiction,
3. Recognition of States and Governments,
4. Acquisition and loss of State Territory,

UNIT-III

1. State Succession,
2. Extradition,
3. Asylum,
4. Settlement of Disputes

UNIT-IV

1. Nature, Definition and Effects of War,
2. Belligerent Occupation,
3. War Crimes,
4. Contraband,
S. Blockade,
6. Prize Counts,
7. Enemy Character, Rules of Warfare

UNIT-V

1. Human Rights: Concept of Human Rights,
2. Provisions of U.N. Charter relating to Human Rights,
3. Universal Declaration of Human Rights, 1948 and its Legal Significance,
4. Covenant on Civil and Political Rights, 1966
5. Covenant on Economic, Social and Cultural Rights,
6. National Commission on Human Rights

BOOKS RECOMMENDED

1. Starke's International Law (Oxford University Press Butterworth & Co. publisher Ltd. 11th Ed.
2013)
2. V.K. Ahuja. Public International Law (Lexis Nexis, Ist Ed. 2016)
3. V.C. Govindaraj. Conflict of Laws-Cases and Materials (Lexis Nexis, Ist Ed. 2017)
4. Aggarwal, H.O. Public International Law and Human Rights (Central Law Publications Ed. 20
5. Kappor, S.K. International Law (Central Law Publications 2013)
6. Harris, D.J. Cases and Material on International Law (Sweet & Maxwell Ed. 2013)
7. Greig, DW. International Law (Butterworths and Co. (Publishers) Ed. 2007)

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	-	-	-	1	2	-	1
CO2	2	-	2	-	1	-	-	-	-
CO3	2	2	2	-	1	-	-	-	-
CO4	3	2	2	2	2	2	-	-	1
CO5	2	3	2	3	2	3	1	-	2

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Comprehensive Viva

Course Code: BBALLB 242*

Class: BBALLB 2nd year

Semester: IV

Credit: 1

L	T	P	C
0	0	2	1

Practical Subject

Modes of Evaluation:

Components	Internal Examination	End term written Exam
Weightage (%)	40%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

LINGAYA'S VIDYAPEETH

SCHOOL OF LAW

BBA LL.B. 5 YEARS PROGRAMME

SUBJECT : Environment Science
SUBJECT CODE : BCE 201
CLASS : B.B.A LL.B. III YEAR
SEMESTER : V
CREDIT : 4

Objectives: Environmental Studies is a multidisciplinary area, the issues of which everyone should know. The aim of the course is to make everyone aware of environmental issues like continuing problems of pollution, loss of forest, solid waste disposal, and degradation of environment. Issues like economic productivity and national security, global warming, the depletion of ozone layer and loss of biodiversity are other serious concerns before the mankind.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understand &conceptualize the evolution, Sources & fundamentals related with Environmental law.

CO2: Understand & critically analyze the concept related with Pollution & its types, Statues related with Air & Water for prevention & control of pollution and Coastal Zone Management.

CO3: Understand & critically analyze the laws related with forest management, Wildlife protection & Judicial Contribution with regards to wildlife protection.

O4: Critically analyze & Evaluate contribution of domestic laws with regards to Land resources, Wetlands, Water resources & Ground water management.

CO5: Evaluate & analyze the contribution of Judiciary with regards to multilateral aspects related with Protection of Environment & Wildlife.

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UNIT I MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: Basic definitions related to environment: Scope, vis-à-vu environmental science and environmental engineering: causes of environmental degradation, atmospheric composition and associated spheres,

UNIT 2-NATURAL RESOURCES: Renewable and non-renewable resources, food resources, modern agriculture and its impact, problem associated with fertilizer and pesticides, water logging, salinity; energy resources, renewable and non-renewable energy sources, solar energy. wind energy, hydro energy, biomass energy, geothermal energy. nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT 3 - ECOSYSTEMS: Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, food chains, food webs and ecological pyramids; hot spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values.

UNIT 4 ENVIRONMENTAL POLLUTION AND SOCIAL ISSUES: Causes, effects and control measures of air pollution, water pollution, sound pollution; global warming, acid rain, ozone layer depletion.

RECOMMENDED BOOKS

1. Agarwal, K.C., "Environmental Biology", 2nd Edition, Nidhi Publ. Ltd., Bikaner, 2001.
2. BharuchaErach, "The Biodiversity of India", 2nd Edition, Mapin Publishing Pvt. Ltd, 2006.

3. Brunner R. C., "Hazardous Waste Incineration", 1st Edition McGraw Hill Inc., 1989.

4. Clark R.S., "Marine Pollution", 1st Edition Clanderson Press Oxford, 1989

5. Cunningham, W.P., Cooper, T.H. Gothani, E. & Hepworth, M.T. Environmental Encyclopedia", 2nd Edition, Jaico Publ. House, 2001.

6. De, A. K. "Environmental Chemistry", 2nd Edition, Wiley Eastern, 1989
7. Jadhav, H. and Bhosale, V.M., "Environmental Protection and Laws", 1st Edition, Himalaya Pub. House, Delhi, 1995.
8. Mckinney, M.L. and Schoel. R.M., "Environmental Science Systems & Solutions", 2nd Edition, Web enhanced edition, 1996.
9. Rao M.N. and Datta, A.K."Waste Water Treatment", 2nd Edition, Oxford & IBH Publ.Co., 1987.
10. Sharma B.K., "Environmental Chemistry", 2nd Edition, Goel Publ. House, Meerut, 2001 Trivedi R.K. and Goel, P.K., "Introduction to Air Pollution", 2nd Edition, Techno science Publications, 1996

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	-	-	2	1
CO2	3	2	1	-	2	-	-	2	-
CO3	2	1	2	1	1	-	-	2	-
CO4	2	1	2	3	2	-	2	2	1
CO5	2	3	2	1	1	1	1	2	2

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Corporate Law

Course Code: BBALLB 303

Class: BBALLB 3rd year

Semester: V

Credit: 4

L	T	P	C
4	0	0	4

COURSE OBJECTIVES:

To introduce Students to the economic function of the company as a legal structure for business, its advantages and disadvantages compared to other structure available such as partnership and the Limited Liability Partnership and in particular to the company's limited liability. To explain the legal nature and significance of limited liability and the price which those using a company as business structure are required to pay for it. To provide students with knowledge and appreciation of the major core topics in company law including the legal nature company as a business structure, the legal implications of separate corporate personality including limited liability, the validity of contracts made and the legal protection of shareholders. Moreover, the legal basis of the control exercised by a company's board of directors and their legal duties as directors and the legal protection of shareholders. The effectiveness of these limitations and constraints in practice are also critical analysis room instructions to train the student.

COURSE OUTCOME:

On completion of this course, the students will be able to:
CO1: have an elementary understanding of various nuances of corporate law like corporate personality, doctrine of piercing the corporate veil etc.
CO2: Identify the relevant legal issues that arise on a given set of facts in the area of corporate law.
CO3: Explain and apply the principles of corporate law covered in the course
CO4: Analyze and predict how unresolved or ambiguous corporate law questions could be resolved by the courts through an analysis of case law and the judicial method.

Catalog Description

The course of corporate Law has been specifically designed to provide in-depth knowledge about incorporation, raising capital by companies, borrowings and investments by companies and other related important issues. The course will also provide deep insights on Company secretary. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-I

Company: Meaning, features, types, privileges of private company, lifting of corporate veil, formation of company, Memorandum of Association: Meaning, importance ,clauses of memorandum of association and their alteration; Doctrine of ultra-vires; Articles of Association: meaning, contents alteration of articles of association; Constructive notice and doctrine of indoor management.

UNIT -II

Prospectus : Definition, contents of prospectus, Statement in lieu of prospectus; Share Capital: Types of Share capital, alteration of share capital , reduction of share capital ,share and stock, share certificate and share warrant; Company Management: Introduction, qualification and disqualification of directors, appointment, vacation, removal , duties and liabilities of directors, managerial remuneration.

UNIT -III

Company Meetings and Resolution: Kinds of company meetings, requisites of a valid meeting, proxy, voting, Agenda, Minutes of meetings, Resolution-meaning and types; Winding up, voluntary winding up, winding up under the supervision of court, consequences of winding up.

UNIT-IV

Merger, Amalgamation, Acquisition, Companies Amendment rules

UNIT-V

Company Secretary: Meaning and importance of company secretary, qualifications, qualities, functions, position, role, Appointment, powers and rights, duties and liabilities of company Secretary.

Books Recommended:

1. Kuchal M.C., (2009) Modern Indian Company Law, Shri Maiavir Books, Noida
2. KapoorN.D., (2010), Company Law: Incorporating the provisions of companies Amendment Act, S. Chand
3. Singh Avtar, (2007), Company Law, Eastern Book Company, Lucknow.
4. Sharma, A., (2010), Company Law and secretarial practice, V.K. publications.
5. Ghosh,K M., Chandratre ,K. R... (2009), Company law with secretarial practice Bharat Law house pvt.Ltd.
6.Jain, N.K, (2007), Company Law and Practice, Deep &Deep Publication.

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	1	-	1	-	-	2	1	2
CO2	2	2	2	1	2	-	-	1	1	-
CO3	2	2	1	-	1	1	-	1	1	2
CO4	3	3	2	1	2	2	1	2	2	2

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Law of Evidence

Course Code: BBALLB 305

Class: BBALLB 3rd year

Semester: V

Credit: 4

L	T	P	C
4	0	0	4

Course Objective:

The law of evidence is one of the most important branches of adjective law. Evidence is the pivot on which the whole edifice of administration of justice rests. It involves several questions, such as what is evidence, typology of evidence, how it is produced before a Judicial Authority and what is the role of the evidence in the administration of justice. The study of the law of evidence is most important in the field of legal education

- To acquaint the students with basic principles of the law of evidence;
- To enable them to understand the importance of evidence in the system of administration of justice.
- To enable them to analyze critically the rules of evidence and its application to a given fact situation.

Course Outcome

On completion of the course students will be able to :

CO1: To understand the fundamental rule of Law of Evidence.

CO2: To understand the relevant fact under Indian Evidence Act 1872.

CO3: To understanding the admission, confession, dying declaration and expert opinion.

CO4: To analyse the character in civil and criminal cases, admissibility of oral and document evidence.

CO5: To analyse the provision of burden of proof, estoppels, privileged of communication and examination of witness.

COURSE OUTLINE

It has **5 modules** which are as follows:

UNIT-I **(Lecture: 7)**

1. History of Law of Evidence
2. Meaning Nature, Scope and Object of Evidence,
3. Types of Evidence,
4. Fundamental Rules of Law of Evidence,
5. Fact in issue and relevant facts, Fact Proved, not proved, disproved (S. 3),
6. Presumption(S-4), Relevancy of Facts (S-5-16),

UNIT-II **(Lecture: 9)**

1. Res Gestate (Section - 6), Occasion, cause & effect of fact in Issue (Section7),
2. Motive, Preparation &Conduct (S-8),
3. Identification (S-9),
4. Conspiracy (S-10),
5. Facts not otherwise Relevant (S-11),
6. Relevancy of State of Mind & State of Body & Bodily feeling (Section-14),
7. Evidence of similar occurrences (Section-15)

UNIT-III **(Lecture: 12)**

1. Meaning of Admission & Confession (17-31), 2.
2. Difference between Admission & Confession,
3. Circumstances under which confession is admissible and not admissible,
4. Evidentiary value of admission & confession,
5. Dying Declaration, Expert Opinion,

UNIT-IV **(Lecture: 11)**

1. Evidence of Character in Civil & Criminal Cases
2. Principles relating to direct evidence (S-60),
3. Law relating to admissibility of documentary evidence (S. 61-66),
4. Proof as to genuineness of document i.e. execution & attestation(S 63-67),
5. Public Document and Private documents(S 74-78),
6. Exclusion of oral by documentary evidence(S-91-99),

UNIT-V **(Lecture: 9)**

1. Meaning of Proof & Presumption,
2. On whom burden of proof lies, Standard of Proof in Civil & Criminal Cases
3. Estoppel: Meaning & Scope (115-117), Principles Governing Doctrine of Estoppel,
4. Witness: Meaning, Types (126-127), Who may be a Witness,
5. Privileges of certain witnesses & Communication (135-136),
6. Examination of Witness (137-166)

BOOKS RECOMMENDED

1. S. Sarkar Ahmed Ejaz, Law of Evidence, (Ashoka Law House, Delhi, 6th Ed. 2002)
2. Vepa P Sarathi, Law of Evidence, (Eastern Book Company, 6th Ed. 2006)
3. Ranchhoddas Ratanlal Thakore and Dhiraj Lal, The Law of Evidence, (Wadhwa &Wadhwa, Nagpur, 22nd Ed. 2006)
4. MC. Sarkar, 8.C. Sarkar, Law of Evidence in India, Pakistan, Bangladesh, Burma and Ceylon, (Wadhwa & Wadhwa, Nagpur, 15th Ed. 2000)

5. Wigmore John Henary, Wigmore on Evidence, (Aspen Law & Business Publications 4th Ed. 1983)
6. Adrian Zuckerman, The Principles of Criminal Evidence, (Oxford University Press, London, 1989)

MAPPING

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	-	-	-	1	-
CO2	1	3	1	-	-	-	-	1	-
CO3	2	2	-	2	-	1	-	1	1
CO4	1	1	-	1	-	2	-	2	-
CO5	1	1	-	1	-	1	-	1	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Property Law

Course Code: BBALLB 307

Class: BBALLB 3rd year

Semester: V

Credit: 4

L	T	P	C
4	0	0	4

Objective: Property Law is one of the basic fundamental law. It mainly deals with transfer of
Immovable Property among the Living persons, The students are made aware regarding the basic principles of Transfer of Property as well as specific transfer like Election, Part Performance, Sale, Mortgage, Lease, Charge and Gift. This paper is very useful in practice for advocates since most of the common disputes are directly and indirectly associate with the Right to Property.

Course Outcome
On completion of the course students will be able to :

CO1: To make student understand scope of TPA and subject matter of transfer.
CO2: To familiarize students with rules against perpetuity,doctrine of election, apportionment.
CO3: To analyze the key provision of joint transfer, fraudulent transfer.
CO4: To analyze the conceptual framework related to marshalling and right and liabilities.
CO5: To make aware of charge, lease and Gift.

UNIT I:

1. Object and Scope of the Transfer of Property, 1882,
2. Interpretation Clause(Section-3), Definition of Transfer of Property,
3. Subject Matter of Transfer,
4. Persons competent to Transfer, Oral Transfer,
5. Condition restraining alienation restriction repugnant to interest created
6. Transfer for the benefit of Unborn Person

UNIT II:

1. Rule Against Perpetuity,
2. Vested and Contingent Interests,
3. Conditional Transfer
4. Doctrine of Election
5.Apportionment
6. Transfer of Property by Ostensible Owner(Section-41)

UNIT III:

1. Transfer by unauthorized Person who subsequently acquires Interest in Property Transferred,
2. Transfer by One Co-owner,
3. Joint Transfer for consideration,
4. Priority of Rights created by Transfer,
6. Doctrine of LIS- Pendens,
7. Doctrine of Part-Performance
5. Fraudulent Transfer

UNIT IV:

1. Definition of Sale,
2. Rights and Liabilities of Buyer and Seller
3. Marshalling by Subsequent Purchaser,
4 Definition of Mortgage and kinds of Mortgage (Section 58-59),
5. Rights and Liabilities of Mortgagor (Section 60 to 66),
6. Rights and Liabilities of Mortgagee (Section 67 to 77),
7. Priority (Section 78 to 80).

UNIT V:

1. Charge (Section 100)
2. Definition of Lease,
3. Rights and Liabilities of Lessor and Lessee (Section 105 to 108),
4. Different Modes of Determination of Lease (Section 111),
5. Gift (Section 122 to 129)

BOOKS RECOMMENDED:

1. D.F. Mulla. Transfer of Property Act (Lexis Nexis 11th Ed. 2013)
2.Shukla S.N. Transfer of Property, reprint (Allahabad Law Agency, Ed. 2017)
3. Sinha RK The Transfer of Property Act (Central Law Agency Ed. 2016)
4. Tripathi G.P. The Transfer of Property Act (Central Law Publication 19th Ed. 2016)

Mapping of COs with Pos and PSOs

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	1	-	-	-	-	-	-
CO2	2	1	1	1	-	-	-	-	-
CO3	2	-	-	-	-	1	-	-	-
CO4	2	1	-	-	-	1	-	1	-
CO5	2	1	1	1	1	-	-	1	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Jurisprudence-I

Course Code: BBALLB 309

Class: BBALLB 3rd year

Semester: V

Credit: 4

L	T	P	C
4	0	0	4

OBJECTIVE: To provide insight to the students about Sources of Law, Administration of Justice, Law and Morality, Schools of Jurisprudence, Legal Rights and Duties, Ownership and Possessions, Legal Personality, Obligation and Liability etc and to helps in understanding the evolution and nature of Law and the fundamental functions of Law from different perspectives. Moreover, the students are also exposed to the information relating to functioning of various legal systems. This helps in making laws and tackling socio-legal problems prevalent in our country by studying the remedial measures in India.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understand &Conceptualize the evolution, meaning & scope of the legal systems.

CO2: Understand & Critically analyze the concept related to various schools of law.

CO3: Understand & Critically analyze the concept related with Socio-Economic Approach and philosophy.

O4: Critically analyze & Evaluate the concepts related with legal aid & Lok Adalat.

CO5: Understand & Critically analyze the concept related to various sources of law.

COURSE OUTLINE

UNIT-1

1.Definition, nature and province/scope of Jurisprudence
2. Theory of Natural Law and jurisprudence,
3. Analytical school-
Austin's theory of Law
Kelson's pure theory of Law
Bentham's theory of Law

UNIT -II

Historical school

Sociological School

Realist school

UNIT -III

Administration of Justice

Socio-Economic Approach and philosophy

Law and Social Change

Legal Aid

Public Interest Litigation

UNIT-IV

Sources of law -

1 - Custom

2-Precedent

3- Legislation

UNIT-V

1 Rights and Duties

2 Possession and Ownership

Books recommended-

B. S. Mani Tripathi The Legal Theory, (Allahabad Law Agency, Allahabad, 18th Ed. 2012)
NV. Paranjapai, Studies in Jurisprudence and Legal Theory, (Central Law Agency, Allahabad 7thEd.
NomitaAggarwal, Jurisprudence, (Central Law Agency, Allahabad, 10th Ed. (rep)2016)
S.P. Dwivedi, Jurisprudence & Legal Theory. (Central Law Agency, Allahabad 7th Ed. 2017)
Salmond. John William, Sir, Jurisprudence or the theory of the law, (Hard Press Publishing (2013)
R.W.M. Dias, Jurisprudence, Jain Law Book Agency, Delhi, 12th Edition, 2014)
Edgar Bodenheimer, Jurisprudence, (Harvard University Press, 1974 (Revised Ed.)
AmartyaSen, The Idea of Justice, (Cambridge, Mass.: Belknap Press/Harvard University Press,Ed. 2009)
Granville Austin Indian Constitution, (The Cornerstone of a Nation, New Delhi, Oxford University Press. Ed. 2007.

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO3
CO1	1	-	2	-	-	1	-	-	2
CO2	2	-	-	-	-	-	-	-	2
CO3	1	2	1	1	1	1	1	-	3
CO4	2	3	1	3	3	2	1	-	3
CO5	2	2	2	1	-	-	-	-	3

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Socio -Economic Offences

Course Code: BBALLB 351

Class: BBALLB 3rd year

Semester: V

Credit: 4

L	T	P	C
4	0	0	4

COURSE OBJECTIVE: This paper aims at creating awareness about laws which are meant for
prevention of socio-economic offences including corruption in public offices, hoarding, adulteration etc.

Course Outcome

On completion of the course students will be able to :

CO1: To understand the evolution and extent of Socio Economic offences.
CO2: To understand the Protection of Women from Domestic Violence Act,2005
CO3: To discuss the Immoral Traffic (Prevention) Act,1956
CO4: To analyse the Prevention of Money Laundering Act,2002
CO5: To analyse the Prevention of Corruption Act, 1988.

COURSE OUTLINE

It has **5 modules** which are as follows:

UNIT: Introduction to the Socio-Economic Offences **(Lecture: 7)**

(i) Concept and Evolution of 'Socio-Economic Offences.'
(ii) Nature and Extent of Socio-Economic Offences.
(iii) Mens Rea, Nature of Liability, Burden of Proof and Sentencing Policy.
(iv) Concept of White Collar Crimes - Sutherland's theory of 'Differential Association.'
(v) Distinction among Socio-Economic Offences, White Collar Crimes and Traditional Crimes.
(vi) The Socio-Economic Offences in India: The Santhanam Committee Report, 1964 and the
47th Report of the Law Commission of India, 1972.

UNIT: II The Protection of Women from Domestic Violence Act, 2005
(Lecture:12)

(i) The Protection of Women from Domestic Violence Act, 2005
(ii) Definitions of 'Aggrieved person,' Section 2(a); 'Domestic Relationship,' Section 2(f); Respondent,' Section 2(q) and Shared Household,' Section 2(s)
(iii)Definition and Meaning of 'Domestic Violence,' Sections 2 (g) and 3
(iv)Protection Officer: Appointment, Duties and Functions (sections 8, 5 and 9)
(v)Provisions related to various Orders and reliefs to the aggrieved persons (Sections 17, 18, 19, 20, 21, and 22) Penalty for breach of protection order by respondent (Section 31)

UNIT: III The Immoral Traffic (Prevention) Act, 1956
(Lecture:8)

(i)History, Development and Magnitude of Human Trafficking
(ii)Constitutional Provisions and Sections 370-373 of the Indian Penal Code,1860
(iii)The 64th report of the Law Commission of India, 1975
(iv)The Immoral Traffic (Prevention) Act, 1956

UNIT: IV The Prevention of Money Laundering Act, 2002
(Lecture:14)

(i)Need for combating Money Laundering
(ii)Magnitude of Money-Laundering, its steps and various methods
(iii)The Prevention of Money-Laundering Act, 2002
(iv)Definition of 'Money Laundering', Section 3 & 2(1)(p)
(v)Punishment for Money Laundering (Section 4)
(vi)Enforcement: Attachment (Section 5) Survey, Search, & Seizure (Sections 16, 17 & 18) Power to arrest (Section 19)
(vii)Adjudication under the Act: Adjudication by Adjudicating Authorities (Section 8) Special courts (Sections 43 to 47) Vesting of Property in Central Government (Section 9)
(viii)Preventive Mechanisms under the Act: Obligation of banking companies, financial institutions and Intermediaries (Sections 12 & 12A) Reciprocal Arrangements with other countries (Overview of Chapter IX i.e. Sections 55 to 61)

UNIT: V The Prevention of Corruption Act, 1988
(Lecture:7)

(i)Need of the Act (read with Santhanam Committee Report)
(ii)The Prevention of Corruption Act, 1988
(iii)Definitions of public servant,' Section 2 (c) and 'gratification, Section 7.
(iv)Offence committed by public servant and bribe giver and their Penalties (Section 7 to 14)
(v)Punishment for attempts (Section 15)

Text Books:

1. J.S.P. Singh, Socio-Economic Offence, 1*Edn, Sri Sai Law Publications,
2. Prof. (Dr.) Nuzhat Parven Khan, Central Law Publication
3. Mr. Dhrub Kumar, 4th Edn., R. Gupta's Publications
4. The Protection of Women from Domestic Violence Act, 2005
5.The Immoral Traffic (Prevention) Act, 1956
6. The Prevention of Money Laundering Act, 2002

MAPPING

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	1	-	2	-	1	2
CO2	2	1	1	-	-	-	-	2	1
CO3	2	1	1	-	-	-	-	1	1
CO4	3	1	1	-	1	-	-	2	1
CO5	2	1	1	-	1	-	-	2	2

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Entrepreneurship Development (Project)

Course Code: BBALLB 311

Class: BBALLB 3rd year

Semester: V

Credit: 1

L	T	P	C
0	0	2	1

Course Objectives: Students are given a project where they will learn entrepreneurship skills so that they can adopt these skills in their life.

Course Name: Environment Laws

Course Code: BBALLB 304

Class: BBALLB 3rd year

Semester: VI

Credit: 4

L	T	P	C
4	0	0	4

Course Objectives

The paper seeks to inculcate a general awareness of the major problems of environmental protection in three categories: (1) Protection of the environment, (2) Pollution abatement, and (3) Protection of natural and living resources, and the major legal framework obtaining in the Indian law.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understand &conceptualize the evolution, Sources & fundamentals related with Environmental law.

CO2: Understand & critically analyze the concept related with Pollution & its types, Statues related with Air & Water for prevention & control of pollution and Coastal Zone Management.

CO3: Understand & critically analyze the laws related with forest management, Wildlife protection & Judicial Contribution with regards to wildlife protection.

O4: Critically analyze & Evaluate contribution of domestic laws with regards to Land resources, Wetlands, Water resources & Ground water management.

CO5: Evaluate & analyze the contribution of Judiciary with regards to multilateral aspects related with Protection of Environment & Wildlife.

Course Outline

Unit I

General Introduction to Environmental Studies

1. Natural resources and its kinds
2. Concept of pollution of the environment
3. Impact of pollution on natural resources (forest, water, minerals, food energy, Land, air)
4. Sources of environment law
5. India's ancient tradition and environment law
6. Evolution of the Indian laws re. protection of the environments

Unit II

Environmental Pollution and Prevention

1. Definition and causes of pollution
2. Types of Pollution:

(a) Air pollution
(5) Water pollution
(c) Soil pollution
(d) Marine pollution
(e) Noise pollution
(f) Thermal pollution
(g) Nuclear hazards

3. Air (Prevention and Control of Pollution) Act 1981 and judiciary's initiative
4. Water (Prevention and Control of Pollution) Act 1974 and judiciary's initiative
5. Environment Protection Act 1986
6. Noise pollution and judiciary's initiative
7. Coastal zone management

Unit III

Protection of Forest Habitat

1. Forest law in India
2. Sustainable use of forest
3. Role of central government in forest protection
4. Wildlife protection Act 1972
5. Judicial initiative for wildlife protection Act

Unit IV

Resource Management

1. Land resources management
2. Wetlands management
3. Water resources management
4. Ground water management
5. Environment impact assessment

Unit V

Contribution of Indian Judiciary

1. Articles in constitution of India
2. Polluter pays principle
3. Precautionary principle
4. Public Trust Doctrine
5. Compensation and rehabilitation

BOOKS RECOMMENDED

1. K.D. Gaur, Criminal Law -Cases and Material, Universal Law Publishing Co.
2. R. C. Nigam, Law of Crimes -Principles of Criminal Law, Asia Publication House Reference Books: 1. K. I. Vibhute (Rev.), P.S.A.Pillai's Criminal Law, Lexis NexisButterworths India 2008.
2. V.B. Raju, Indian Penal Code, 1860, State Mutual Book and Periodical Service Ltd.
3. K.N.C. Pillai &ShabistanAquil (Rev.), Essays on the Indian Penal Code (The Indian Law Institute, 2005)
4. K.T. Thomas and MA Rashid, Ratanlal&Dhirajlal's The Indian Penal Code, Lexus Nexis, 2015.

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	-	-	2	1
CO2	3	2	1	-	2	-	-	2	-
CO3	2	1	2	1	1	-	-	2	-
CO4	2	1	2	3	2	-	2	2	1
CO5	2	3	2	1	1	1	1	2	2

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Civil Procedure Code, 1908

Course Code: BBALLB 306

Class: BBALLB 3rd year

Semester: VI

Credit: 4

L	T	P	C
4	0	0	4

Course Objective:

5. To provide adequate knowledge about procedures/rules of litigation in the civil courts. The students ought to be aware of the procedural aspects of the enforcement of civil rights in the Indian courts.
6. To give an overview of law of limitation for institution of suit, appeal, review, reference etc. since the law assists the vigilant and not those who sleep over the rights.
7. To view some of the current problems arising out of the procedural technicalities like delay in getting order, Judgment and decree in civil litigations. In some civil cases, even generations pass but no final decision comes out from the court, which is now a point of discussion in the society. To apprise the students with latest amendments in the Code of Civil Procedure is also one of the main objects.
8. To discuss about the nuances of the Civil Procedure and inculcate in them the basic traits of civil practice.

Course Outcome:

After the completion of the subject, the students would be able to:

CO1: Conceptualize the basics of procedural law of the civil litigation in India.

CO2: Familiarize with the different stages in a civil procedure to enable the students to practice in the civil courts.

CO3: Familiarize with certain important concepts and practical skill development activity will provide insights into the actual working of the court procedures.

CO4: Conceptualize the hierarchal setup of civil courts in India along with the different stages of a suit filing, drafting, hearing and execution proceedings.

CO5: Comprehend the importance of the law of limitation as the law supports only vigilant and not the dormant, who sleeps over his rights.

Course Description:

In India, the law governing the procedure to be followed in the civil courts is provided under the Code of Civil Procedure 1908, which is read alongside laws such as the Limitation Act, 1963 and the Registration Act etc. The whole law of procedure is divided into two parts – CPC 1 and CPC 2 along with the Limitation Act 1963. The paper will focus on the civil procedures followed in instituting a suit. The course is designed to acquaint the students with the structure of the civil judiciary, its powers and jurisdiction, and the significance of various procedural steps stipulated for trial of civil litigation. The nature and significance of pleadings and practical aspects relating to it are studied. The course focuses on providing a theoretical framework for the rules of procedure and to identify the values and policies on which the rules are based. The course contains an overview of the entire body of rules of civil procedure ranging from commencement of proceedings, to defining issues for trial, to enforcement of judgments. This course will pursue civil litigation through appellate courts examining the corrective steps available in civil proceedings. Appellate litigation strategies and choice of grounds for appellate / revision petitions are studied in the context of provisions of the C.P.C. and rules of civil practice. Drafting exercises will form a major part of the course. This course also deals with the law of limitation as applicable to civil proceedings. Continuing the study of civil procedure, the course also involves the study on execution of decrees and orders of court and the procedures laid down for it.

Course Content

UNIT I: An Introduction to the Code of Civil Procedure: Key Concepts

Definitions and concepts –

- Need and Importance of Procedural Law
- Suit of a civil nature
- Decree, Judgment, Order
- Foreign Court,Foreign Judgment
- Mens Profits
- Affidavit
- Plaint
- Written Statement
- Legal Representative
- Caveat
- Jurisdiction of Civil Courts and Kinds of jurisdictions
    - Subject matter jurisdiction
    - Pecuniary jurisdiction
    - Territorial jurisdiction
- *Res subjudice S. 10*
- *Res judicata S.11*
- Joinder of parties O I R 1
- Joinder of cause of action O II R 2

UNIT II: Pleadings and Trial of the civil suit

- Rules of pleading
    - Signing of pleading
    - Verification of pleading
- Rules of writing plaint (O VI)
- Set off &Counterclaim
- Rejection of plaint (O VII R11)
- Return of plaint (O VII R10)
- Amendment of pleading (O VI R17)
- Interpleader suit (S.88 and O XXXV)
- Appearance and Non-appearance of parties (O IX)
- Examination of parties (OX)
- Alternate Dispute Resolution
- Settlement of issues (OXIV)
- Disposal of suit on the first hearing (O XV)
- Withdrawal and Adjustment of suit (OXXIII)
- Interim Orders,
- Trial of the civil suit

UNIT III: Appeal, Reference, Review and Revision

- Appeal, Reference, Review and Revision
- Appeals from Original Decree
- Appeals from Appellate Decrees : Second appeal, Appeal to the Supreme Court
- General Provisions relating to Appeals
- Reference to High Court
- Review
- Revision

UNIT IV: Execution Proceedings

- Meaning and Purpose of execution
- Stay of execution
- Restitution
- Decree court and executing court
- Questions determined by executing court
- Garnishee order
- Mode of Execution: Arrest, Attachment, Sale

UNIT V: Law of Limitation

- Meaning, nature and scope of law of limitation
- Bar of Limitation and its efficacy
- Sufficient Cause its meaning and applicability
- Continuous running of time: General principle, meaning, scope
- Difference between prescribed period and period of limitation (S.3 Limitation Act)
- When court is closed on the last day (S.4 Limitation Act)
- Condonation of delay (S.5 Limitation Act)
- Exclusion of time proceeding *bona fide* in court without jurisdiction (S.14 Limitation Act)

UNIT VI: Particular Suits and Miscellaneous

- Suit by or against government O XXVI
- Suit by or against Minors
- Suit by an Indigent person
- Summary Suit (OXXXVII CPC)
- Caveat (S.148A CPC)
- Inherent powers of the court (S.151 to S.153 CPC)

TEXTBOOKS:

6. The Code of Civil Procedure, Justice CK Thakkar, 2016, Esatern Book Company. 7th Edition.
7. Code of Civil Procedure, Dr. Avtar Singh, 2015, 4th Edition, Central Law Publication
8. The Code of Civil Procedure, M.P. Jain, 2016, 4th Edition, Lexis Nexis.
9. The Code of Civil Procedure, TP Tripathi, 2006, Allahabad Law Agency.
10. Code of civil procedure, P.C. Sarkar, 2017, 12th Edition, Lexis Nexis

REFERENCE BOOKS/STATUTES

6. The Code of Civil Procedure, 1908
7. The Limitation Act, 1963
8. Mulla -The Code of Civil Procedure, B.M. Prasad, 2008, 17th Edition, Lexis Nexis
9. Code of Civil Procedure 1908, B.V. Viswanatha. Aiyer, 2016, 8th Edition, Thomson Reuters

Law of limitation & prescription, UN Mitra, 2009, 12th Edition, Lexis Nexis

Mapping between COs and POs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
C131.1	3	-	-	-	-	-	3	3	3	-
C131.2	-	-	-	1	-	-	-	-	-	-
C131.3	-	3	-	3	-		3	-	-	-
C131.4	-	-	3	-	3	3	-	-	-	-
C131.5	2	-	-		3	2	3	-	-	1

1=weakly mapped
2= moderately mapped
3=strongly mapped

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Code of Criminal Procedure

Course Code: BBALLB 310

Class: BBALLB 3rd year

Semester: VI

Credit: 4

L	T	P	C
4	0	0	4

Objective: Of all the branches of law, criminal law is the most important branch of law, because it closely touches and concerns man in his day-today affairs. The Criminal Procedure is an inseparable part of the penal law. Without the Criminal procedure code, the substantive criminal law will become
worthless and meaningless. Our law of criminal procedure is mainly contained in the Code of Criminal
Procedure 1973. It provides the machinery for the detection of crime, apprehension of suspected
criminals, collection of evidence, determination of the guilt or innocence of the suspected person and the imposition of suitable punishment on the guilty person. With this perspective this subject is designed to make the student understand how the Criminal Procedure Code controls and regulates the working of the machinery set up for the investigation and trial of offence

Course Outcome

CO1: To make students understand the constitution, power and function of the criminal courts in India and distinguish between cognizable, non-cognizable, bailable and non-bailable offence and power and functioning of the police
CO2: To make students understand with law related to maintenance, investigation by police and jurisdiction of courts
CO3: To familiarise students with composition, working and jurisdiction of the criminal courts.
CO4: To make students understand meaning, importance of Juvenile Justice Act.
CO5: To make student able to understand composition, functioning and power of Appellate court.

UNIT-I

1. Constitution of Criminal Courts and Offices (Section 6-25),
2. Power of Courts (Section 26-35),
3. Power of Superior Officers of Police (Section-36),
4. Arrest of Persons (Section 41-60),
5. Difference between Summons and Warrant,
6. Difference between cognizable and non-cognizable offences,
7. Rules regarding Proclamation and attachment (Section 82-86),
8. Difference between Bailable and non-bailable offence,
9. Difference between compoundable and non-compoundable offences

UNIT-II

1. Provisions as to Bail and Bonds (Section 436-450),
2. Order for maintenance of wives, children and parents (Section 125-128),
3. Information to the Police and their powers to Investigate (Section154-176),
4. Jurisdiction of Criminal Courts in Inquiries and Trials (Section 177-189),

UNIT-III

1. The Charge (Section 211-224),
2. Trial Before a Court of Session (Section 225-237),
3. Trial of Warrant cases by Magistrates (Section 238-250),
4. Trial of Summons Cases by Magistrate (Section 251-259),
5. Summary Trials (Section 260-265), Plea Bargaining (Section 265-A, 265-L
6. Pleas of Autrefois Acquit and Autrefois Convict (Section 300),

UNIT-IV

The Juvenile Justice (Care and Protection of Children) Act 2015 Section (1-55)

UNIT-V

1. The Judgement (Section 353-365),
2. Submission of Death Sentence for confirmation Section (366-371),
3. Appeals (Section 372-394),
4. Reference and Revision (Section 395-405),
5. Transfer of criminal Cases (Section 406-412),
6. Limitation for taking cognizance of Certain Offences (Section 467-473),
7. The Probation of Offender Act 1958, Section (1-5 and 12-14)

BOOKS RECOMMENDED

1. C. K. Thakker "Takwani' & M.C. Thakker, Criminal Procedure (Lexis Nexis, New Delhi, 4th Ed.2014)
2. K. N. Chandrasekhar Pillai, Criminal Procedure (Eastern Book Company, Lucknow, 16h Ed.
2016)
3. RatanLal&Dhirajlal, The Code of Criminal Procedure, (Lexis Nexis, New Delhi, 22nd Ed. 2017)
4. N. V. Paranjape, The Code of Criminal Procedure, (Central Law Agency, Allahabad, 6th Ed.2017)
Law Commission Reports
5. Forty first Report of the Law commission of India on the Code of Criminal Procedure, 1898
6. Thirty seventh Report of the Law commission of India on the Code of Criminal Procedure, 1898
7. Fourteenth Report of the Law commission of India on the Reform of Judicial Administration

MAPPING WITH COs WITH Pos AND Cos.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	2	1	-	-	-	-	-	1
CO2	3	2	1	1	-	-	-	-	1
CO3	1	3	1	-	-	1	-	-	1
CO4	1	1	1	2	-	1	1	-	1
CO5	1	-	-	2	1	2	1	-	1

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Arbitration Conciliation & Alternative Dispute Resolution System theory

Course Code: BBALLB 308

Class: BBALLB 4th year

Semester: VI

Credit: 4

L	T	P	C
4	0	0	4

Objective- To find out the various Dispute Resolution Techniques used at International and National level. To trace out the differences between most prominent dispute resolution methods including traditional litigation, arbitration in many forms including International Commercial Arbitration mediation and conciliation etc. The system of ADR is less time consuming as well as informal. Therefore, cost of litigation is also subsequently reduce. With the help of this paper, the students learn new techniques of resolution of disputes in certain cases.

Course Outcome

CO1: To make student understand the domestic and international commercial arbitration.
CO2: To familiarize students with difference between ADR and other dispute mechanism.
CO3: To analyze the key provision of Arbitration and conciliation Act 1996.
CO4: To analyze the conceptual framework related to various ADR process.
CO5: To make aware of various convention related to Arbitration dispute resolution.

UNIT 1

1.Evolution of ADR, ADR in India,
2.Advantages & disadvantages of ADR,
3.ADR Processes Pretrial Mediation,
4.Mediation,Negotiation,Conciliation,
5. ADR in family disputes, Conciliation under CPC,

UNIT 2

1. Concept, Meaning& Growth of Lok Adalats,
2. Lok Adalat sunder Legal Services AuthoritiesAct,1987,
3.Nyaya Panchayats-Historical Perspectives,
4.Advantages of Nyaya Panchayats,
5. Composition & Jurisdiction of Nyaya Panchayats

UNIT 3

1.Arbitration& Conciliation Act (Section 1-43);
2.Definition of Arbitration,
3.International Commercial Arbitration,
4.Objectives of the Act,
5. Arbitration Agreement
6. Composition and jurisdiction of Arbitral Tribunal,
7. Conduct of Arbitral Proceedings.

UNIT 4

1. Making of Arbitral Awards and Termination of Proceedings,
2. Recourse Against Arbitral Award,
3. Finality and Endorsement of Arbitral Award,
4. Appealable orders,
5. Lion on Arbitral Awards and Deposits as to costa,
6. Effect on Arbitration Agreement of Death and of parties insolvency

UNIT 5

1.Arbitration& Conciliation Act (Section 44-60).
2. Foreign Awards-Definition,
3. Enforcement of Certain Foreign Awards,
4. New York Convention Awards,
5. Geneva Convention Awards,
6. Convention on Recognition and Enforcement of Foreign Arbitral Awards (Schedule 1), Protocol
on Arbitration Clauses (Schedule II).
7. Convention on Execution of Foreign Arbitral Awards (Schedule III),
8. Conciliation under Arbitration and Conciliation Act, 1996(Sections 61-81).
9. Role of Conciliator, Confidentiality in conciliation.

RECOMMENDED BOOKS

1.Anupam Kurlwal, An Introduction to Alternative Dispute System (ADR), (Central Law Publication, Allahabad, Ed. 2014).
2. S.C. Tripathi, Arbitration and Conciliation Act, 1996 with Alternative means of settlement of
dispute, (Central Law Publication, Allahabad, Ed. 2015).
3. Avtar Singh, Law of Arbitration and conciliation, (Eastern Book Company, Lucknow, Ed. 2017
4. Ashwinie Kumar Bansal, International Commercial Arbitration Practice and Procedure, (Universal Law Publishing Co., New Delhi, Ed. 2012)
5. G.K. Kwatra, Arbitration and conciliation Law of India, (Universal Law Publication Co.

New
Delhi, Ed. 2014).

MAPPING Cos WITH Pos AND PSOs.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	1	-	-	-	-	2	-
CO2	-	1	-	1	-	-	-	-	-
CO3	2	-	1	-	-	-	-	1	2
CO4	3	1	2	-	1	1	-	1	1
CO5	1	1	2	-	-	-	-	-	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Banking and Insurance

Course Code: BBALLB 312

Class: BBALLB 3rd year

Semester: VI

Credit: 4

L	T	P	C
4	0	0	4

Objective: In this paper the students will be taught different kinds of banks, their functions, and relationship with customers and the banking frauds, law relating to recovery of debts due to banks recovery of debts. Kinds of insurance and the body regulating the insurance sector will also be studied, along with their judicial interpretation and the new and emerging dimensions in both insurance and banking.

COURSE OUTCOME:

At the end of the course, students should be able to:

C01 - To understand the working of the Reserve Bank of India and IRDA

C02 - To grasp the conduct of monetary policy and its effect on the interest rate, credit availability, prices, and the inflation rate

C03 -Discuss bank lending policies and procedures.

C04 -To elucidate the broad functions of banks and Insurance companies

C05 - Evaluate the performance of the banking industry and Insurance sector

Catalog Description

The course deals with acquainting the students with the fundamentals of banking and Insurance. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-1 : BANKING SYSTEM IN INDIA

1. History of Banking in India.
2. Banking Definition, Meaning, Bank, Banker Banking Company, Commercial Banks.
3. Contract between Banker and Customer.
4. Banking Regulation Laws:
   i. Reserve Bank of India Act, 1934
   ii. Banking Regulation Act, 1949

UNIT-2 : CUSTOMER

1. Meaning, Legal Character of Banker-Customer Relationship.
2. Rights and Obligation of Banks.
3. Right of Set off & Bankers Lien.
4. Duty of Confidentiality, Exceptions to the Duty.
5. Special Type of Customers: Lunatics, Minors, Agents, Administrators and Executors, Partnership Firms and Companies.

UNIT-3 : LENDING, SECURITIES AND RECOVERY BY BANKING

1. Principles of Lending
2. Position of Weaker Sections.
3. Nature of Securities and Risks Involved .
4. Default and Recovery .
5. Recovery of Debts with and without Intervention of Courts / Tribunal:
    i. Recovery of Debts due to Banks and Financial Institutions Act, 1993.
    ii. Enforcement Of Security Interest Act, 2002

UNIT-4: CONTROL BY GOVERNMENT AND ITS AGENCY

1. Need for Elimination of Systematic Risk.
2. Avoidance Money Laundering, Control by Ombudsman.
3. R.B.I., R.B.I. as Central Bank of India, Evolution of Central Bank.
4. Characteristics and Functions of Central Banks, Central Bank as Banker.
5. Objectives and Organizational Structure of R.B.I., Regulations of the monetary system, Credit Control.

UNIT-5: INSURANCE LAW

1. Nature of Insurance Contracts.
2. Kinds of Insurance:
    i. Life Insurance
    ii. Property Insurance
    iii. Fire Insurance
3. Constitution, Functions and Powers of Insurance Regulatory and Development Authority
4. Application of Consumer Protection Act, 1986.

Text Books:

1. ***Banking and Insurance Law and Practice, Institute of Company Secretaries of India,***
2. ***Taxmann Publishers, 2010 2. M.N. Mishra, Law of Insurance, Central Law Agency, 9 th Edition, 2012***
3. ***M.L. Tannen : Banking Law and Practice in India***
4. ***S.N. Gupta : The Banking Law and Practice in India***
5. ***Sharma and Nainta : The Banking Law And Negotiable Instrument Act***

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	1	-	1	-	-	1	1	-
CO2	2	2	2	1	2	-	-	1	1	-
CO3	2	2	1	-	1	1	-	-	-	-
CO4	1	1	2	1	2	2	1	2	-	-
CO5	2	2	2	1	2	-	-	-	-	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Arbitration Conciliation & Alternative Dispute Resolution System Practical

Course Code: BBALLB 352

Class: BBALLB 3rd year

Semester: VI

Credit: 1

L	T	P	C
	0	2	1

Objective- To find out the various Dispute Resolution Techniques used at International and National level. To trace out the differences between most prominent dispute resolution methods including traditional litigation, arbitration in many forms including International Commercial Arbitration mediation and conciliation etc. The system of ADR is less time consuming as well as informal. Therefore, cost of litigation is also subsequently reduce. With the help of this paper, the students learn new techniques of resolution of disputes in certain cases.

Course Outcome

CO1: To make student understand the domestic and international commercial arbitration.
CO2: To familiarize students with difference between ADR and other dispute mechanism.
CO3: To analyze the key provision of Arbitration and conciliation Act 1996.
CO4: To analyze the conceptual framework related to various ADR process.
CO5: To make aware of various convention related to Arbitration dispute resolution.

UNIT 1

1.Evolution of ADR, ADR in India,
2.Advantages & disadvantages of ADR,
3.ADR Processes Pretrial Mediation,
4.Mediation,Negotiation,Conciliation,
5. ADR in family disputes, Conciliation under CPC,

UNIT 2

1. Concept, Meaning& Growth of Lok Adalats,
2.Lok Adalat sunder Legal Services AuthoritiesAct,1987,
3.Nyaya Panchayats-Historical Perspectives,
4.Advantages of Nyaya Panchayats,
5. Composition & Jurisdiction of Nyaya Panchayats

UNIT 3

1.Arbitration& Conciliation Act (Section 1-43);
2.Definition of Arbitration,
3.International Commercial Arbitration,
4.Objectives of the Act,
5. Arbitration Agreement
6. Composition and jurisdiction of Arbitral Tribunal,
7. Conduct of Arbitral Proceedings.

UNIT 4

1. Making of Arbitral Awards and Termination of Proceedings,
2. Recourse Against Arbitral Award,
3. Finality and Endorsement of Arbitral Award,
4. Appealable orders,
5. Lion on Arbitral Awards and Deposits as to costa,
6. Effect on Arbitration Agreement of Death and of parties insolvency

UNIT 5

1.Arbitration& Conciliation Act (Section 44-60).
2. Foreign Awards-Definition,
3. Enforcement of Certain Foreign Awards,
4. New York Convention Awards,
5. Geneva Convention Awards,
6. Convention on Recognition and Enforcement of Foreign Arbitral Awards (Schedule 1), Protocol
on Arbitration Clauses (Schedule II).
7. Convention on Execution of Foreign Arbitral Awards (Schedule III),
8. Conciliation under Arbitration and Conciliation Act, 1996(Sections 61-81).
9. Role of Conciliator, Confidentiality in conciliation.

RECOMMENDED BOOKS

1.Anupam Kurlwal, An Introduction to Alternative Dispute System (ADR), (Central Law Publication, Allahabad, Ed. 2014).
2. S.C. Tripathi, Arbitration and Conciliation Act, 1996 with Alternative means of settlement of
dispute, (Central Law Publication, Allahabad, Ed. 2015).
3. Avtar Singh, Law of Arbitration and conciliation, (Eastern Book Company, Lucknow, Ed. 2017
4. Ashwinie Kumar Bansal, International Commercial Arbitration Practice and Procedure, (Universal Law Publishing Co., New Delhi, Ed. 2012)
5. G.K. Kwatra, Arbitration and conciliation Law of India, (Universal Law Publication Co.

New
Delhi, Ed. 2014).

MAPPING Cos WITH Pos AND PSOs.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	1	-	-	-	-	2	-
CO2	-	1	-	1	-	-	-	-	-
CO3	2	-	1	-	-	-	-	1	2
CO4	3	1	2	-	1	1	-	1	1
CO5	1	1	2	-	-	-	-	-	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Internship

Course Code: BBALLB 354

Class: BBALLB 3rd year

Semester: VI

Credit: 1

L	**T**	**P**	**C**
	0	2	1

Practical Subject

Modes of Evaluation:

Components	**Internal Examination**	**External Examination**
Weightage (%)	**60%**	**40%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Labour Law - I

Course Code: BBALLB 401

Class: BBALLB 4th year

Semester: VII

Credit: 4

L	T	P	C
4	0	0	4

Course Objectives: To apprise the students with application of various laws for the raising of living standards of labourers and peaceful of resolution of Industrial Disputes. In this regard the functions of Labour Court, Tribunals, and Arbitration are discussed in detail. Strike, Lockout, Role of Trade Unions and the Factories Act etc are explained in detail and easy manner.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understanding of the principles of labour law to a level that is sufficient to satisfy the requirements for admission to legal practice.

CO2: Resolve legal issues relating to the Labour laws in terms of the Strike, Lockout, and other provision related to dispute between employee and employer.

CO3: Conceptualize and analyze the causes of devlopments the trade unionism in India and its causes. .

CO4: Assess and analyze the rights and liabilities of registered trade union along with its membership.

CO5: Conceptualize and identify different aspect of The Factory Act,1948.

Catalog Description:

The course of Labour and Industrial Law I has been specifically designed to provide in-depth knowledge about Labour and Capital, raising disputes between employer and employee and other related important issues. The course will also provide deep insights on Industry, factory. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective Labour lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-I: THE INDUSTRIAL DISPUTE ACT, 1947

1. Object and main features of the Act.
2. Definitions: Appropriate Government, Employer, Industry, Industrial Dispute, Workmen, PublicUtility Service, Industrial Establishment or Undertaking,
3. Authorities under the Act (Section 3-9 and 11-15),
4. Notice of Change (Section 9-A),
5. Reference of Disputes to Boards, Court and Tribunal (section 10),
6. Voluntary Reference of Disputes to Arbitration (section 10-A),
7. Power of Labour Court and Tribunal to give relief in case of Discharge or Dismissal of Workmen(section 11-A),
8. Awards and Settlements (section, 16-21)

UNIT-II: THE INDUSTRIAL DISPUTES ACT 1947

1. Definition of Strike and Lockout (section-2), other Statuary Provisions of ID Act, 1947 relating
to Strikes and Lockouts (section 22-28),
2. Layoff and Retrenchment (section 2, 25A-26E and 25F-25H),
3. Compensation to Workmen in case of Transfer of Undertakings (section 25 FF),
4. 60 Days Notice to be Given of Intention to Close Down the Undertaking (section 25 FFA)
5. Compensation to workmen in case of closing down of undertaking (section 25 FFF), specialprovisions relating to lay off, retrenchment and closure in certain establishments (section 25K-25S),
6. Unfair labour practice (section 25 1-250), scope of section 33 and 36 of ID Act, 1947

UNIT-III: THE TRADE UNIONS ACT, 1926

1. Development of Trade Unions Law in India,
2. Definition: Executive, Registrar, Trade Union,
3. Registration of Trade Union (section 3-9), Cancellation of Registration (section-10),
4. Appeals (section-II),
5. Incorporation of Registered Trade Union (Section 13).

UNIT-IV: THE TRADE UNIONS ACT, 1926

1. Right and Liabilities of Registered Trade Union (section 15-18),
2. Right to Inspect Books of Trade Union (section 20),
3. Right of Minor to be Membership of Trade Union (section 21).
4. Disqualification of Office Bearers of Trade Unions (section-2la),
5. Proportion of Office Bearers to be connected with an Industry (section 22),
6. Change of Name and Amalgamation of Trade Union (section 23 to 26)
7. Dissolution and Returns (section 27 & 28)

UNIT-V: THE FACTORIES ACT, 1948

1. Definitions: Adult, Adolescent, Child Hazardous Process, Manufacturing Process, Worker, Factory,
2. Approval of Licensing and Registration of Factories (section 6).
3. Notice by Occupier and Duties of Occupier (section 7).
4. Inspector and Certifying Surgeons (section 8 to 10).
5. Statutory Provisions relating to Health and Safety (section 11 to 41),
6. Welfare (section 42 to 50).
7. Working Hours of Adult (51 to 66).
8. Employment of Young Persons (section 67 to 77),
9. Annual Leave with wages (section 78 to 84)

Text Books:

1. C V Memoria and Satish Memoria, Dynamics of Industrial Relation
2. K Srivastava . Industrial peace and Labour In India

References:

1. Mishra - Labour and Industrial Law
2. V.G. Goswami – Labour Law
3. Madhavan pillai - Labour and Industrial Law
4.O.P. Malhotra – Labour Law
5. Nirmal Singh and S K Bhatia Industrial Relation and Collective Bargaining

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	2	3	2	1	3	2	2
CO2	2	2	2	2	3	2	2
CO3	2	2	2	1	2	2	1
CO4	2	2	2	2	1	1	2
CO5	3	2	2	2	2	1	0

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Trust Equity & specific Relief act, 1963

Course Code: BBALLB 403

Class: BBALLB 4th year

Semester: VII

Credit: 4

L	T	P	C
4	0	0	4

Objective: Objective: The objective of the course is to provide students with an overall understanding of the law of equity with special emphasis on fiduciary obligations, trusts, equitable assignment of property and equitable remedies. The paper is useful for students to understand and compare the role of Equity in ancient and modern legal system.

COURSE OUTCOME:

At the end of the course, students should be able to:

C01 – identify and state a clear understanding of the law of trust, equity and fiduciary relationship and how it applies to whole of civil law in India.

C02 – identify the different types of principles of equity and equitable remedies.

C03 – distinguish between different types of trust and analyse the powers rights and duties of a trustee

C04 – critically analyse the theoretical and philosophical underpinnings of the law of equity and trust

C05 – critique the societal impact of the law of equity and trust

Catalog Description

The course deals with acquainting the students with the fundamentals of equity trsut and fiduciary relationship.. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, . Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-1 (8 lectures)

5. History, nature and principles of Equity-Emergence of law of trust from Equity
6. The making of Indian Law of Trust and provisions of law of Trust-Religious Trusts
7. Principles of Equity and Equitable Remedies
8. Equitable Relief in different branches of law with special reference to property law.

UNIT-2 (9 lectures)

7. Nature of Equity
8. History of Courts of Equity
9. Relations of law of Equity
10. The maxims of equity
11. Different Equitable remedies.

UNIT – 3 (8 lectures)

5. Essentials of Trust
6. Fiduciary Relationship Concept, kinds vis-a-vis Trusteeship
7. Trust and contract, Power, condition, charge and personal obligations- distinguished
8. Classification of Trust and its importance

UNIT – 4 (10 lectures)

7. Private Trusts
8. Public Trusts
9. Appointments, Retirement and removal of Trustee
10. Rights, Power, Discretion and control of Trustees
11. Duties of trustee in relation to:
12. (i) Trust property; and (ii) Beneficiary

UNIT – 5 (13 lectures)

6. The Administration of Trust
7. Liability for Breach of Trust
8. Rights and Remedies of the Beneficiary
9. Constructive Trusts
10. Appointment and Discharge of Trustees

BOOKS RECOMMENDED:

8. Ahmad Aquil, Equity, Trusts and Specific Relief.
9. Desai S.T., Equity, Trusts and Specific Relief.
10. Hansbury&Mousley, Modern Equity.
11. Jhabwala N.H, Elements of Equity, Trusts and Specific Relief.
12. Rao GCV Subha, Equity, Trust and Fiduciary Relation.
13. Singh G.P., Principles of Equity. Snell, Principles of Equity.
14. Tondon M.P., Principles of Equity and Trusts

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	1	-	1	-	-	-	1	-
CO2	3	3	2	2	1	-	-	1	2	-
CO3	2	1	1	-	1	1	-	-	-	-
CO4	3	1	3	2	2	2	1	2	-	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

15.

16. Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Taxation Laws

Course Code: BBALLB 405

Class: BBALLB 4th year

Semester: VII

Credit: 4

L	T	P	C
4	0	0	4

Course Objective :

1.Taxation is a general law made by governments to collect revenue from people and organizations.
2. A tax formula contains at least three elements: the definition of the base, the rate structure, and the identification of the legal taxpayer.
3. The base multiplied by the appropriate
rate gives a product, called the tax liability, which is the legal obligation that the taxpayer must
meet at specified dates.
4. A tax is identified by the characteristics of its base, such as income in thecase of an income tax.
5.The paper is helpful to the students in understanding the theoretical aswell as practical aspects of Taxation Policy of the Government.

Course Outcome

On completion of the course students will be able to :

CO1: To understand the basic concept of Income Tax

CO2: To understand the calculation of different head of Income.

CO3: To understanding the deduction, rectification and assessment procedure.

CO4: To analyse the appeal, references, revision, penalties and Liability in special cases

CO5: To analyse the rebate, Relief, double taxation relief.

Catalog Description

No government can run a country without revenue. One of the major sources of revenue is taxation. Taxes can be classified as Direct and Indirect Tax. Direct taxes encompass those taxes where impact and incidence falls on the same person. Income Tax Act, 1961 is the prime legislation in the area of direct taxes in India. It is very interesting to know various facets of this Act. The Act makes ample scope for tax planning and tax management by utilizing various provisions which are enshrined therein. A tax payer can reduce her tax liability by taking advantage of various incentives that are provided in the Act.The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to

discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

COURSE OUTLINE

It has **5 modules** which are as follows:

UNIT-I **(Lecture: 7)**

1. Definition: Income-Meaning, Concept, Application and Diversion of Income, Agricultural Income, Assessee, Assessment year and Previous Year, Residential Status and Tax Liability of Assessee
2. Distinction between Capital Receipt and Revenue Receipt;
3. Capital Expenditure and revenue

UNIT-II **(Lecture: 29)**

1. Heads of Income
(a) Salary
(b) Income from house property
(c) Capital gains
2. Income of other persons included in Assesssee's Total Income
3. Set out and Carry Forward of Losses

UNIT-III **(Lecture: 5)**

1. Assessment Procedure
2. Rectification of Mistakes
3. Deductions under Section 80 C, 80 D, 80 CCE, 80 G, 80 U

UNIT-IV **(Lecture: 4)**

1. Appeal, Reference and Revision
2.Penalties (Section 271 to 275)
3.Income Tax Authorities
4. Liability in Special Cases (Sec 159-181)

UNIT-V **(Lecture: 3)**

1. Rebate of Income Tax (Sec 87-88)
2. Relief from Income Tax (Sec 89)
3Double Taxation Relief (Sec 90-91)
4. Collection, Recovery and Refund (Sec 190 to 234 and Sec 237-245)

BOOKS RECOMMENDED

1. Kailash Rai, Taxation Law, (Allhabad Law Agency 16th Ed. 2017)
2. V.K. Singhania. Students Guide to Income Tax (Taxman Publication Pvt. Ltd. Ed. 20152
3. Kanga & Palkiwala.The Law and Practice of Income Tax (N.M. Tripathi Pvt. Ltd. Latest Ed.)
4. Sampath Iyengar. Law of Income Tax (Bharat Law House Pvt. Ltd. New Delhi, Ed. 2014)gt

MAPPING

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	-	-	-	-	-	-	1	-
CO2	1	3	1	-	-	-	-	1	-
CO3	2	2	-	2	-	1	-	1	1
CO4	1	1	-	1	-	2	-	2	-
CO5	1	1	-	1	-	1	-	1	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Interpretation of Statues

Course Code: BBALLB 407

Class: BBALLB 4th year

Semester: VII

Credit: 4

L	T	P	C
4	0	0	4

Objective: In the construction interpretation of statutes, the principle aim of the court must be to carry out the Intention of Legislature. A statute is presumed to make no changes in the common law. For the Law student it is very necessary to know the fundamentals of interpretation, therefore, they are taught different principles of interpretation used by courts to find out the real intention and object of legislation. It is very helpful in legal profession.

Course Outcome
On completion of the course students will be able to :

CO1: To make student understand the meaning, principles of interpretation.
CO2: To familiarize students with external aid, interpretation of penal and taxing statues.
CO3: To analyze the key provision of rule of Ejusdem Generis and Noscitur-a-sociis.

CO4: To analyze the conceptual framework Rule of Pari Materia, and Stare Decisis.
CO5: To make aware of Legislation and Relationship between Law and Public Opinion

UNIT I:
1. Statute: Meaning and Classification,
2. Interpretation-Meaning, Object, Purpose
3. Basic Principles of Interpretation, Difference between Interpretation and Construction, Rule of
Construction-Literal, Golden and Mischief Rules,
4. Limitations of the Court

UNIT II:
1. Internal Aid,
2. External Aid,
3. Interpretation of Mandatory and Directory Provisions,
4. Interpretation of Penal and Taxing Statutes

UNIT III:
1. Interpretation of Indian Constitution
2. Rule of Ejusdem Generis
3. Rule of Noscitur-a-sociis

UNIT IV:

1. Rule of Pari Materia,
2. Rule of Stare Decisis
3. Contemporanea Expositio eat optima Et Fortissima in Lege
4. Bentham's Theory of Legislation
5. Pains and Pleasure,
6. Greatest Happiness of Greatest Number,
7. Utilitarianism

UNIT V:

1. What is Legislation
2. Who Legislate,
3. Restriction on the Legislature,
4. Legislation is a Science,
5. The Method of Law Reform,
6. Principles of Legislation, Relationship between Law and Public Opinion.

BOOKS RECOMMENDED:

1 G.P.Singh. Principles of Statutory Interpretation, (Lexis Nexis 14th Edition, 2016)
2. Avtar Singh. Introduction to Interpretation of Statutes, (Lexis Nexis 4th Edition, 2014)
3. V.P. Sarathi. Interpretation of Statutes, (E.B.C. 5th Edition, 2010)
4.Kafaltiya A.B. Interpretation of Statutes, (E.B.C 2016 Latest Ed.)
5. D.N.Mathur. Interpretation of Statutes, (Central Law Publication 2013 Latest Ed.)
6. R.D. Srivastava. Interpretation of Statutes and Legislation, (Central Law Publication 6th Edition, 2013) .

Mapping of COs with Pos and PSOs

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	-	-	1	-	-	-	-
CO2	2	2	1	1	1	1	-	-	-
CO3	2	1	1	-	-	1	-	-	-
CO4	2	2	-	-	-	1	-	-	-
CO5	2	2	1	-	-	1	1	-	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Investment Law and Competition Law

Course Code: BBALLB 409

Class: BBALLB 4th year

Semester: VII

Credit: 4

L	T	P	C
4	0	0	4

Objective: An investment objective is one of the few parameters that a financial advisor, asset management company, or robo-advisor require in order to determine the assets in the portfolio of their clients. An investment objective is the purpose of the client for which he or she decides to invest in a particular asset or security.

COURSE OUTCOME:

Upon successful completion of the course, students will:

CO1 have knowledge and understanding of the conceptual basis of international investment law

CO2 have an appreciation of how the main procedural and substantive principles of international investment law apply in practice

CO3 be able to select and apply the international and domestic rules on the regulation of foreign direct investments

CO4 analyze the complexity of problems and legitimacy issues related to legal regulation of foreign direct investments and the system of investor-state dispute settlement.

Catalog Description

The course contains various aspects of investment related laws and regulations. The course will give you ideas about shares, debentures, depository system etc. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective corporate lawyering skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-1: SECURITIES

1. Evolution of Securities and Investment Laws in India
2. Concept of Securities and Kinds of Securities.
3. Regulatory Framework to Govern Securities in India: The Securities Contracts (Regulation) Act, 1956 - Delisting of Securities
4. Role of Stock Exchange under It - Powers and Functions under SEBI Act, 1992
5. The Depositories Act, 1996 -Dematerialisation of Shares

UNIT-2: ROLE OF BANKS

1. Role of Banks to Issue Securities
2. Changing Functions of Banks from Direct Lending to Modern System of Investment Banking.
3. Securitization and Reconstruction of Financial Assets

UNIT-3: FOREIGN LAWS

1. Role of the Foreign Exchange Management Act, 1999 to Regulate Foreign Trade - Difference from FERA
2. Administration of Exchange Control.
3. Adjudicatory Powers .
4. Foreign Trade (Development & Regulation) Act, 1992

UNIT-4 : JOINT VENTURE

1. Joint ventures in India and Foreign Collaborations
2. Concept of Transnational Corporations and Multinational Corporations – UNCTAD model .
3. Foreign Direct Investment.
4. Foreign Institutional Investors: Its Regulatory

UNIT-5 : DEPOSITORIES

1. Denationalized securities
2. Recognition of securities
3. Types of depository receipt: IDR, ADR,GDR and EURO receipt
4. SEBI guidelines on depositories.

Text Books:

- ***Avatar Singh, Company Law, Eastern Book Company, Lucknow.***
- ***Ramaih, A Guide to Companies Act, Wadhwa Publications.***
- ***Securities Laws And Compliances By ICSI***

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	1	-	1	-	-	1	1	-
CO2	2	2	2	1	2	-	-	1	1	-
CO3	2	2	1	-	1	1	-	-	-	-
CO4	1	1	2	1	2	2	1	2	-	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Comprehensive Viva

Course Code: BBALLB 451*

Class: BBALLB 4th year

Semester: VII

Credit: 4

L	T	P	C
0	0	4	2

Practical subject

Modes of Evaluation:

Components	Internal Examination	End term written Exam
Weightage (%)	40%	60%

Internal Examination

Components	Assignment/ Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	40

Course Name: Moot Court

Course Code: BBALLB 452

Class: BBALLB 4th year

Semester: VII

Credit: 1

L	T	P	C
0	0	2	1

Objective- The objective of this subject is to teach students how to do legal research, present arguments and prepare memorial in a moot court along with basics professional ethics required in a court room.

Course Outcome
On completion of the course students will be able to :

CO1: Take part in Moot court competitions following relevant rules and instructions
CO2: Learn how to do legal research, form issues, address those issues and frame arguments.
CO3: Understand the pros and cons of argumentation.
CO4: Learn courtroom etiquettes and act in a professional manner
CO5: Develop confidence and communication skills.
CO6: Gain legal research skills.

RULES FOR MOOT COURT COMPETITION

► MARKING CRITERIA FOR MEMORIALS:

Marking Criteria	Marks Allotted
Evidence of Original Thought	20
Knowledge of Law and Facts	20
Proper and Articulate Analysis	20
Correct format and Citation	20
Extent and Use of Research	20
TOTAL MARKS	100

Number of Copies of Memorial to be submitted: 2
• Number of Compendium to be submitted: 1

RULES FOR THE ORAL ROUNDS:

Preliminary Rounds

The preliminary rounds will be held on February 12, 2020. The Preliminary rounds shall comprise of Two Rounds of oral arguments subject to the allotment of team codes where three teams are representing as Applicant and three teams as the Respondents. In preliminary rounds, each team shall have to argue once, as per their allotment, either as Applicant or as Respondent.

Each team will get a total of 20 minutes to present their case. And 5 minutes will be allotted for rebuttal. The division of time per speaker is left to the discretion of the team, where the teams shall divide timings as:

a. Speaker 1- mention the specific time with respect to specific issues.
b. Speaker 2- mention the specific time with respect to specific issues,
(on A4 size paper to be submitted in the court room)

• The oral arguments should be confined to the issues presented in the memorial. The researcher may sit with the speakers during the oral rounds. Maximum scores for the oral rounds shall be 50 points per speaker by a judge

.The speakers shall provide the copies ofthe compendium in the court room. No two Teams will argue against each other morethan once in the Preliminary Rounds.

The oral rounds shall be judged on the following criteria:

Marking Criteria	Marks Allotted
Preparation and familiarity with facts	10
Structure of Legal Argument	10
Knowledge & Application of Law	10
Organization, Presentation, Speaking Ability	05
Responsiveness to Questions	05
Persuasiveness and Advocacy	05
Courtroom Etiquette	05
MARKS FOR EACH SPEAKER	50
TOTAL MARKS	100

• The winners of the preliminary rounds, i.e. total two teams (2 teams) shall qualify for the Final Rounds.

Final Rounds:

The Final Rounds shall also take place on February 12, 2020. The two teams who stand declared as winners of the Preliminary Rounds shall qualify for the Final Rounds. Each team will get a total of 30 minutes to present their case which will include rebuttal and sub-rebuttal time. The Winner of the Final Round shall be declared Winner of the Competition.

> Scouting

Teams shall not be allowed to observe the orals of another team, unless they have been officially knocked-out of the competition. Scouting is strictly prohibited. Scouting by any team shall entail instant disqualification.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	3	3	2	1	2	3	1	-
CO2	1	3	2	2	2	1	2	1	-
CO3	1	2	3	2	1	1	1	3	2
CO4	-	2	2	2	2	2	2	-	1
CO5	-	1	3	-	2	-	2	-	-
CO6	1	1	2	1	2	-	-	1	1

Modes of Evaluation:

Components	**Internal Examination**	**External Examination**
Weightage (%)	**60%**	**40%**

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Labour Law-II

Course Code: BBALLB 402

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Objective-

1.To know the development and the judicial setup of Labour Laws.
2.To learn the salient features of welfare and wage Legislations.
3.To learn the laws relating to Industrial Relations, Social Security and Working conditions.
4.To understand the laws related to working conditions in different settings.

Course Outcomes

On completion of this course, the students will be able to

CO1: Understanding of the principles of labour law to a level that is sufficient to satisfy the requirements for admission to legal practice.

CO2: Resolve legal issues relating to the Labour laws in terms of the Strike, Lockout, and other provision related to dispute between employee and employer.

CO3: Conceptualize and analyze the causes of developments in Wages Acts.

CO4: Assess and analyze the rights and liabilities under Industrial Employment Act.

CO5: Conceptualize and identify different aspect equal renumeration Act.

Unit-I: The Workmen's Compensation Act, 1923

1. Main Features of the Act,
2. Definitions Compensation, Dependent, Employer, Workman, Partial Disablement, Total Disablement,
3. Employer's Liability for Compensation(section-8).
4. Notice and claims of the Accident (section-10),
5. Commissioner (Section 19 to 29).

6. Appeals (section 30).
7. Medical Examination (Section 11)

UNIT-II: The Minimum Wages Act, 1948

1. Objects and Constitutional Validity of the Act,
2. Salient Features of the Act
3. Definitions: Employer. Cost of Living Index, Scheduled Employment, Wages,
4. Minimum Wages, Fair Wage and Living Wage,
5. Fixation and Revision of Minimum Rates of Wages, Working Hours,
6. Determination of Wages and Claims (section 3,20 and 21).

UNIT-III: Payment of Wages Act, 1936

1. Definitions: Employer, Industrial and other Establishment, Wages,
2. Payment and Deduction from Wages (section 3-13).
3. Inspector (section 14).
4. Authority to Hear claims section 15),
5. Appeal (section-17)

UNIT-IV: The Industrial Employment (Standing Orders) Act, 1946,

1. Procedure for Certification & Adoption of Standing Orders.
2. Certifying Officer,
3. The Employees' State Insurance Act, 1948-
4. Employees State Insurance Corporation,
5. Standing Committee, Medical Benefit Council,
6. Contributions, Benefits, Employees Insurance Court

UNIT-V : The Equal Remuneration Act, 1976-

1. Definition Clause
2. Payment of Remuneration at Equal Rates section 4 to 7)
3. Inspector,
4. Penalities and Cognizance of Offences under the Act,

The Payment of Bonus Act, 1965-

1. Eligibility, Disqualification for Bonus (section 8,9)
2. Minimum & Maximum Bonus (5,10,11);
3. Proportionate Reduction (5, 13)
4. Recovery of Bonus Due (5,21)
5. Customary Bonus, Productivity Bonus

The Payment of Gratuity Act, 1972.

1. Definitions, Eligiblity, Payment, Determination,
2. Recovery and Protection of Gratuity, Sec. 2-A, 4, 7, 8, and 13

TEXTBOOKS:

1. CB Memoria and Satish Memoria. Dynamics of industrial Relations, (Himalaya Publishing
House-Mumbai Part II and III. Ed. 2007
2. Dr. V.G. Goswani. Labour and Industrial law.(Central Law Agency Allahabad, Part VI. Ed.2005)
3.Nirmal Singh and S.K. Bhatia. Industrial Relations and Collective Bargaining.(Deep and DeepPublications Pur.Lid. - Delhi, Ed. 2000.)
4. Srivastav K. Industrial Peace and Labour in India. (Kitab Mahal Allahabad, Ed. 2003)
5. Indian Law Institute. Labour Law and Labour Relations, (Ed. 2002)
6. KM Pillai Labour and Industrial Law, (Allahabad Law Agency, Faridabad Haryana, Part I. Ed.2005)
7. S.N. Mishra. Labour and Industrial Law, (Central Law Publications, Allahabad, Part I. Ed.
2004)
8. HL Kumar. Labour problems and remedies. (Universal Book Traders, Delhi, Ed. 2006

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	2	3	2	1	3	2	2
CO2	2	2	2	2	3	2	2
CO3	2	2	2	1	2	2	1
CO4	2	2	2	2	1	1	2
CO5	3	2	2	2	2	1	0

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Intellectual Property Law

Course Code: BBALLB 404

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Objective: To create awareness about the concept of Intellectual Properties, various conventions, Provisions of Copy Right Act, 1957, The Trade Mark Act 1999 and The Patents Act 1970. The students can understand the process of Registration of Copyright work, trade mark and patents with the help of this paper.

UNIT-1

- Concept of Property vis-a-vis Intellectual Property
- Basic concepts of Intellectual Property Law
- Nature of Intellectual Property
- Origin and Development of Intellectual Property - Copy Right, Trade Mark
- Commercial Exploitation of Intellectual Property
- Enforcement of Rights and Remedies Against Infringement
- Patent

UNIT-2

- International Character of Intellectual Property
- Intellectual Property and Economic Development
- International Protection of Intellectual Property - overview of International Conventions
- -Berne Convention - WIPO Treaties 1996, Paris Conventions, TRIPS Agreements etc.
- India's Position vis-a-vis International Conventions and Agreements

UNIT-3

- Object of Patent Law Inventions-
- Patentable and Non-Patentable
- Process Patent and Product Patent
- Procedure for obtaining a Patent
- Rights and Obligations of a Patentee
- Revocation and Surrender of Patents
- Infringement of Patent.

UNIT-4

- What is a Trade Mark
- Functions of a Trade Mark
- Trade Mark Registry and Register of Trade Mark
- Registration of Trade Marks
- Effects of Registration
- Assignment and Transmission of Trade Marks
- Rectification and Correction of Register
- Passing Off and Infringement Action

UNIT -5

- Meaning and Basis of Copyright
- Copyright Office and Copyright Board
- Subject Matter of Copyright
- Ownership, Assignment and Infringement of Copyright
- Remedies for Infringement
- Abridgement of the Work and Term of Copyright
- Rights of Broadcasting Authorities

BOOKS RECOMMENDED:

- David A. Einhorn. Intellectual Property Law in Cyberspace (3rd Ed. 2017)
- Xuan-Thco N. Nguyen, Robert W. Gomulkiewicz, and Danielle M. Conway. Intellectus
- Property, Software, and Information Licensing: Law and Practice (Cumulative Supplement Ist Ed. 2017)
- Jerey A. Maine and Xuan-Thao N. Nguyen. Intellectual Property Taxation: Transacti.
  and Litigation Issues (Cumulative Supplement 2nd Ed. 2017)
- Aline C. Flower. Intellectual Property Technology Transfer (Supplement 2nd Ed. 201

Mapping of COs with Pos and PSOs

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	1	1	1	1	-	3	1
CO2	1	3	2	1	2	1	1	3	2
CO3	-	3	2	2	3	-	1	2	1
CO4	-	1	-	-	1	1	1	2	2
CO5	2	-	2	1	2	2	-	2	2
CO6	-	1	1	1	-	-	-	1	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

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Course Name: Cyber Law

Course Code: BBALLB 406

Class: BBALLB 4th year

Semester: VI I

Credit: 4

L	T	P	C
4	0	0	4

Objective- To regulate framework for the control of Cyber crimes as they are in contact with the public at large and provide remedial measures for the public problems.
Both the personal and professional worlds are extremely dependent today or the Cyber World. The world is increasingly dependent on networked information and communication technologies (ICT). However, with growing dependency, new threats to network and information security have emerged and there is ever-growing vulnerability to Cyber Crime. This is also true for India where the number of internet users is growing rapidly and where ICT are of crucial importance for its economy. Thus, an effort to spread awareness of Cyber Security is the need of the hour and particularly among the law fraternity as these are the persons who in must handle the cases of cybercrime. Lawyers, Police, Govt. Officers, Law students and the NGO's must know about the details of the Information Technology.

Course Outcome

CO1: To make student aware the various kinds of cyber crime.
CO2: To familiarize students with intellectual property issues in cyber space and grow the development of law in this regard.
CO3: To analyze the various provision of Information technology act .
CO4: Student will able to gather knowledge about electronic contract.
CO5: To make student understand the cyber world and cyber law in general.

UNIT 1
Basic concept of Technology and Law
i. Understanding the Technology
ii.Scope of Cyber Laws
iii. Cyber Jurisprudence
Understanding Electronic Contracts
i. The Indian Law of Contract
ii. Types of Electronic Contracts
iii. Construction of Electronic Contracts

UNIT 2
1. **Copyright in Information Technology**
i. Copyright in internet
ii. Software Piracy

iii.Multimedia and copyright issues
2.**Patents**
i. Indian position on computer related patents
ii. International context of patents
3.**Trademarks**
i.Trade mark Law in India
ii Infringement and passing off

UNIT 3
INFORMATION TECHNOLOGY ACT 2000
i.Digital Signature
ii. E-Governance
iii.Regulation of Certifying Authorities
iv.Duties of Subscribers
v.Penalties and Adjudication
vi.Offences under the Act
vii. Making of Rules and Regulation

UNIT 4
1.Understanding Cyber Crimes
i.Crime in context of Internet
ii.Types of Crime in Internet

2.Indian Penal Law & Cyber Crimes
i.Fraud
ii. Hacking,
iii. Mischief
iv. Trespass
v. Defamation
vi. Stalking
vii..Spam

UNIT 5
Issues of Internet Governance
i. Issues of Internet Governance,
ii. Freedom of Expression in Internet,
iii. issues of Censorship
iv. Hate Speech
v. Sedition
vi. Libel
vii. Subversion
viii Privacy Issues
ix. International position on Free Speech in Internet

MAPPNG WITH Cos WITH Pos and PSOs

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	-	-	-	-	-	2	1
CO2	2	3	1	-	1	2	-	1	1
CO3	1	1	-	1	-	-	-	2	2
CO4	-	-	1	-	1	-	-	-	1
CO5	1	1	1	-	-	1	-	1	1

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: International Trade Law

Course Code: BBALLB 408

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Course Objectives: The course focuses on the organisations involved in International Trade, the conventions and treaties which regulate International Trade and the principles which are used in International Trade.

UNIT-I: ORIGIN AND EVOLUTION OF GATT & WTO.

a. Global Economics and International Trade Law
b. Protectionism vs. Free Trade
c. Birth of GATT, 1947
d. GATT Rounds of Negotiation Including Doha Round and After
e. The WTO: Its Genesis (Uruguay Round 1986 to 1994)
f. The WTO Charter and GATT 1994, WTO Agreements, Understandings, Annexes
g. Objective, Function and Structure of WTO (Key Organs or Bodies), Membership, Decision Making Process, Voting, Amendment, Waiver etc.

UNIT-II: THE PRINCIPLES ON NON-DISCRIMINATION IN GATT & WTO

a. Most-favoured-Nation Treatment (MFN) Article 1 of GATT 1947: its background and history, meaning, scope, significance & advantages,; meaning and scope of _like product‘.
b. Exceptions to MFN (Annexes A to F of Article 1, Customs Unions and Free Trade Areas (Art. XXXIV), Generalized System of Preferences (Art XXV), Art. XXXV, Art XXV, Art. XX, Art XXI, XII-XVIII, Art. VI, Subsidies Code and Government Procurement Code, Art XXIII, XIX (Escape Clause); Also Discuss Regional Associations like NAFTA, BRICS, SAFTA, TTIP etc.
c. National treatment principle (NT) Article III, GATT: its Origin & Scope, Meaning, Methodology.
d. Exceptions to National Treatment Principle

UNIT-III: DISPUTE SETTLEMENT PROCEDURES UNDER GATT AND WTO

a. Dispute settlement under GATT: Article XXII, Article XXIII, its merit & de-merit
b. Difference between the GATT and WTO dispute settlement procedures
c. Dispute Settlement Procedure under the WTO charter (refer Agreement on Dispute Settlement Understanding), Consultation, Dispute Panel Body, Appellate Body, Implementation of findings/decisions of WTO Dispute Settlement Body (Refer Article XXV GATT)

UNIT-IV: AGREEMENT ON SUBSIDIES AND COUNTERVAILING MEASURES

a. Identification of Subsidies that are subject to the SCM Agreement.
b. Definition of Subsidy', Specificity'.
c. Regulation of Specific Subsidies
    i. Prohibited Subsidies
    ii. Actionable Subsidies
    iii. Non- actionable Subsidies
d. Dispute Settlement and Remedies

UNIT-V: AGREEMENT ON DUMPING AND ANTI-DUMPING DUTIES

a. Anti-dumping: A Basic Overview
b. Anti-dumping Investigations
    i) Initiation
    ii) Evidence used in the Investigation
    iii) Key substantive issues: Dumping, injury and causation
c. Anti- dumping Measures
    i) Provisional measures
    ii) Price undertakings
    iii) Duration & review of duties
    iv) The use of Anti-dumping Measures other than Tariff Duties
d. Challenging AD measures in WTO Dispute Settlement
    i) Standard of Review
    ii) The measures to be challenged
    iii) Good faith, Even-handedness, Impartiality

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Human Rights Law

Course Code: BBALLB 410

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Objective- The understanding of human rights is the foundation for the development of a good citizen and is responsible legal professional. The main objective of this course is to provide an insight into the meaning and significance of various human rights in the contemporary era and the mechanisms developed at the international and national level for protection and promotion of such rights.
This course attempts to increase the knowledge of law students with respect to human rights; to
focus their attention on the underlying values of human rights and to explore various international and national legal frameworks which embody human rights and promote them in
practice.

Course Outcome
On completion of the course students will be able to :

CO1: Understand the significance and basic concept of human rights,
CO2: Form linkage between human rights, fundamental rights and fundamental duties.
CO3: Learn different causes of human rights violation and how can justice be given to victims.
CO4: Learn about international treaties, conventions related to human rights.
CO5: Evaluate the relationship between international and municipal law on human rights.
CO6: Find the loopholes in human rights system and suggest changes.

UNIT I:
Introduction -
1. Meaning and Concept of Human Rights
2.History and Development of Human Rights
3. Basis of Protection and need for Protection of H.R.

UNIT II:
1. Universal Protection of Human Rights
2. U.N. Charter and Human Rights

3. U.N. bodies primarily concerned with Human Rights
4. Human Rights Council
5. The Universal Declaration of Human Rights
6. Key International Convention on Human Rights

UNIT III:

1. Regional System for Protection of Human Rights
2. The European Convention on Human Rights, 1950
3.The American Convention on Human Rights, 1969
4. Asian Human Rights Charter, 1998

UNIT IV:

1. Human Rights under Indian Law
2. Human rights and Indian Constitution
3. Role of Indian Judiciary

UNIT V:

1. National Human Rights
2. National Human Rights Commission
3. The Protection of Human Rights Act, 1993- Establishment, Powers and Functions of NHRC - Role of NHRC

BOOKS RECOMMENDED:

1. Bajwa, G.S. and D.K. Bajwa, Human Rights in India: Implementation and Violations, D.K. Publishers, New Delhi (1996).
2. Basu, D.D., Human Rights in Constitutional Law, Prentice Hall, New Delhi (1994).
3. Sehgal, B.P.Singh, ed., Human Rights in India: Problems and Perspectives, Deep and Deep Publications, New Delhi (1999).
4. S.K.Avesti and R.P.Kataria, Law Relating to Human Rights, Orient Publications, New Delhi (2000)
5. SK Kapoor, Human Rights under International and Indian Law, Central Law Agency, Allahabad. (1999)
6. HO Agarwal Human Rights, Central Law Publications, Allahabad, (12th Edn. - 2012)
7. Justice Palok Basu, Law Relating to Protection of Human Rights, Modern Law Publications, Allahabad (2002).
8. Sircar, V.K., Protection of Human Right in India, Asia Law House, Hyderabad (2004-05.)

TIL

Mapping of COs with Pos and PSOs

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	-	1	1	3	-	2	2
CO2	2	2	1	1	-	3	1	3	2
CO3	1	3	2	2	1	2	1	2	2
CO4	3	-	-	-	1	1	1	2	2
CO5	2	-	-	1	-	2	-	2	2
CO6	-	-	2	1	-	1	-	1	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course name : Law relating to Right to Information and Media Law

Course Code: BBALLB 412

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Course Objectives

The course aims to give knowledge about provisions of the Act - How Right to Information Law is bringing transparency and accountability in the working of the government and to study the role of judiciary on RTI and also about Media & Law

Course Outcomes

On completion of this course, the students will be able to:

CO1: Understand &Conceptualize the evolution, meaning, scope & basics related with Right to Information & Free flow of Information.

CO2: Critically assess & analyze the provisions of "The Right to Information Act".

CO3: Understand & critically analyze the involvement & contribution of the Judiciary with regards to right to information.

O4: Critically analyze & evaluate the role media involving different aspects & rights to information.

CO5: Evaluate the multilateral aspects of the concepts related with right to information with media & constitutional framework related with them & evaluate the practical applicability of RTI Act.

Course Outline

UNIT-I

INTRODUCTION

1. Meaning and Scope of Right to Information
2. Media Access to Official Information
3. Right to Information and Human Rights Violations
4. Difference between Right to Information and Right to Obtain Information
5. Right to Information Law- Basic Elements
6. Factors Restricting Free Flow of Information

UNIT-II

THE RIGHT TO INFORMATION ACT, 2005

1. Preliminary (Section 1 to 2)
2. The Central Information Commission (Section 12 to 14)
3. Right to Information and Obligations of Public Authorities (Section 3 to 11)
4. The State Information Commission (Section 15 to 17)
5. Powers & Function of the Information Commission, appeals & penalties (Section 18 to 20)
6. Miscellaneous (Section 21 to 31)

UNIT-III

JUDICIARY ON RIGHT TO INFORMATION

1. Free flow of Information for Public Record
2. Right to information: Fundamental Right
3. Disclosure of Information
4. Right to know
5. Right to Acquire & Disseminate Information
6. Direction on Voter's Right to Information
7. Third Party Information
8. Public Authority under Art. 12 of the Indian Constitution

UNIT-IV

MEDIA & LAW

1. Media & Criminal Law (Defamation/obscenity/Sedition)
2. Media & Tort Law (Defamation and Negligence).
3. Media and Legislature-Privileges of the Legislature
4. Media and Executive Official Secrets Act, 1923
5. Media & Judiciary-contempt of Court

UNIT-V

MEDIA IN CONSTITUTIONAL FRAMEWORK

1. Freedom of Expression in Indian Constitution
2. Interpretation of Media Freedom
3. Issues of Privacy
4. Pre-Trial by Media and Free Expression
5. Media and Human Rights

RECOMMENDED BOOKS

1. J.N. Barowalia, Commentary on the Right to Information Act (University Law Publication,Delhi,Ed. 2016)

2. P.K. Das, Hand Book on the Right to Information Act (Universal Law Publication, Delhi,Ed.2016)

3. Dheera Khandelwal and K.K. Khandelwal, A Commentary and Digest on the Right toInformation Act 2005. (Vol-2, The Bright Law House, Delhi, Ed. 2014)

4. A.S. Yadav, Right to Information Act 2005: An Analysis (Central Law Publication, Allahabad,Ed. 2016)

5. N.V. Paranjape, Right to Information Law in India (Lexis Nexis, Ed. 2014).

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-
CO3	1	1	2	2	-	1	-	-	1
CO4	-	-	2	1	1	3	-	-	1
CO5	2	1	2	2	3	1	1	-	2

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name : Internship

Course Code: BBALLB 452

Class: BBALLB 4h year

Semester: VIII

Credit: 4

L	T	P	C
	0	2	1

Practical Subject: Students have to undergo mandatory internship of 1 month and prepare a report based on that.

Through internship a law student gains practical experience and contemporaneously inculcates work ethics by interning either under a lawyer or a law firm or a government body participating in legal sphere or a research organisation or any other legally-oriented institution. Prime objective is to prepare student to demonstrate desirable qualities & professional ethics to be employable in different fields related with legal profession.

Course Outcomes

On completion of this course the students will be able to:

CO1: Understand &conceptualize the procedural laws of the domestic Courts.

CO2: Gain useful background in the way a legal professional thinks and works in a legal professional workplace and the way that workplace operates.

CO3: Work under professional supervision with regards to legal matters.

O4: Exercise critical thinking and judgment in the context of developing advanced professional knowledge

CO5: Evaluate &analysemultilateral aspects related with the working of Judicial System of our country.

Modes of Evaluation:

Components	Internal Examination	External Examination
Weightage (%)	60%	40%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Intellectual Property Law

Course Code: BBALLB 402

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Objective: To create awareness about the concept of Intellectual Properties, various conventions, Provisions of Copy Right Act, 1957, The Trade Mark Act 1999 and The Patents Act 1970. The students can understand the process of Registration of Copyright work, trade mark and patents with the help of this paper.

UNIT-1

- Concept of Property vis-a-vis Intellectual Property
- Basic concepts of Intellectual Property Law
- Nature of Intellectual Property
- Origin and Development of Intellectual Property - Copy Right, Trade Mark
- Commercial Exploitation of Intellectual Property
- Enforcement of Rights and Remedies Against Infringement
- Patent

UNIT-2

- International Character of Intellectual Property
- Intellectual Property and Economic Development
- International Protection of Intellectual Property - overview of International Conventions
- -Berne Convention - WIPO Treaties 1996, Paris Conventions, TRIPS Agreements etc.
- India's Position vis-a-vis International Conventions and Agreements

UNIT-3

- Object of Patent Law Inventions-
- Patentable and Non-Patentable
- Process Patent and Product Patent
- Procedure for obtaining a Patent
- Rights and Obligations of a Patentee
- Revocation and Surrender of Patents
- Infringement of Patent.

UNIT-4

- What is a Trade Mark
- Functions of a Trade Mark
- Trade Mark Registry and Register of Trade Mark
- Registration of Trade Marks
- Effects of Registration
- Assignment and Transmission of Trade Marks
- Rectification and Correction of Register
- Passing Off and Infringement Action

UNIT -5

- Meaning and Basis of Copyright
- Copyright Office and Copyright Board
- Subject Matter of Copyright
- Ownership, Assignment and Infringement of Copyright
- Remedies for Infringement
- Abridgement of the Work and Term of Copyright
- Rights of Broadcasting Authorities

BOOKS RECOMMENDED:

- David A. Einhorn. Intellectual Property Law in Cyberspace (3rd Ed. 2017)
- Xuan-Thco N. Nguyen, Robert W. Gomulkiewicz, and Danielle M. Conway. Intellectus
- Property, Software, and Information Licensing: Law and Practice (Cumulative Supplement Ist Ed. 2017)
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  and Litigation Issues (Cumulative Supplement 2nd Ed. 2017)
- Aline C. Flower. Intellectual Property Technology Transfer (Supplement 2nd Ed. 201

- **Mapping of COs with Pos and PSOs**
-

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	1	1	1	1	-	3	1
CO2	1	3	2	1	2	1	1	3	2
CO3	-	3	2	2	3	-	1	2	1
CO4	-	1	-	-	1	1	1	2	2
CO5	2	-	2	1	2	2	-	2	2
CO6	-	1	1	1	-	-	-	1	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Labour Law-II
Course Code: BBALLB 404

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Objective-

1.To know the development and the judicial setup of Labour Laws.
2.To learn the salient features of welfare and wage Legislations.
3.To learn the laws relating to Industrial Relations, Social Security and Working conditions.
4.To understand the laws related to working conditions in different settings.

Course Outcome

On completion of this course, the students will be able to
CO1.Students will know the development and the judicial setup of Labour Laws.
CO2.Students will learn the salient features of welfare and wage Legislations.
CO3.Students will learn the laws relating to Industrial Relations, Social Security and Working conditions
CO4.Students will also learn the enquiry procedural and industrial discipline.

Unit-I: The Workmen's Compensation Act, 1923

1. Main Features of the Act,
2. Definitions Compensation, Dependent, Employer, Workman, Partial Disablement, Total Disablement,
3. Employer's Liability for Compensation(section-8).
4. Notice and claims of the Accident (section-10),
5. Commissioner (Section 19 to 29).
6. Appeals (section 30).
7. Medical Examination (Section 11)

UNIT-II: The Minimum Wages Act, 1948

1. Objects and Constitutional Validity of the Act,
2. Salient Features of the Act
3. Definitions: Employer. Cost of Living Index, Scheduled Employment, Wages,
4. Minimum Wages, Fair Wage and Living Wage,
5. Fixation and Revision of Minimum Rates of Wages, Working Hours,
6. Determination of Wages and Claims (section 3,20 and 21).

UNIT-III: Payment of Wages Act, 1936

1. Definitions: Employer, Industrial and other Establishment, Wages,
2. Payment and Deduction from Wages (section 3-13).
3. Inspector (section 14).
4. Authority to Hear claims section 15),
5. Appeal (section-17)

UNIT-IV: The Industrial Employment (Standing Orders) Act, 1946,

1. Procedure for Certification & Adoption of Standing Orders.
2. Certifying Officer,
3. The Employees' State Insurance Act, 1948-
4. Employees State Insurance Corporation,
5. Standing Committee, Medical Benefit Council,
6. Contributions, Benefits, Employees Insurance Court

UNIT-V :The Equal Remuneration Act, 1976-

1. Definition Clause
2. Payment of Remuneration at Equal Rates section 4 to 7)
3. Inspector,
4. Penalities and Cognizance of Offences under the Act,

The Payment of Bonus Act, 1965-

1. Eligibility, Disqualification for Bonus (section 8,9)
2. Minimum & Maximum Bonus (5,10,11);
3. Proportionate Reduction (5, 13)
4. Recovery of Bonus Due (5,21)
5. Customary Bonus, Productivity Bonus

The Payment of Gratuity Act, 1972.

1. Definitions, Eligiblity, Payment, Determination,
2. Recovery and Protection of Gratuity, Sec. 2-A, 4, 7, 8, and 13

TEXTBOOKS:

1. CB Memoria and Satish Memoria. Dynamics of industrial Relations, (Himalaya Publishing
House-Mumbai Part II and III. Ed. 2007
2. Dr. V.G. Goswani. Labour and Industrial law.(Central Law Agency Allahabad, Part VI. Ed.2005)
3.Nirmal Singh and S.K. Bhatia. Industrial Relations and Collective Bargaining.(Deep and DeepPublications Pur.Lid. - Delhi, Ed. 2000.)
4. Srivastav K. Industrial Peace and Labour in India. (Kitab Mahal Allahabad, Ed. 2003)
5. Indian Law Institute. Labour Law and Labour Relations, (Ed. 2002)
6. KM Pillai Labour and Industrial Law, (Allahabad Law Agency, Faridabad Haryana, Part I. Ed.2005)
7. S.N. Mishra. Labour and Industrial Law, (Central Law Publications, Allahabad, Part I. Ed.
2004)
8. HL Kumar. Labour problems and remedies. (Universal Book Traders, Delhi, Ed. 2006

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	1	1	-	-	1	-	1	1	1	1
CO2	-	-	1	-	1	-	1	2	1	-
CO3	1	-	-	-	-	-	1	1	-	-
CO4	1	-	-	-	-	-	2	1	-	-
CO5	-	-	-	-	-	-	1	1	-	-
CO6	1	1	-	-	-	1	1	1	-	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Interpretation of Statues

Course Code: BBALLB 406

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Objective : In the construction interpretation of statutes, the principle aim of the court must be to carry out the intention of Legislature. A statute is presumed to make no changes in the common law. For the Law student it is very necessary to know the fundamentals of interpretation, therefore, they are taught different principles of interpretation used by courts to find out the real intention and object of legislation. It is very helpful in legal profession.

Course Outcome
On completion of the course students will be able to :

CO1: To make student understand the meaning, principles of interpretation.
CO2: To familiarize students with external aid, interpretation of penal and taxing statues.
CO3: To analyze the key provision of rule of Ejusdem Generis and Noscitur-a-sociis.

CO4: To analyze the conceptual framework Rule of Pari Materia, and Stare Decisis.
CO5: To make aware of Legislation and Relationship between Law and Public Opinion.

UNIT I:
1. Statute: Meaning and Classification,
2. Interpretation-Meaning, Object, Purpose
3. Basic Principles of Interpretation, Difference between Interpretation and Construction, Rule of
Construction-Literal, Golden and Mischief Rules,
4. Limitations of the Court

UNIT II:
1. Internal Aid,
2. External Aid,
3. Interpretation of Mandatory and Directory Provisions,
4. Interpretation of Penal and Taxing Statutes

UNIT III:

1. Interpretation of Indian Constitution
2. Rule of Ejusdem Generis
3. Rule of Noscitur-a-sociis

UNIT IV:

1. Rule of Pari Materia,
2. Rule of Stare Decisis
3. Contemporanea Expositio eat optima Et Fortissima in Lege
4. Bentham's Theory of Legislation
5. Pains and Pleasure,
6. Greatest Happiness of Greatest Number,
7. Utilitarianism

UNIT V:

1. What is Legislation
2. Who Legislate,
3. Restriction on the Legislature,
4. Legislation is a Science,
5. The Method of Law Reform,
6. Principles of Legislation, Relationship between Law and Public Opinion.

BOOKS RECOMMENDED:

1 G.P.Singh. Principles of Statutory Interpretation, (Lexis Nexis 14th Edition, 2016)
2. Avtar Singh. Introduction to Interpretation of Statutes, (Lexis Nexis 4th Edition, 2014)
3. V.P. Sarathi. Interpretation of Statutes, (E.B.C. 5th Edition, 2010)
4.Kafaltiya A.B. Interpretation of Statutes, (E.B.C 2016 Latest Ed.)
5. D.N.Mathur. Interpretation of Statutes, (Central Law Publication 2013 Latest Ed.)
6. R.D. Srivastava. Interpretation of Statutes and Legislation, (Central Law Publication 6th Edition, 2013) .

Mapping of COs with Pos and PSOs

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	-	-	1	-	-	-	-
CO2	2	2	1	1	1	1	-	-	-
CO3	2	1	1	-	-	1	-	-	-
CO4	2	2	-	-	-	1	-	-	-
CO5	2	2	1	-	-	1	1	-	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Alternative Dispute Resolution System

Course Code: BBALLB 408

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Objective- To find out the various Dispute Resolution Techniques used at International and National level. To trace out the differences between most prominent dispute resolution methods including traditional litigation, arbitration in many forms including International Commercial Arbitration mediation and conciliation etc. The system of ADR is less time consuming as well as informal. Therefore, cost of litigation is also subsequently reduce. With the help of this paper, the students learn new techniques of resolution of disputes in certain cases.

Course Outcome

CO1: To make student understand the domestic and international commercial arbitration.
CO2: To familiarize students with difference between ADR and other dispute mechanism.
CO3: To analyze the key provision of Arbitration and conciliation Act 1996.
CO4: To analyze the conceptual framework related to various ADR process.
CO5: To make aware of various convention related to Arbitration dispute resolution.

UNIT 1

1.Evolution of ADR, ADR in India,
2.Advantages & disadvantages of ADR,
3.ADR Processes Pretrial Mediation,
4.Mediation,Negotiation,Conciliation,
5. ADR in family disputes, Conciliation under CPC,

UNIT 2

1. Concept ,Meaning& Growth of Lok Adalats,
2.Lok Adalat sunder Legal Services AuthoritiesAct,1987,
3.Nyaya Panchayats-Historical Perspectives,
4.Advantages of Nyaya Panchayats,
5. Composition & Jurisdiction of Nyaya Panchayats

UNIT 3

1.Arbitration& Conciliation Act (Section 1-43);
2.Definition of Arbitration,
3.International Commercial Arbitration,
4.Objectives of the Act,
5. Arbitration Agreement
6. Composition and jurisdiction of Arbitral Tribunal,
7. Conduct of Arbitral Proceedings.

UNIT 4

1. Making of Arbitral Awards and Termination of Proceedings,
2. Recourse Against Arbitral Award,
3. Finality and Endorsement of Arbitral Award,
4. Appealable orders,
5. Lion on Arbitral Awards and Deposits as to costa,
6. Effect on Arbitration Agreement of Death and of parties insolvency

UNIT 5

1.Arbitration& Conciliation Act (Section 44-60).
2. Foreign Awards-Definition,
3. Enforcement of Certain Foreign Awards,
4. New York Convention Awards,
5. Geneva Convention Awards,
6. Convention on Recognition and Enforcement of Foreign Arbitral Awards (Schedule 1), Protocol
on Arbitration Clauses (Schedule II).
7. Convention on Execution of Foreign Arbitral Awards (Schedule III),
8. Conciliation under Arbitration and Conciliation Act, 1996(Sections 61-81).
9. Role of Conciliator, Confidentiality in conciliation.

RECOMMENDED BOOKS

1.Anupam Kurlwal, An Introduction to Alternative Dispute System (ADR), (Central Law Publication, Allahabad, Ed. 2014).
2. S.C. Tripathi, Arbitration and Conciliation Act, 1996 with Alternative means of settlement of
dispute, (Central Law Publication, Allahabad, Ed. 2015).
3. Avtar Singh, Law of Arbitration and conciliation, (Eastern Book Company, Lucknow, Ed. 2017
4. Ashwinie Kumar Bansal, International Commercial Arbitration Practice and Procedure, (Universal Law Publishing Co., New Delhi, Ed. 2012)
5. G.K. Kwatra, Arbitration and conciliation Law of India, (Universal Law Publication Co.

New
Delhi, Ed. 2014).

MAPPING Cos WITH Pos AND PSOs.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	1	-	-	-	-	2	-
CO2	-	1	-	1	-	-	-	-	-
CO3	2	-	1	-	-	-	-	1	2
CO4	3	1	2	-	1	1	-	1	1
CO5	1	1	2	-	-	-	-	-	-

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course name : Law relating to Right to Information

Course Code: BBALLB 412

Class: BBALLB 4th year

Semester: VIII

Credit: 4

L	T	P	C
4	0	0	4

Course Objectives

The course aims to give knowledge about provisions of the Act - How Right to Information Law is bringing transparency and accountability in the working of the government and to study the role of judiciary on RTI and also about Media & Law.

Course Outcomes

On completion of this course, the students will be able to:

CO1: Understand &Conceptualize the evolution, meaning, scope & basics related with Right to Information & Free flow of Information.

CO2: Critically assess & analyze the provisions of "The Right to Information Act".

CO3: Understand & critically analyze the involvement & contribution of the Judiciary with regards to right to information.

O4: Critically analyze & evaluate the role media involving different aspects & rights to information.

CO5: Evaluate the multilateral aspects of the concepts related with right to information with media & constitutional framework related with them & evaluate the practical applicability of RTI Act.

Course Outline

UNIT-I

INTRODUCTION

1. Meaning and Scope of Right to Information
2. Media Access to Official Information
3. Right to Information and Human Rights Violations
4. Difference between Right to Information and Right to Obtain Information
5. Right to Information Law- Basic Elements
6. Factors Restricting Free Flow of Information

UNIT-II

THE RIGHT TO INFORMATION ACT, 2005

1. Preliminary (Section 1 to 2)
2. The Central Information Commission (Section 12 to 14)
3. Right to Information and Obligations of Public Authorities (Section 3 to 11)
4. The State Information Commission (Section 15 to 17)
5. Powers & Function of the Information Commission, appeals & penalties (Section 18 to 20)
6. Miscellaneous (Section 21 to 31)

UNIT-III

JUDICIARY ON RIGHT TO INFORMATION

1. Free flow of Information for Public Record
2. Right to information: Fundamental Right
3. Disclosure of Information
4. Right to know
5. Right to Acquire & Disseminate Information
6. Direction on Voter's Right to Information
7. Third Party Information
8. Public Authority under Art. 12 of the Indian Constitution

UNIT-IV

MEDIA & LAW

1. Media & Criminal Law (Defamation/obscenity/Sedition)
2. Media & Tort Law (Defamation and Negligence).
3. Media and Legislature-Privileges of the Legislature
4. Media and Executive Official Secrets Act, 1923
5. Media & Judiciary-contempt of Court

UNIT-V

MEDIA IN CONSTITUTIONAL FRAMEWORK

1. Freedom of Expression in Indian Constitution
2. Interpretation of Media Freedom
3. Issues of Privacy
4. Pre-Trial by Media and Free Expression
5. Media and Human Rights

RECOMMENDED BOOKS

1. J.N. Barowalia, Commentary on the Right to Information Act (University Law Publication,Delhi,Ed. 2016)

2. P.K. Das, Hand Book on the Right to Information Act (Universal Law Publication, Delhi,Ed.2016)

3. Dheera Khandelwal and K.K. Khandelwal, A Commentary and Digest on the Right toInformation Act 2005. (Vol-2, The Bright Law House, Delhi, Ed. 2014)

4. A.S. Yadav, Right to Information Act 2005: An Analysis (Central Law Publication, Allahabad,Ed. 2016)

5. N.V. Paranjape, Right to Information Law in India (Lexis Nexis, Ed. 2014).

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-
CO3	1	1	2	2	-	1	-	-	1
CO4	-	-	2	1	1	3	-	-	1
CO5	2	1	2	2	3	1	1	-	2

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Moot Court

Course Code: BBALLB 452

Class: BBALLB 4th year

Semester: VIII

Credit: 1

L	T	P	C
0	0	2	1

Objective- The objective of this subject is to teach students how to do legal research, present arguments and prepare memorial in a moot court along with basics professional ethics required in a court room.

Course Outcome
On completion of the course students will be able to :

CO1: Take part in Moot court competitions following relevant rules and instructions
CO2: Learn how to do legal research, form issues, address those issues and frame arguments.
CO3: Understand the pros and cons of argumentation.
CO4: Learn courtroom etiquettes and act in a professional manner
CO5: Develop confidence and communication skills.
CO6: Gain legal research skills.

RULES FOR MOOT COURT COMPETITION

► MARKING CRITERIA FOR MEMORIALS:

Marking Criteria	Marks Allotted
Evidence of Original Thought	20
Knowledge of Law and Facts	20
Proper and Articulate Analysis	20
Correct format and Citation	20
Extent and Use of Research	20
TOTAL MARKS	100

Number of Copies of Memorial to be submitted: 2
• Number of Compendium to be submitted: 1

RULES FOR THE ORAL ROUNDS:

Preliminary Rounds

The preliminary rounds will be held on February 12, 2020. The Preliminary rounds shall comprise of Two Rounds of oral arguments subject to the allotment of team codes where three teams are representing as Applicant and three teams as the Respondents. In preliminary rounds, each team shall have to argue once, as per their allotment, either as Applicant or as Respondent.

Each team will get a total of 20 minutes to present their case. And 5 minutes will be allotted for rebuttal. The division of time per speaker is left to the discretion of the team, where the teams shall divide timings as:

a. Speaker 1- mention the specific time with respect to specific issues.

b. Speaker 2- mention the specific time with respect to specific issues,

(on A4 size paper to be submitted in the court room)

• The oral arguments should be confined to the issues presented in the memorial. The researcher may sit with the speakers during the oral rounds. Maximum scores for the oral rounds shall be 50 points per speaker by a judge

.The speakers shall provide the copies ofthe compendium in the court room. No two Teams will argue against each other morethan once in the Preliminary Rounds.

The oral rounds shall be judged on the following criteria:

Marking Criteria	Marks Allotted
Preparation and familiarity with facts	10
Structure of Legal Argument	10
Knowledge & Application of Law	10
Organization, Presentation, Speaking Ability	05
Responsiveness to Questions	05
Persuasiveness and Advocacy	05
Courtroom Etiquette	05
MARKS FOR EACH SPEAKER	50
TOTAL MARKS	100

• The winners of the preliminary rounds, i.e. total two teams (2 teams) shall qualify for the Final Rounds.

Final Rounds:

The Final Rounds shall also take place on February 12, 2020. The two teams who stand declared as winners of the Preliminary Rounds shall qualify for the Final Rounds. Each team will get a total of 30 minutes to present their case which will include rebuttal and sub-rebuttal time. The Winner of the Final Round shall be declared Winner of the Competition.

> Scouting

Teams shall not be allowed to observe the orals of another team, unless they have been officially knocked-out of the competition. Scouting is strictly prohibited. Scouting by any team shall entail instant disqualification.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	3	3	2	1	2	3	1	-
CO2	1	3	2	2	2	1	2	1	-
CO3	1	2	3	2	1	1	1	3	2
CO4	-	2	2	2	2	2	2	-	1
CO5	-	1	3	-	2	-	2	-	-
CO6	1	1	2	1	2	-	-	1	1

IX SEMESTER

Course Name: Legal Ethics & Court Craft

Course Code: BBALLB 501

Class: BBALLB 5th year

Semester: IX

Credit: 4

L	T	P	C
4	0	0	4

Objective: It is an indispensible complementary part of our legal system without the study of which no advocate is suitably equipped with the basic requisites required to go to the court.

COURSE OUTCOME:

At the end of the course, students should be able to:

C01 – to understand the basic rules of Delhi High court and Supreme Court

C02 – to explain the various rules regarding Limitation Act and Registration act

C03 – to apply and Evaluate the various themes in professional ethics , and be able to interpret what amounts to professional misconduct and what are its consequences

C04 – interpret the various duties an advocate has towards the court, client and society

C05 – to analyse what amounts to contempt of court and evaluate its procedure

Catalog Description

This subject curriculum has included multiple subjects which are essential for a law student to understand the importance of Professional Ethics and morality in the practice of law what are the various duties of an advocate and if the advocate does njot follow these ethics then what are the consequences. The teaching methodology will include both traditional classroom teaching and teaching by way of PPT. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able understand the importance of professional ethics in law profession the importance of Limitation act and Registration Act and apply all these rules in their practice of law.

Unit-I: Supreme Court Rules 1966 and Delhi High Court Rules 1967 (9 Lectures)

a. Supreme Court Rules 1966

i. Advocates and their Course of Conduct

ii. Role of Single Judge and Registrar of the Supreme Court

iii. Types of Petition Entertained by the Supreme Court, Writ petition, Election Petition

b. Delhi High Courts Rules

i. Advocates and their Course of Conduct

ii. Role and Power of Single Judge

iii. Civil and Criminal Jurisdiction of the Court

Unit-II: The Limitation Act, 1963 and the Registration Act, 1908 (22 Lectures)

a. Limitation

i. Procedural Law: Section 5 Condonation of Delay, Sections: 6-9 Legal Disability, Sections 14-15 Exclusion of Time of Proceeding in Good Faith in Wrong Court, Section 18-19 Acknowledgement

ii. Substantive Law: Section: 25 Law of Prescription and Section: 27 Adverse Possession, Section: 29 Saving Clause

b. Registration

i. Compulsory Registered Documents Section: 17

ii. Optional Registration Section: 18

iii. Time and Place for Registration Section: 23-31

iv. Effects of Registration and non-Registration Section: 47-50

UNIT: III The Bench-Bar Relations (8 Lectures)

a. The Advocates Act, 1961

b. State Bar Council and Bar Council of India: Duties and Functions

c. Professional Misconduct and Punishments Section:35

d. Role and power of Disciplinary Committee Section:36-42

UNIT: IV Legal Ethics (2 Lectures)

a. Duty to Court, Client, Opponent, Colleagues Section:7 and Section: 49 along with the Rules of the Bar Council India

b. Duty towards Society

UNIT: V Contempt of Court - Contempt of Courts Act, 1971 (7 Lectures)

a. Contempt- Meaning and Purpose

Section:

2(a), Civil Contempt

2(b), Criminal Contempt

2(c), Criminal Contempt- Mens Rea Principle in Contempt Cases

Contempt by State Government

b. Defenses- Section:3 to 8

c. Contempt of Judges & Magistrates Section:16

d. Punishment for Contempt- Section:10 to 13

e. Procedure Section:14-15.,17-18

Text Books:

1. Dr. Monica Singhania & Dr. Vinod Singhania, Students guide to Indirect Tax Laws, Taxman

2. The Advocates Act, 1960

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	2	2	-	2	-	1	2	1
CO2	3	2	1	2	1	-	2	-	1
CO3	-	1	1	-	1	1	-	-	-
CO4	1	1	3	1	-	2	1	1	1
CO5	1	2	1	1	-	-	1	1	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Drafting, Pleading, and Conveyance

Course Code: BBALLB 503

Class: BBALLB 5th year

Semester: IX

Credit: 4

L	T	P	C
4	0	0	4

Course Objective:

The object of the course is to present the substantive law in the context of pleadings, drafting and conveyancing and show how those transactions are influenced by legal considerations. A well drafted document instantly attracts the attention of the Court. It develops the skill of drafting of legal documents among students. It helps the students in making a good lawyer and judge.

Course Outcome:

On completion of this course, the students will be able to:

CO1:To make students understand the general principle of drafting and pleading.

CO2:To familiarize students with civil appeal revision and writ petition.

CO3: To make students aware about the bail application criminal complaint and revision etc.

CO4:To develop the sense in the students about different types of deeds.

CO5:To familiarize the students with notice, licence and exchange deed.

Catalog Description:

The course of Drafting, Pleading, And Conveyance (Theory) has been specifically designed to provide in-depth knowledge about drafting a legal documents and other related important issues. The course will also provide deep insights on writing legally. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective drafting skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-I

1 General Principles of Drafting
2. Fundamental Rules of Pleadings (Civil)
5. Plaint
4.Written Statement
5.Interlocutory Application
6. Amendment of pleadings

UNIT-II

1.Affidavit
2.Execution Petition
3. Memorandum of Appeal (Civil)
4.Revision
5. Wait Petition

UNIT-III

1. Petition under Hindu Marriage Act,1955
2. Complaint (Criminal)
3.Claim petition under Motor Vehicle Act 1988
4. Bail Application
5. Anticipatory Bail Application
6.Revision (Criminal)

UNIT-IV

1. Sale Deed
2. Mortgage Deed
3. Lease Deed
4. Gift Deed
5.Promissory Note
6. Power of Attorney (GPA & SPA)
7. Will

UNIT-V

1. Notice
2. Adoption Deed
3.Partnership Deed
4. Exchange Deed
5. Agreement of Sale
6. Leave and License

Text Books:

- Chaturvedi, R.N. Pleading, Drafting & Conveyncing.
- Dr. A.B. Kafaltiya, Pleading Drafting & Conveyancing

References:

1.Mulla, D.F.: The Code of Civil Procedure, 1908.
2.Sarkar, The Law of Civil Procedure,
3.Chaturvedi, A.N., Pleading, Conveyancy & Drafting & Legal Professional.
4.Chaturvedi, R.N. Pleading, Drafting & Conveyncing.
5.Dr. A.B. Kafaltiya, Pleading Drafting & Conveyancing

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	3	3	2	1	2	2	2
CO2	2	2	2	1	1	2	2
CO3	2	2	2	1	1	2	1
CO4	2	2	2	-	1	1	2
CO5	2	2	2	-	-	1	1

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Land Laws

Course Code: BBALLB 505

Class: BBALLB 5th year

Semester: IX

Credit: 4

L	T	P	C
4	0	0	4

COURSE OBJECTIVES

The students will have an understanding of the laws which are related with the land & tenancy. This course will help the students to have the understanding about the practical issues & aspects related to the land & other related aspects. They will acquire the ability to identify legal issues and principles underlying any given factual situation, to undertake and present research on such issues and be able to synthesize such sources and use them to formulate arguments in their research.

COURSE OUTCOMES

On completion of this course, the students will be able to:

CO1: Understand and analyze legislative power to make laws relating to land and land ceiling is in the state list.

CO2: Understand & analyze different states enactment on tenancy & ceiling of Punjab & Haryana respectively.

CO3: Understand & critically analyze the regulation related to rent & other aspects of Haryana.

O4: Critically analyze & evaluate the working & functions of panchayats with regards to land related matters.

CO5: Evaluate & Critical analysis the multilateral aspects of the panchayat amities & revenue sources.

CATALOG DESCRIPTION

This course will discuss important features of the local laws and statutory provisions relating to property, with a focus on land law. The principal aim is to acquaint students with the fundamental proprietary interests and to teach students how to apply the relevant laws and concepts to practical situations where such interests are in dispute. The course will include some national & other local laws majorly from two states like Haryana & Punjab.

Mapping CO's with PO's & PSO's

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	2	2	3	-	1	-	1
CO2	2	2	2	2	3	-	1	-	-
CO3	2	2	-	1	2	1	1	1	-
CO4	-	2	1	-	1	2	1	-	1
CO5	-	2	1	-	1	2	-	-	-

COURSE OUTLINE

UNIT-I **No. of Lectures 09**

PUNJAB LAND REVENUE ACT 1887

1. Definition of Key Words,
2. Revenue Officers: Their Power and Functions, Preparation of Revenue
3. Records
4. Arbitration (Sections 127-135), Concepts & Procedure of Partitions

Unit-II **No. of Lectures -11**

A. THE PUNJAB TENANCY ACT-1887

1. Definition of Key Words under the Act,
2. Class of Tenants, Law relating to Rent, Law relating to
3. Occupancy of Tenant,
4. Law of Ejectment of Tenants

B. HARYANA CEILING OF LAND HOLDING ACT 1972

1. Definition of Key Words (Section-3),
2. Concept of Permissible Area and Surplus Area (Ss-4 to 6),
3. Ceiling on Land, Acquisition and Disposal of Surplus Area (SS 7 to 15),
4. Aggrieved Party (Section-18)

Unit-III: **No. of Lectures -08**

HARYANA RENT CONTROL ACT, 1973

1. Definitions (SS 1-4),
2. Rights & Duties of Tenants,
3. Rights and Duties of Landlords,
4. Grounds of Ejectment of Tenants.

Unit-IV **No. of Lectures -10**

HARYANA PANCHAYATI RAJ ACT 1994 (Sec. 1 to 54) (Chapter 1 to 6)

1. Definition of Key Words,
2. Constitution of Gram Sabha and Gram Panchayat,
3. Gram Panchayat's Duties,
4. Functions and Powers, Finance and Taxation,
5. Control of Gram Panchayat,
6. Sources of Income and Expenditure of Gram Panchayat.

Unit-V **No. of Lectures -08**

HARYANA PANCHAYATI RAJ ACT 1994, PANCHAYATI SAMITI (CHAPTER 7 TO 11) AND SECTION 55 TO 116)

1. Definition of Key Words,
2. Conduct of Business of Panchayat Samities,
3. Servant of Panchayat Samities,
4. Duties and Powers of Panchayat Samiti, Finance and Taxation,
5. Sources of Income of Panchayat Samiti, Control of Panchayat Samiti

BOOKS RECOMMENDED

1. Harshali Chowdhary, Punjab & Haryana Land Laws, (Central Law Publications, Allahabad, 1st Ed. 2016)

2. Badruddin, Commentary on Revenue Laws, Panchayat Laws and Rent Laws, (The Law House, Rohtak, 4th Ed. 2015)

3. Neety Kaul, Land Laws in Punjab and Haryana, (Chawla Publications (P) Ltd., Chandigarh, 6th Ed. 2014)

4. P. Narula, Punjab and Haryana Land Laws, (Allahabad Law Agency, Ed. 2012)

ARTICLES

1. R.S. Gae, *Land Law in India: With Special Reference to the Constitution,* Cambridge University Press, https://www.jstor.org/stable/758169.

2. https://www.scconline.com/blog/post/2017/03/03/no-application-can-be-filed-under-section-28-a-of-land-acquisition-act-1894-subsequent-to-the-same-being-filed-under-section-18-of-the-act/

3.https://www.aaptaxlaw.com/land-acquisition-act/section-18-19-20-land-acquisition-act-reference-to-court-collectors-statement-to-the-court-service-of-notice-section-18-19-20-of-land-acquisition-act-1894.html

4. https://www.satara.gov.in/en/notice/under-section-18-of-the-land-acquisition-act-1894-list-of-the-following-cases/

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Moot Court

Course Code: BBALLB 507

Class: BBALLB 5th year

Semester: IX

Credit: 4

L	T	P	C
4	0	0	4

Objective- The objective of this subject is to teach students how to do legal research, present arguments and prepare memorial in a moot court along with basics professional ethics required in a court room.

Course Outcome
On completion of the course students will be able to :

CO1: Take part in Moot court competitions following relevant rules and instructions
CO2: Learn how to do legal research, form issues, address those issues and frame arguments.
CO3: Understand the pros and cons of argumentation.
CO4: Learn courtroom etiquettes and act in a professional manner
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CO6: Gain legal research skills.

RULES FOR MOOT COURT COMPETITION

► MARKING CRITERIA FOR MEMORIALS:

Marking Criteria	Marks Allotted
Evidence of Original Thought	20
Knowledge of Law and Facts	20
Proper and Articulate Analysis	20
Correct format and Citation	20
Extent and Use of Research	20
TOTAL MARKS	100

Number of Copies of Memorial to be submitted: 2
• Number of Compendium to be submitted: 1

RULES FOR THE ORAL ROUNDS:

Preliminary Rounds

The preliminary rounds will be held on February 12, 2020. The Preliminary rounds shall comprise of Two Rounds of oral arguments subject to the allotment of team codes where three teams are representing as Applicant and three teams as the Respondents. In preliminary rounds, each team shall have to argue once, as per their allotment, either as Applicant or as Respondent.

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b. Speaker 2- mention the specific time with respect to specific issues,
(on A4 size paper to be submitted in the court room)

• The oral arguments should be confined to the issues presented in the memorial. The researcher may sit with the speakers during the oral rounds. Maximum scores for the oral rounds shall be 50 points per speaker by a judge.

The speakers shall provide the copies ofthe compendium in the court room. No two Teams will argue against each other morethan once in the Preliminary Rounds.

The oral rounds shall be judged on the following criteria:

Marking Criteria	Marks Allotted
Preparation and familiarity with facts	10
Structure of Legal Argument	10
Knowledge & Application of Law	10
Organization, Presentation, Speaking Ability	05
Responsiveness to Questions	05
Persuasiveness and Advocacy	05
Courtroom Etiquette	05
MARKS FOR EACH SPEAKER	50
TOTAL MARKS	100

• The winners of the preliminary rounds, i.e. total two teams (2 teams) shall qualify for the Final Rounds.

Final Rounds:

The Final Rounds shall also take place on February 12, 2020. The two teams who stand declared as winners of the Preliminary Rounds shall qualify for the Final Rounds. Each team will get a total of 30 minutes to present their case which will include rebuttal and sub-rebuttal time. The Winner of the Final Round shall be declared Winner of the Competition.

> Scouting

Teams shall not be allowed to observe the orals of another team, unless they have been officially knocked-out of the competition. Scouting is strictly prohibited. Scouting by any team shall entail instant disqualification.

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	3	3	2	1	2	3	1	-
CO2	1	3	2	2	2	1	2	1	-
CO3	1	2	3	2	1	1	1	3	2
CO4	-	2	2	2	2	2	2	-	1
CO5	-	1	3	-	2	-	2	-	-
CO6	1	1	2	1	2	-	-	1	1

Modes of Evaluation:

Components	**Internal Examination**	**End External Examination**
Weightage (%)	**60%**	**40%**

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: International Trade & Economics

Course Code: BBALLB 509

Class: BBALLB 5th year

Semester: IX

Credit: 4

L	T	P	C
4	0	0	4

Course Objectives: The course focuses on the organizations involved in International Trade, the conventions and treaties which regulate International Trade and the principles which are used in International Trade.

UNIT-I: ORIGIN AND EVOLUTION OF GATT & WTO.

h. Global Economics and International Trade Law
i. Protectionism vs. Free Trade
j. Birth of GATT, 1947
k. GATT Rounds of Negotiation Including Doha Round and After
l. The WTO: Its Genesis (Uruguay Round 1986 to 1994)
m. The WTO Charter and GATT 1994, WTO Agreements, Understandings, Annexes
n. Objective, Function and Structure of WTO (Key Organs or Bodies), Membership, Decision Making Process, Voting, Amendment, Waiver etc.

UNIT-II: THE PRINCIPLES ON NON-DISCRIMINATION IN GATT & WTO

e. Most-favoured-Nation Treatment (MFN) Article 1 of GATT 1947: its background and history, meaning, scope, significance & advantages,; meaning and scope of _like product‘.
f. Exceptions to MFN (Annexes A to F of Article 1, Customs Unions and Free Trade Areas (Art. XXXIV), Generalized System of Preferences (Art XXV), Art. XXXV, Art XXV, Art. XX, Art XXI, XII-XVIII, Art. VI, Subsidies Code and Government Procurement Code, Art XXIII, XIX (Escape Clause); Also Discuss Regional Associations like NAFTA, BRICS, SAFTA, TTIP etc.
g. National treatment principle (NT) Article III, GATT: its Origin & Scope, Meaning, Methodology.
h. Exceptions to National Treatment Principle

UNIT-III: DISPUTE SETTLEMENT PROCEDURES UNDER GATT AND WTO

d. Dispute settlement under GATT: Article XXII, Article XXIII, its merit & de-merit
e. Difference between the GATT and WTO dispute settlement procedures
f. Dispute Settlement Procedure under the WTO charter (refer Agreement on Dispute Settlement Understanding), Consultation, Dispute Panel Body, Appellate Body,

Implementation of findings/decisions of WTO Dispute Settlement Body (Refer Article XXV GATT)

UNIT-IV: AGREEMENT ON SUBSIDIES AND COUNTERVAILING MEASURES

e. Identification of Subsidies that are subject to the SCM Agreement.
f. Definition of Subsidy', Specificity'.
g. Regulation of Specific Subsidies
    i. Prohibited Subsidies
    ii. Actionable Subsidies
    iii. Non- actionable Subsidies
h. Dispute Settlement and Remedies

UNIT-V: AGREEMENT ON DUMPING AND ANTI-DUMPING DUTIES

c. Anti-dumping: A Basic Overview
d. Anti-dumping Investigations
    i) Initiation
    ii) Evidence used in the Investigation
    iii) Key substantive issues: Dumping, injury and causation
c. Anti- dumping Measures
    i) Provisional measures
    ii) Price undertakings
    iii) Duration & review of duties
    iv) The use of Anti-dumping Measures other than Tariff Duties
d. Challenging AD measures in WTO Dispute Settlement
    i) Standard of Review
    ii) The measures to be challenged
    iii) Good faith, Even-handedness, Impartiality

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Drafting, Pleading, and Conveyance

Course Code: BBALLB 513

Class: BBALLB 5th year

Semester: IX

Credit: 1

L	T	P	C
0	0	2	1

Course Objective:

The object of the course is to present the substantive law in the context of pleadings, draftings and conveyancing and show how those transactions are influenced by legal considerations. A well drafted document instantly attracts the attention of the Court. It develops the skill of drafting of legal documents among students. It helps the students in making a good lawyer and judge.

Course Outcome:

On completion of this course, the students will be able to:

CO1:To make students understand the general principle of drafting and pleading.

CO2:To familiarize students with civil appeal revision and writ petition.

CO3: To make students aware about the bail application criminal complaint and revision etc.

CO4:To develop the sense in the students about different types of deeds.

CO5:To familiarize the students with notice, licence and exchange deed.

Catalog Description:

The course of Drafting, Pleading, And Conveyance (Theory) has been specifically designed to provide in-depth knowledge about drafting a legal documents and other related important issues. The course will also provide deep insights on writing legally. The teaching methodology includes chalk and talk and power point presentation as the primary mode, along with case studies and analysis. Class discussion will also take places in order to discuss the practical applicability of the Law. The students will be able to put in practice and exhibit effective drafting skills, employing legal research, analysis, rationalisation and critical-thinking ability

An effort will be made to combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation.

UNIT-I

1 General Principles of Drafting
2. Fundamental Rules of Pleadings (Civil)
5. Plaint
4.Written Statement
5.Interlocutory Application
6. Amendment of pleadings

UNIT-II

1.Affidavit
2.Execution Petition
3. Memorandum of Appeal (Civil)
4.Revision
5. Wait Petition

UNIT-III

1. Petition under Hindu Marriage Act,1955
2. Complaint (Criminal)
3.Claim petition under Motor Vehicle Act 1988
4. Bail Application
5. Anticipatory Bail Application
6.Revision (Criminal)

UNIT-IV

1. Sale Deed
2. Mortgage Deed
3. Lease Deed
4. Gift Deed
5.Promissory Note
6. Power of Attorney (GPA & SPA)
7. Will

UNIT-V

1. Notice
2. Adoption Deed
3.Partnership Deed
4. Exchange Deed
5. Agreement of Sale
6. Leave and License

Text Books:

- Chaturvedi, R.N. Pleading, Drafting & Conveyncing.
- Dr. A.B. Kafaltiya, Pleading Drafting & Conveyancing

References:

1.Mulla, D.F.: The Code of Civil Procedure, 1908.
2.Sarkar, The Law of Civil Procedure,
3.Chaturvedi, A.N., Pleading, Conveyancy & Drafting & Legal Professional.
4.Chaturvedi, R.N. Pleading, Drafting & Conveyncing.
5.Dr. A.B. Kafaltiya, Pleading Drafting & Conveyancing

Mapping

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	3	3	2	1	2	2	2
CO2	2	2	2	1	1	2	2
CO3	2	2	2	1	1	2	1
CO4	2	2	2	-	1	1	2
CO5	2	2	2	-	-	1	1

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Summer Internship

Course Code: BBALLB 551*

Class: BBALLB 5th year

Semester: IX

Credit: 4

L	T	P	C
4	0	0	4

Course Objectives: Through internship a law student gains practical experience and contemporaneously inculcates work ethics by interning either under a lawyer or a law firm or a government body participating in legal sphere or a research organization or any other legally-oriented institution. Prime objective is to prepare student to demonstrate desirable qualities & professional ethics to be employable in different fields related with legal profession.

Practical Subject

Course Outcomes

On completion of this course the students will be able to:

CO1: Understand &conceptualize the procedural laws of the domestic Courts.

CO2: Gain useful background in the way a legal professional thinks and works in a legal professional workplace and the way that workplace operates.

CO3: Work under professional supervision with regards to legal matters.

O4: Exercise critical thinking and judgment in the context of developing advanced professional knowledge

CO5: Evaluate & analyse multilateral aspects related with the working of Judicial System of our country.

Modes of Evaluation:

Components	Internal Examination	External Examination
Weightage (%)	60%	40%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

XTH SEMESTER

Course Name: Gender Justice & Feminist Jursiprudence

Course Code: BBALLB 502

Class: BBALLB 5th year

Semester: X

Credit: 4

L	T	P	C
4	0	0	4

UNIT I: GENDER JUSTICE, SEX, POSITION OF WOMEN

1. Gender justice
   a. Notions of sex and gender
   b. Deconstructing 'Man', 'Woman', 'Other'
   c. Private-public dichotomy
2. Condition of Women in ancient, medieval and modern India: An overview
3. Understanding Patriarchy system

UNIT II: KINDS OF FEMINISM

1. Issues and contradictions in feminism
   a. Liberal feminism
   b. Radical feminism
2. Socialist/Marxist feminist approaches

UNIT III: GENDER JUSTICE: THE INTERNATIONAL PERSPECTIVE

1. Universal Declaration of Human Rights (UDHR)
2. UN Convention for the Elimination of Discrimination against Women
3. UN Human Rights Council Resolution on Human rights, Sexual Orientation and Gender identity, 2011
4. Human Rights Council Resolution on sexual orientation and gender identity

UNIT IV: GENDER JUSTICE AND THE INDIAN LAWS

1. Feminist Jurisprudence under constitution of India
2. Indian Penal Code 1860
   a. Rape Laws
   b. Voyeurism, stalking and Cyber Bullying
   c. Outraging the modesty of the women
   d. Causing miscarriage
3. Indecent Representation of Women (Prohibition) Act, 1986

UNIT V: FEMALE PROTECTION IN SOME SPECIAL LAWS

1. Labour laws
2. Sexual Harassment at Workplace
   The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act
   2013
4. Immoral Traffic Prevention Act, 1956 and its Amendments and Section 360 IPC

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Real Estate Laws

Course Code: BBALLB 506

Class: BBALLB 5th year

Semester: X

Credit: 4

L	T	P	C
4	0	0	4

REAL ESTATE LAWS

UNIT I: REAL ESTATE AND INFRASTRUCTURE SECTOR IN INDIA

1. Real estate industry in India
2. Leasing & Land Ownership in India
3. Trends in Public Private Partnership in India
4. Definition of Infrastructure
5. Railways, Highways & Roads, Ports / Airports / Telecom, Power & Renewable Energy, Special Economic Zones, Digital India Land Records Modernization Programme (DILRMP)

UNIT II : REAL ESTATE (REGULATION & DEVELOPMENT) ACT, 2016.

1. Definitions: (Apartment, Building, Carpet Area, Common Area, Competition Certificate, Occupancy Certificate, Planning Area, Promoter, Real Estate Agent, Real Estate Project, Sanctioned Plan),
2. Registration of Real Estate Project and Registration & Functions of Real Estate Agents;
3. Duties of Promoter,
4. Rights and Duties of Allottees,
5. The Real Estate Regulatory Authority & The Real Estate Appellate Tribunal,
6. Offences, Penalties and Adjudication under the Act.

UNIT III : RIGHT TO FAIR COMPENSATION AND TRANSPARENCY IN LAND ACQUISITION, REHABILITATION AND RESETTLEMENT ACT, 2013 - II

1. Objects and application of the Act,
2. Definitions (affected Family, agricultural land, cost of acquisition, land, landless and landowner; person interested; requiring body; resettlement area)
3. Determination of Social Impact and Public Purpose and Appraisal of Social impact Assessment Report,

4. Notification and Acquisition; Rehabilitation and Resettlement Award and procedure and Manner of rehabilitation;
5. National Monitoring Committee for rehabilitation and Resettlement;
6. Land Acquisition, Rehabilitation and Resettlement Authority.

UNIT IV THE BUILDING AND OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 .

1. Aims and Objectives / Definitions,
2. Registration of Establishments,
3. Registration of workers as Beneficiaries,
4. Welfare Board under the Act.

UNIT V DELHI RENT CONTROL ACT

1. Introduction to and Delhi Rent Control Legislation in Delhi: 1958 and 1996
2. Definitions, Grounds of Evictions
3. Dispute Settlement Mechanisms

Modes of Evaluation:

Components	**Internal Examination**	**Mid Sem.**	**End term written Exam**
Weightage (%)	**15%**	**25%**	**60%**

Internal Examination:

Components	**Assignment/Case Comment**	**Viva**	**Total Marks**
Weightage (%)	**75% weightage**	**25% weightage**	**15**

Course Name: Criminology

Course Code: BBALLB 506

Class: BBALLB 5th year

Semester: X

Credit: 4

L	T	P	C
4	0	0	4

Objective-To determine the root causes of criminal behaviour and to develop effective and humane means for addressing and preventing it. Criminology is related to but not identical to the field of criminal justice.

Course Outcome

CO1: To make student understand the theoretical and historical perspectives of criminology.
CO2: To familiarize students with White collar crime, Crime against Women and Children, Terrorism.
CO3: To analyze the key provision of juvenile delinquency.
CO4: To analyze the conceptual framework related to Indian crime reality .
CO5: To make aware of various punishments and its justification.

UNIT 1 : Theoretical and Historical Perspectives of Criminology

1. Perspective of Crime and Criminal – Sin, Wrong and Crime – Changing concept of crime in varying social formations – Crime viewed through consensus or conflict perspectives
2. Relationship between Criminal Policy, Criminal Law and Criminology

UNIT 2: **Crime causation generally**

1.Prominent criminological thought currents – Classicalism, Positivism and Radicalism
2.Learning Theories of Causation – Differential Association Theory of Sutherland
3. Social Disorganization Theories – Durkheim, Merton
4. Psychodynamic Theory – Freud
5. Economic Theory of Crime

UNIT 3 : INDIAN CRIME REALITY

7. Organized Crimes
8. Cyber Crime
9. Trafficking
10. Narcotic Trade
11. Money Laundering
12. Privileged Class Deviance

UNIT 4 :Juvenile Delinquency

3. Concept of Juvenile Delinquency
4. Legal Position in India.

UNIT 5:PUNISHMENT AND ITS JUSTIFICATION

1. Theories of Punishment – Retribution, Deterrence, Reform and Prevention
2. Kinds of Punishment – with a special emphasis on Capital Punishment.
3. Probation as a form of Punishment.

RECOMMENDED BOOKS

8. David Garland, "Of Crimes and Criminals: The Development of Criminology in Britain",
in Mike Maguire, Rod Morgan, Robert Reiner (ed.), The Oxford Handbook of Criminology (2nd ed., 1997) 09
9. George B. Vold, Thomas J. Bernard, Jeffrey B. Snipes, "Classical and Positivist Criminology", Theoretical Criminology (5th ed., 2002) 38 ii
10. Edwin H. Sutharland and Donald R. Cressey), "A Sociological Theory of Criminal Behavior", Criminology (10th ed.). 47
11. 1 The Juvenile Justice (Care and Protection of Children) Act, 2000 as amended by THE JUVENILE JUSTICE (CARE AND PROTECTION OF CHILDREN) AMENDMENT ACT,
2006 (No, 33 OF2006)
12. S.S. Srivastava, "Capital Punishment", Criminology and Criminal Administration (2nd ed. 2002) 89-99 123
13. Bushan Tilak Kaul, "Criminal Law", XXXVIII Annual Survey of Indian Law 181-226, 195-20 (2002)
14. The Probation of Offenders Act, 1958

MAPPING Cos WITH POs AND PSOs.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	1	-	-	2
CO3	1	-	1	-	-	-	-	-	-
CO4	1	2	1	1	1	1	-	-	-
CO5	-	1	-	-	-	-	-	-	-

Modes of Evaluation:

Components	Internal Examination	Mid Sem.	End term written Exam
Weightage (%)	15%	25%	60%

Internal Examination:

Components	Assignment/Case Comment	Viva	Total Marks
Weightage (%)	75% weightage	25% weightage	15

Course Name: Internship (Lawyers / Law Firm)

Course Code: BBALLB 512*

Class: BBALLB 5th year

Semester: X

Credit: 4

L	T	P	C
9	0	0	9

Course Objectives

Through internship a law student gains practical experience and contemporaneously inculcates work ethics by interning either under a lawyer or a law firm or a government body participating in legal sphere or a research organisation or any other legally-oriented institution. Prime objective is to prepare student to demonstrate desirable qualities & professional ethics to be employable in different fields related with legal profession.

Course Outcomes

On completion of this course the students will be able to:

CO1: Understand &conceptualize the procedural laws of the domestic Courts.

CO2: Gain useful background in the way a legal professional thinks and works in a legal professional workplace and the way that workplace operates.

CO3: Work under professional supervision with regards to legal matters.

O4: Exercise critical thinking and judgment in the context of developing advanced professional knowledge

CO5: Evaluate &analysemultilateral aspects related with the working of Judicial System of our country.

Modes of Evaluation:

Components	Internal Examination	External Examination
Weightage (%)	60%	40%

Course Name: Dissertation

Course Code: BBALLB 552

Class: BBALLB 5th year

Semester: X

Credit: 4

L	T	P	C
4	0	0	4

Course objectives: Students will be given a topic based on their area of interest and they will have to submit a dissertation. It will enhance their research and writing skills.

Practical Subject

Modes of Evaluation:

Components	Internal Examination	External Examination
Weightage (%)	60%	40%

SCHEME FOR B. TECH.

B. TECH. MECHNICAL ENGINEERING			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BSC-101	Physics	3	1	0	4
2	ESC-101	Basic ElectricalEngineering	3	1	0	4
3	HSS-101	English	2	0	0	2
4	BSC-103	Mathematics-I	3	1	0	4
5	ESC-103	Introduction To Computer Systems &Internet Basics	3	0	0	3
6	MC-101	Environmental Science	2	0	0	0
7	BSC-151	Physics Lab	0	0	2	1
8	ESC-151	Basic Electrical Engineering Lab	0	0	2	1
9	HSS-151	English Lab	0	0	2	1
10	ESC-153	Engineering Graphics & Design	0	0	6	3
11	PDP-101	Induction & Nurturing Hobbies	0	0	2	1
		Total	**16**	**3**	**14**	**24**

SCHEME FOR B. TECH.

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choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

B. TECH. MECHNICAL ENGINEERING			Semester			II
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	BSC -102	Chemistry	3	1	0	4
2	ESC-102	Programming forproblem solving	3	0	0	3
3	BSC-104	Mathematics-II	3	1	0	4
4	HSS-102	Effective TechnicalCommunication	3	0	0	3
5	MC-102	Constitution of India	2	0	0	0
6	BSC 152	Chemistry Lab	0	0	2	1
7	ESC-152	Programming for problem solving Lab	0	0	4	2
8	ESC-154	Workshop Practice	0	0	4	2
9	PDP-102	People Connect	0	0	2	1
		Total	**14**	**2**	**12**	**20**

SCHEME FOR B. TECH.

DEPARTMENT OF MECHANICAL ENGINEERING

B. TECH. MECHNICAL ENGINEERING			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BSC-201	Math-III (NumericalMethods)	3	1	0	4
2	ME-201C	ManufacturingProcesses	3	1	0	4
3	ME-203C	Fluid Mechanics	3	1	0	4
4	ME-205C	EngineeringMechanics	3	1	0	4
5	ME-207C	Thermodynamics	3	0	0	3
6	ESC-201	Basics of ElectronicsEngineering	3	1	0	4
7	BSC-253	Math-III (NumericalMethods) Lab	0	0	2	1
8	ME-251C	ManufacturingProcesses Lab	0	0	2	1
9	ME-253C	Fluid Mechanics lab	0	0	2	1
10	PDP-201	Personality Development andGrooming	0	0	2	1
		Total	**18**	**5**	**8**	**27**

B. TECH. MECHNICAL ENGINEERING	Semester	IV

DEPARTMENT OF MECHANICAL ENGINEERING

SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ME -202 C	Applied Thermodynamics	3	1	0	4
2	ME -204 C	Strength OfMaterials	3	0	0	3
3	ME- 206 C	Fluid Machinery	3	1	0	4
4	ME -208 C	Kinematics ofMachines	3	1	0	4
5	HSS -202	Engineering Economics andManagement	3	0	0	3
6	ME- 252 C	Applied ThermodynamicsLab	0	0	2	1
7	ME-254 C	Strength Of Materials- Lab	0	0	2	1
8	ME -256 C	Fluid MachineryLab	0	0	2	1
9	ME-258C	Kinematics ofMachines Lab	0	0	2	1
10	ME-260C	Machine Drawing	0	0	2	1
11	PDP-202	Life Skills	0	0	2	1
		Total	**15**	**3**	**12**	**24**

SCHEME FOR B. TECH.

B. TECH. MECHNICAL ENGINEERING			Semester	V
SN	**Course Code**	**Course Name**	**Periods**	**Credits**

			L	T	P	
1	ME- 301 C	Dynamics ofMachines	3	1	0	4
2	ME -303 C	ManufacturingTechnology	3	0	0	3
3	ME -305 C	Heat Transfer	3	1	0	4
4	ME -307 C	Solid Mechanics	3	1	0	4
5	ME -309 C	Design of Machine Elements	3	1	0	4
6	ME -351 C	Dynamics of Machines Lab	0	0	2	1
7	ME- 353C	Manufacturing Technology Lab	0	0	2	1
8	ME -355 C	Heat Transfer Lab	0	0	2	1
9	MC -III	Essence of IndianTraditional Knowledge	0	0	0	0
10	PDP-301	Leadership & EntrepreneurshipDevelopment	0	0	2	1
		Total	**15**	**4**	**8**	**23**

B. TECH. MECHNICAL ENGINEERING			**Semester**			**VI**
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	ME-302C	Material science	3	0	0	3

2	MES-304C	PLC for Automation	4	0	0	4
3	MES-306C	IoT for Smart Manufacturing	4	0	0	4
4	MES-308C	Python for automation	4	0	0	4
5	ME6E11C/ ME6E12C	Industry 4.0/ Computer integrated manufacturing	4	0	0	4
6	ME-352C	Material sciencelab	0	0	2	1
7	MES-354C	Automation Lab-I	0	0	2	1
8	MES-356C	IoT for Smart Manufacturing Lab	0	0	2	1
9	MES-358C	Python Lab	0	0	2	1
	PDP-302	Problem SolvingSkills	0	0	2	1
		TOTAL	**19**	**0**	**10**	**24**

SCHEME FOR B. TECH.

B. TECH. MECHNICAL ENGINEERING			**Semester**	**VII**
SN	**Course Code**	**Course Name**	**Periods**	**Credits**

			L	**T**	**P**	
1		Open elective	3	0	0	3
2	MES-403C	Smart ManufacturingSystems	4	0	0	4
3	MES-405 C	Additive Manufacturing	4	0	0	4
4	MES-407 C	Smart SensorsFor Automation	4	0	0	4
5	MES-455 C	Additive ManufacturingLab	0	0	2	1
6	MES-459 C	AutomationLab-II	0	0	2	1
7	ME-400 C	Seminar	0	0	2	2
8	ME-496 C	Project Work	0	0	8	4
	PDP-401	Campus toCorporate	0	0	2	1
		TOTAL	15	0	16	**24**

OPEN ELECTIVE

CourseCode		**Periods**	

	Course Name	L	T	P	Credits
MEOE-401C	INDUSTRIALROBOT	3	0	0	3
	Total --->	**3**	**0**	**0**	3

B. TECH. MECHNICAL ENGINEERING			Semester			VIII
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	ME -406C	INTERNSHIP	0	0	32	16
2	ME- 402 C	ONLINE MODE(MOOC)	3	0	0	3
		Total	**3**	**0**	**5**	**19**

BSC-101	PHYSICS	L-T-P	Credits
		3-1-0	4

1. ***ELECTROSTATICS AND MAGNETOSTATICS (10 lectures)***
Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential, Boundary conditions of electric field and electrostatic

potential; method of images; energy of a charge distribution and its expression in terms of electric field.

Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation forthe vector potential and its solution for given current densities.

2. ***MECHANICS (8 lectures)***

Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction; Extension to cylindrical and spherical Coordinates

3. ***QUANTUM MECHANICS (8 lectures)***

Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle.

4. ***WAVE OPTICS (10 lectures)***

Huygens' principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Mach-Zehnder interferometer.

Fraunhauffer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

5. ***LASERS (8 lectures)***

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO2), solid-state lasers (ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine.

SUGGESTED TEXT/REFERENCE BOOKS

i. David Griffiths, Introduction to Electrodynamics.
ii. W. H. Hayt and J. A. Buck. Engineering Electromagnetics.
iii. Engineering Mechanics, 2nd ed. — MK Harbola.

iv. Introduction to Mechanics — MK Verma
v. Eisberg and Resnick, Introduction to Quantum Physics
vi. D. J. Griffiths, Quantum mechanics

COURSE OUTCOMES:

Physics is one of the foundation subjects to all engineering disciplines and the study in engineering physics is aimed at blending a strong physics component with relevant engineering backgrounds. The core objective is to provide a coherent foundation of physics for all majors that are usually necessary to work in areas such as computer science, electronic industry, mechanical domains and communication technologies. The contents are based on the static and dynamic state of elementary physics resulting in the field theory and wave mechanics the matter.

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DEPARTMENT OF MECHANICAL ENGINEERING

		L-T-P	Credits
BSC-103	MATHEMATICS-I	3-1-0	4

MATHEMATICS-I CALCULUS AND LINEAR ALGEBRACOURSE

OBJECTIVE:

- To apply differential and integral calculus to notions of curvature and to improper integrals. Apartfrom some other applications they will have a basic understanding of Betaand Gamma functions.
- The fallouts of Rolle's Theorem that is fundamental to application of analysis toEngineeringproblems.
- The tool of power series and Fourier series for learning advanced Engineering Mathematics.
- To deal with functions of several variables that are essential in most branches of engineering.
- The essential tool of matrices and linear algebra in a comprehensive manner.

1. ***MATRICES (10 lectures)***
   Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, Skew- symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

2. ***SEQUENCES AND SERIES (12 lectures)***
   Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

3. ***CALCULUS (8 lectures)***
   Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions andtheir properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

4. ***CALCULUS (8 lectures)***
   Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule; Maxima and minima.

5. ***MULTIVARIABLE CALCULUS (DIFFERENTIATION) (10 lectures)***
Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

SUGGESTED TEXT/REFERENCE BOOKS

(i) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson,Reprint, 2002.
(ii) Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
(iii) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,2008.
(iv) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
(v) D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
(vi) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, LaxmiPublications, Reprint, 2008.

COURSE OUTCOMES:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

ESC-101	BASIC ELECTRICAL ENGINEERING	L T P	Cr
		3-1-0	4

LEARNING OBJECTIVES:

- □ **To understand and analyses basic electric and magnetic circuits**
- □ ***To study the working principles of electrical machines and power converters.***
- □ **To introduce the components of low voltage electrical installations**.

DETAILED CONTENTS:

1. **DC CIRCUITS (8 hours)**
   Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin, Norton and maximum power transfer Theorems.

2. ***AC CIRCUITS (8 hours)***
   Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three phase balanced circuits, voltageand current relations in star and delta connections.

3. ***TRANSFORMERS (8 hours)***
   Construction, working principle of transformer, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and its comparison with ordinary transformer.

4. ***ELECTRICAL MACHINES (8 hours)***
   Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of dc motor. Construction and working of synchronous generators.

5. ***POWER CONVERTERS & ELECTRICAL INSTALLATIONS (8 hours)***
DC-DC converters and AC-DC converters, Switches, Fuses, MCBs, Earthing and its types, Important Characteristics for Batteries and battery backup. Elementary calculations for energy consumption, power factor improvement.

SUGGESTED TEXT / REFERENCE BOOKS

(i) D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
(ii) D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
(iii) L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
(iv) E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
(v) V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

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DEPARTMENT OF MECHANICAL ENGINEERING

ESC-103	INTRODUCTION TO COMPUTER SYSTEMS & INTERNET BASICS	L-T-P	Credits
		3-0-0	3

PREREQUISITE:
NA

OBJECTIVE: To give basic knowledge of Computer Hardware, Software systems & internets

1. **COMPUTER SYSTEMS:** Overview of Computer Systems, Evolution of Computer Systems, Generations of computers, Characteristics of Computer: speed, storage, Accuracy, Categories of computer: Micro Computers, Mini Computers, Main Frames, Super Computers, Computer Organization: Central processing unit, Arithmetic and Logic Unit, Control Unit, Memory System: Primary memory, secondary memory and Data Representation in a Computer System. Number system
: decimal, Binary, Octal, Hexadecimal representation and conversion

2. **PROGRAMMING LANGUAGES & OPERATING SYSTEM BASICS:** Software Basics: Application software, System Software, Utility Software, Programming languages: Low level languages, Machine language, Assembly language, Limitations of Low level languages, High Level languages, Translator, Assembler, Interpreter, Compiler, Operating System: Need of Operating System, Function of Operating System, Types of Operating System

3. **NETWORK SYSTEMS, INTERNET & WEB:** Introduction to networking, Local and Wide Area Networks, communication media: wired and wireless, Network Topologies: Star, Ring, Bus, Networking devices: Switch, Hub, Bridge, Internet overview, Internet Architecture, The idea of hypertext and hyper media; how the browser works: MIME types, plug-ins and helper applications; XML, XHTML, XSLT and the W3C, Hosting and Domains:

4. **HYPERTEXT MARKUP LANGUAGE:** The anatomy of an HTML document; marking up for structure and style: ordered and unordered lists, Structuring content with HTML using natural divisions, Marquee, Anchor Tag, Email Link; embedding images and controlling appearance, table creation: Frames and Nesting, iframes, forms, Semantic elements of HTML5, HTML5 Form elements, Media tags in HTML5, HTML5 Data Storage

5. **COMPUTER SECURITY:** Security Threats: Intruders, Password Cracking, Different types of malicious Software: Virus, Worms, Trojan Horse, Prevention from malicious Software: Antivirus(Introduction)

TEXT BOOKS:

1. Computer Fundamentals: P. K. Sinha, BPB pub.
2. Fundamentals of Computer Science and Programming with C: A. K. Sharma, Dhanpat RaiPub.
3. Uttam K. Roy, "Web Technology", Oxford Publication4.

REFERENCE BOOKS:

1. Computing Fundamentals & C Programming: E. Balaguruswamy, TMH.
2. Fundamentals of Computers: V Rajaraman, PHI

COURSE OUTCOMES:

On successful completion of this course students will be able to:

- □ Identify different application areas of computers.
- □ Distinguish hardware and software components of the computer system.
- □ Use Ms-windows operating system. Make use of the basic Microsoft office applications for office use.
- □ Identify information resources and services available on the Internet.
- □ Make use of search and retrieval services on subjects of their interest.

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DEPARTMENT OF MECHANICAL ENGINEERING

		L-T-P	Credits
ESC-153	**ENGINEERING GRAPHICS & DESIGN**	**0-0-6**	**3**

LEARNING OUTCOMES:

Engineering drawing is an effective language of engineers. It is the foundation block which strengthens the engineering and technological structure. Moreover, it's the transmitting link between ideas and realization. After learning the course the students should be able to understand conventions and the methods of engineering drawing and interpret engineering drawings, using fundamental technical mathematics, construct basic and intermediate geometric improve their visualization skills so that they can apply these skills in developing new projects improve their technical communication skill in the form of communicative drawings, comprehend the theory of projections and acquire basic knowledge of computer aided drafting**.**

UNIT 1: INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their significance, usage of drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Dimensioning.

UNIT2: ORTHOGRAPHIC PROJECTIONS

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes;

UNIT 3: PROJECTIONS OF SOLIDS

Projections of planes inclined Planes - Auxiliary Planes; Projection of Regular Solids covering those inclined to both the planes, Auxiliary Views; Section of such solids and the true shape of the section.

UNIT 4: SECTIONS AND SECTIONAL VIEWS OF RIGHT ANGULAR SOLIDS

Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; objects from industry and dwellings (foundation to slab only) Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids Conversion of Isometric Views to Orthographic Views and Vice-versa

UNIT 5: OVERVIEW OF COMPUTER GRAPHICS

Introduction to Computer Aided Drafting and CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area

(Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

SUGGESTED TEXT/REFERENCE BOOKS:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech
5. Publishers (Corresponding set of) CAD Software Theory and User Manuals

COURSE OUTCOMES:

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software. This course is designed to address:

- to prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- to prepare you to communicate effectively
- to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice
- After learning the course the students should be able to To know and understand the conventions and the method of engineering drawing. Interpret engineering drawings using fundamental technical mathematics.
- Construct basic and intermediate geometry.

The student will learn:

Introduction to engineering design and its place in society

- □ Exposure to the visual aspects of engineering design
- □ Exposure to engineering graphics standards
- □ Exposure to solid modelling

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DEPARTMENT OF MECHANICAL ENGINEERING

HSS-101	ENGLISH	L T P	Cr
		2-0-0	2

Detailed contents

1. VOCABULARY BUILDING

1.1 The concept of Word Formation
1.2 Root words from foreign languages and their use in English
1.3 Acquaintance with prefixes and suffixes from foreign languages in English toform derivatives.
1.4 Synonyms, antonyms and standard abbreviations.

2. BASIC WRITING SKILLS

2.1 Sentence Structures
2.2 Use of phrases and clauses in sentences
2.3 Importance of proper punctuation
2.4 Creating coherence
2.5 Organizing principles of paragraphs in documents
2.6 Techniques for writing precisely
2.7 Jane Austen: Pride and Prejudice(novel)

3. IDENTIFYING COMMON ERRORS IN WRITING

3.1 Subject-verb agreement
3.2 Noun-pronoun agreement
3.3 Misplaced modifiers
3.4 Articles
3.5 Prepositions
3.6 Redundancies
3.7 Clichés

4. NATURE AND STYLE OF SENSIBLE WRITING

4.1 Describing
4.2 Defining
4.3 Classifying
4.4 Providing examples or evidence
4.5 Writing introduction and conclusion

5. WRITING PRACTICES

5.1 Comprehension
5.2 Précis Writing
5.3 Essay Writing
5.4 Charles Dickens: Oliver Twist (novel)

6. ORAL COMMUNICATION

(This unit involves interactive practice sessions in Language Lab)

Listening Comprehension

Pronunciation, Intonation, Stress and Rhythm

Common Everyday Situations: Conversations and Dialogues
Communication at Workplace

Interviews

Formal Presentations

SUGGESTED READINGS:

(i) Practical English Usage. Michael Swan. OUP. 1995.

(ii) Remedial English Grammar. F.T. Wood. Macmillan.2007
(iii) On Writing Well. William Zinsser. Harper Resource Book. 2001
(iv) Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
(v) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.

COURSE OUTCOMES:

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

BSC-151	PHYSICS LAB	L-T-P	Credits
		0-0-2	1

LIST OF EXPERIMENTS:

1. To study response curve of a series LCR circuit.
2. To determine the Planck's constant using LEDs.
3. To determine the Rydberg's constant of Hydrogen atom.
4. To find the refractive index and Cauchy's constants of a prism.
5. To find the wavelength of light by Newton's rings experiment.
6. To determine the thickness of a thin wire by interference.
7. To determine the wavelength of LASER using diffraction grating.
8. To determine the resolving power of a telescope.
9. To find the numerical aperture of an optical fiber cable.
10. To find the wavelength of light using Michelson's interferometer

ESC-151	BASIC ELECTRICAL ENGINEERING LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS / DEMONSTRATIONS:

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi – meter, oscilloscope. Resistors, capacitors and inductors.
2. Demonstration of cut – out sections of machines :
3. Torque speed characteristic of dc motor.
4. Parallel operation of single phase Transformer.
5. Open circuit & short circuit test on single phase transformer.
6. To verify the Thevenin's & Norton's theorem.
7. To verify the Superposition theorem.
8. To study frequency response of series & parallel RLC Circuit.
9. Load test on D.C. Shunt generator
10. Torque – speed characteristics of three phase Induction motor & direction reversal by changeof phasesequence of connection.
11. To plot field current Vs Armature voltage characteristics of synchronous generator.

HSS-151	ENGLISH LAB	L T P	Cr
		0-0-2	1

ORAL COMMUNICATION

(This unit involves interactive practice sessions in Language Lab)

- Listening Comprehension
- Pronunciation, Intonation, Stress and Rhythm
- Common Everyday Situations: Conversations and Dialoguescommunication at Workplace
- Interviews
- Formal Presentations

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DEPARTMENT OF MECHANICAL ENGINEERING

MC-101	ENVIRONMENTAL SCIENCE	L T P	Cr
		2 -0 -0	0

1. **THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:** Basic definitions related to environment; Scope, vis-à-vis environmental science and environmental engineering; a uses of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principals involved in environmental education, environmental awareness, Environmental ethics, environmental organization and their involvement.

2. **NATURAL RESOURCES:** Renewable and non-renewable resources; forest resources, over- exploitation, and deforestation / afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; Food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non-renewable energy sources, solar energy, wind energy, hydro energy,biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.

3. **ECOSYSTEMS:** Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids; characteristic features, structure and function of the following ecosystem -forest ecosystem, grassland ecosystem desert ecosystem and aquatic ecosystems.
4. **BIODIVERSITY AND ITS CONSERVATION:** Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.
5. **ENVIRONMENTAL POLLUTION:** Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution; solid waste management, e-waste management; disaster management –floods, earthquake, cyclone and landslides.

6. **SOCIAL ISSUES AND THE ENVIRONMENT:** Water conservation, rain water harvesting, watershed management; climate change, global warming, acid rain, ozone layer depletion; Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act.

7. **HUMAN POPULATION AND THE ENVIRONMENT:** Population growth, population explosion –family welfare programmes; role of information technology in environment and human health; case studies, Chipko movement, Sardar Sarovar dam, mining and quarrying in Udaipur, salinity and water logging in Punjab, Haryana and Rajasthan, Bhopal gas tragedy, Chernobyl nuclear disaster, arsenic pollution in ground water.

TEXT BOOK

Kaushik, Anubha, and Kaushik, C.P., "Perspectives in Environmental Studies", 4th Edition,NewAge International Publishers, 2004

REFERENCE BOOKS

1. Agarwal, K.C., "Environmental Biology", 2nd Edition, Nidhi Publ. Ltd., Bikaner, 2001.
2. Bharucha Erach, "The Biodiversity of India", 2nd Edition, Mapin Publishing Pvt. Ltd., 2006.
3. Brunner R. C., "Hazardous Waste Incineration", 1st Edition McGraw Hill Inc., 1989.
4. Clark R.S., "Marine Pollution", 1st Edition Clanderson Press Oxford,1989
5. .Cunningham, W.P., Cooper, T.H. Gorhani, E. & Hepworth, M.T., EnvironmentalEncyclopedia", 2nd Edition, Jaico Publ. House, 2001.
6. De, A. K., "Environmental Chemistry", 2nd Edition, Wiley Eastern, 1989
7. Jadhav, H. and Bhosale, V.M ., "Environmental Protection and Laws", 1st Edition,Himalaya Pub. House, Delhi, 1995.
8. Mckinney, M.L. and Schocl. R.M., "Environmental Science Systems & Solutions", 2nd Edition, Web enhanced edition, 1996.
9. Rao M.N. and Datta, A.K.,"Waste Water Treatment", 2nd Edition, Oxford & IBH Publ.Co.,1987.
10. Sharma B.K., "Environmental Chemistry", 2nd Edition, Goel Publ. House, Meerut, 2001
11. Trivedi R.K. and Goel, P.K., "Introduction to Air Pollution", 2nd Edition, Techno-sciencePublications, 1996

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DEPARTMENT OF MECHANICAL ENGINEERING

II Semester

BSC-102	Chemistry	L T P	Cr
		3 -1 -0	4

Unit-I PHASE RULE

Terminology, Definition of phase rule, Derivation of phase rule equation, One component system (H_2O system and CO_2 system), two components system, Simple eutectic system (Pb – Ag), Pattinson's Process, congruent system (Zn–Mg), incongruent system(Na-K system), Merits and demerits of phase rule.

UNIT-II THERMODYNAMICS

Second law of thermodynamics, **entropy** change for reversible & irreversible processes, Entropy change for ideal gas, variation of free energy with temperature & pressure, Gibbs-Helmholtz equation, Clapeyron- Clausius equation & it's integrated form Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.

UNIT-III CORROSION AND ITS PREVENTION

Definition, Types of corrosion: Dry, wet corrosion (rusting of iron), galvanic corrosion, differential aeration corrosion, stress corrosion. Factors affecting corrosion, preventive measures (proper design, Cathodic and Anodic protection, sacrificial protection and barrier protection), Soil Corrosion.

UNIT-IV SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Part-A:Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterisation techniques.

UNIT-V INTERMOLECULAR FORCES AND POTENTIAL ENERGY SURFACES

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena, Potential energy surfaces of H_3, H_2F and HCN and trajectories on these surfaces.

UNIT-VI ORGANIC REACTIONS AND SYNTHESIS OF A DRUG MOLECULE

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ringopenings. Synthesis of a commonly used drug molecule.

UNIT-VII STEREOCHEMISTRY

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis.

Isomerism in transitional metalcompounds

Suggested Text Books :

(i) University chemistry, by B. H. Mahan
(ii) Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane(iii)Fundamentals of Molecular Spectroscopy, by C. N. Banwell
(iv) Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
(v) Physical Chemistry, by P. W. Atkins
(vi) Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5thEdition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Outcomes

The concepts developed in this course will aid in quantification of several concepts in

chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on theelectronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base thedescription of all chemical processes at molecular levels. The course will enable the student to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals andintermolecular forces.
- Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting differentmolecular energy levels in various spectroscopic techniques
- Rationalise periodic properties such as ionization potential, electronegativity,oxidation states and electronegativity.
- List major chemical reactions that are used in the synthesis of molecules.

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DEPARTMENT OF MECHANICAL ENGINEERING

BSC-104	Mathematics-II	L T P	Cr
		3 -1 -0	4

Detailed contents

Unit I: Basic Probability: (12 lectures)

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

Unit II: Continuous Probability Distributions: (6 lectures)

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Unit III: Complex Variable – Differentiation: (14 lectures)

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof).

Unit IV: First order ordinary differential equations: (8 lectures)

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Unit V: Ordinary differential equations of higher orders: (10 lectures)

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Suggested Text/Reference Books

(i) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
(ii) P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, UniversalBook Stall, 2003 (Reprint).
(iii)S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

(iv) W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed.,Wiley, 1968.
(v) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, LaxmiPublications, Reprint, 2010.
(vi) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000. (vii)E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
(viii) E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.

Course Outcomes

The objective of this course is to familiarize the students with statistical techniques. It Aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.

The students will learn:

- The mathematical tools needed in evaluating multiple integrals and their usage.
- The effective mathematical tools for the solutions of differential equations that model physicalprocesses.
- The ideas of probability and random variables and various discrete and
- continuous probability distributions and their properties.
- The statistical methods of studying data samples.

ESC-102	PROGRAMMING FOR PROBLEM SOLVING	L T P	Cr
		3 -0 -0	3

Unit-1: BASICS OF PROGRAMMING AND OVERVIEW OF C PROGRAMMING:

Programming Fundamental, Problem definition, Idea of Algorithm, steps to solve logical and numerical problems, Representation of Algorithms: Flow charts/ Pseudocode with example, Types of programming languages, Translators, From algorithms to programs; source code, variables and memory location, Introduction to C, Structure of C program, C character set, Identifier and Keywords, Data types, constants, variables, Declaration, Arithmetic expressions & precedence , statements, Symbolic constants, type conversion, Types of operators, Input and output functions in C, header files, common programming errors, Control Statements,Sequencing, Selection, Condition and iteration.

Unit-2: ARRAYS AND STRING: Declaring, Referencing and initializing arrays, array subscript, using for loop for sequential access, multi-dimensional array, String basics string library functions, assignment and substring, concatenation, string comparison.

Unit-3: FUNCTIONS AND POINTERS: Definition of function, function prototype, Purpose of main function, passing parameters, Scope of function, recursion, Call by value and reference, Types of storage classes, Scope of variable: Global and local, static variables, Recursion.. Pointer variables, initializing pointers, pointer operators, pointer expressions, pointers and arrays, pointer and functions,

Unit-4: STRUCTURES, UNIONS & RECURSION

Defining a structure, Declaring structure variables, Structure initialization, Copying and Comparing Structure variables, Array of structures, Arrays within structure, nested structures, Unions. Recursion as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

Unit-5: DYNAMIC MEMORY ALLOCATION AND FILE PROCESSING: *C's dynamic* allocation functions. Streams and file types, opening and closing a data file, input and output operations, text mode versus binary mode, formatted input output operations with files, random access to files.

Reference Books:-

1. Programming in C by Schaum Series, McGraw Hills Publishers, New Delhi.
2. Let Us C by YashwantKanetkar; BPB Publication, New Delhi.
3. Exploring C by YashwantKanetkar; BPB Publications, New Delhi.

4. Application Programming in C by RS Salaria, Khanna Book Publishing Co. (P) Ltd., NewDelhi.
5. Programming in C by R Subburaj, Vikas Publishing House Pvt. Ltd., Jangpura, New Delhi.
6. Programming with C Language by C Balaguruswami, Tata McGraw Hill, New Delhi.
7. Programming in C by BP Mahapatra, Khanna Publishers, New Delhi

HSS-102	EFFECTIVE TECHNICAL COMMUNICATION	L T P	Cr
		3 -0 -0	3

Module 1:

Information Design and Development- Different kinds of technical documents,

Information development life cycle, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media.

Module 2:

Technical Writing, Grammar and Editing- Technical writing process, forms of

discourse, Writing drafts and revising, Collaborative writing, creating indexes, technical writing style and language. Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication, Usability, Hunan factors, Managing technical communication projects, time estimation, Single sourcing,ocalization.

Module 3:

Self Development and Assessment- Self assessment, Awareness, Perception and

Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity

Module 4:

Communication and Technical Writing- Public speaking, Group discussion, Oral presentation,Interviews, Graphic presentation, Presentation aids, Personality Development.

Writing reports, project proposals, brochures, newsletters, technical articles, manuals, officialnotes, business letters, memos, progress reports, minutes of meetings, event report.

Module 5:

Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes,

Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity.

Text/Reference Books:

1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004.(ISBN:07828357-4)
6. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi2002.
7. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

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DEPARTMENT OF MECHANICAL ENGINEERING

MC-102	CONSTITUTION OF INDIA	L T P	Cr
		2 -0 -0	0

Objective: Constitution of India is the lengthiest written Constitution in the world. Came into existence as a result of the independence, the Constitution strikes a perfect balance between the State (allocation of powers) and a citizen within his/her individual capacity (providing the rights). This paper will emphasize on some of the important provisions of the Constitution,giving an insight about the functioning of the State and its essential pillars.

UNIT – 1

- Making and Basic structure of the Constitution
- Salient features of the Constitution
- Citizenship

UNIT – 2

- Fundamental Rights of a citizen
- Fundamental Duties of a citizen
- Directives principles of State policy

UNIT – 3

- Union and the Executive (President, Vice-President, Judiciary)

UNIT – 4

- Emergency Provisions

UNIT – 5

State Liability

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DEPARTMENT OF MECHANICAL ENGINEERING

ESC-154	WORKSHOP PRACTICE	L T P	Cr
		0 -0 -4	2

Course Objectives:

- To teach students the practices of workshop management and maintenance.
- To familiarize students with workshop machinery like drills, lathes, welding torches, files, saws,hammers, etc.
- To teach students the need to economize materials when managing a workshop.
- To teach students the safety measures needed in a workshop and how to deal with accidents atwork.
- To teach student welding and manufacture of selected items.
- To teach students the practice of plumbing.
- To teach students the basics of electrical installations.

Course Outcomes: Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. Upon completion of this course, the students will gain knowledge of the different manufacturing processes and day to day industrial as well domestic life which are commonly employed in the industry, to fabricate components using different materials.

(A) Fitting Trade:

1. Preparation of T-Shape Work piece as per the given specifications.
2. Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.

(B) Machine shop: Study of machine tools in particular Lathe machine (different parts, different operations, study of cutting tools)

1. To obtain required diameters (steps) on a cylinder work piece with the given lengths.
2. To obtain the required diameters (taper) on a cylinder work piece with the given dimensions.

(C) Carpentry: Study of Carpentry Tools, Equipment and different joints

1. To make a dovetail lap joint.
2. To make a cross half lap joint.

(D) Foundry Trade: Introduction to foundry, Patterns, pattern allowances, ingredients of molding sand and melting furnaces. Foundry tools and their purposes

1. To prepare a sand mold, using the given single piece pattern.
2. To prepare a sand mold, using the given split piece pattern.

(E) Welding: Introduction, Study of Tools and welding Equipment (Gas and Arc welding)

1. To make a single v-butt joint, using the given mild steel pieces and by arc welding.
2. To make a T-joint using the given mild steel pieces and by arc welding.

(F) Electrical and Electronics: Introduction to House wiring, different types of cables. Types of power supply, types of motors, Starters, distribution of power supply, types of bulbs, parts of tube light, Electrical wiring symbols.

1. Two lamps connected in series - measure and check the voltage and current using multimeter.
2. Two lamps connected in parallel - measure and check the voltage and current using multimeter.

(G) CNC Machining: To study the working principle of CNC machining.

Reference Books:

1. Mechanical Workshop Practice by K C John, PHI Learning
2. Workshop Technology Vol. 1 and 2 by Raghuvanshi B.S. DhanpatRai& Sons 1998

3. Workshop Technology by Chapman W.A. J and Arnold E. Viva low priced student edition, 1998

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DEPARTMENT OF MECHANICAL ENGINEERING

ESC-152	PROGRAMMING FOR PROBLEM SOLVING LAB	L T P	Cr
		0 -0 -4	2

LIST OF EXPERIMENTS

(Students have to do at 3-4 programs from each section)

SEQUENTIAL CONTROL STATEMENTS

1. Write a program to Print HELLO
2. Write a program to add two numbers
3. Write a program to calculate simple interest
4. Write a program to calculate average of three numbers
5. Write a program to swap two numbers
6. Write a program to illustrate mixed data types
7. Write a program to calculate area and circumference of circle
8. Write a program to evaluate a polynomial expression
9. Write a program to add digits of a four digit number
10. Write a program to check whether the person if eligible for voting or not

CONDITIONAL CONTROL STATEMENTS

11. Write a program to find greatest of two numbers
12. Write a program to find out which type of triangle it is
13. Write a program to find out greatest of three numbers
14. Write a program to evaluate performance of the student
15. Write a program to make a basic calculator

LOOP CONTROL STATEMENTS

16. Write a program to print Fibonacci up-to the given limit
17. Write a program to find the sum of digits of a number
18. Write a program to find factorial of a number
19. Write a program to print table of any number
20. Write program for printing different pyramid pattern

ARRAYS AND STRINGS

21. Write a program to enter the elements in a one dimensional array
22. Write a program to find the sum and average of five numbers
23. Write a program to sort the array elements
24. Write a program to enter the marks of 50 students an calculate the average
25. Write a program to add 2 matrix
26. Write a program to multiply 2 matrices
27. Write a program to calculate the length of string
28. Write a program to concatenate 2 strings

29. Write a program to reverse the string
30. Write a program to count the numbers of characters in a string
31. Write a program that converts lower case characters to upper case
32. Write a program without using predefined functions to check whether the string is palindromeor not

FUNCTIONS & POINTERS

33. Write a program using function to find the largest of three numbers
34. Write a program using function to sum the digits of a number
35. Write a program to calculate factorial of a number using recursive function
36. Write a program to print first n Fibonacci using recursive function
37. Write a program to illustrate the concept of chain of pointers
38. Write a program using function to swap two numbers using call by reference
39. Write a program to calculate the area and perimeter of circle using pointers
40. Write a program to copy the contents of one array into another in the reverse order usingpointers

STRUCTURES

41. Write a program to read an employee record using structure and print it
42. Write a program to prepare salary chart of employee using array of structures
43. Write a program to print the name and percentage of 20 students (array of structures andarrays within structures).
44. Write a program to demonstrate structure within structure.

FILE HANDLING

45. Write a program to create, open, and close files.46.

a. Write a program to demonstrate the purpose of different file opening modes.
b. Write a program to count the number of characters, spaces, tabs, new line characters in a file.
c. Write a program to receive strings from keyboard and write them to a file.
d. Write a program to copy a file to another.
e. Write a program to read strings from a file and display them on screen.

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DEPARTMENT OF MECHANICAL ENGINEERING

(III SEMESTER)

Course code	Course title	L	T	P	Credits
BSC-201	**MATH-III (NUMERICAL METHODS)**	3	1	0	4

Course objective:
CO1. The objective of this course is to familiarize the students with statistical techniques. CO2. It aims to equip the students with standard concepts and tools at an intermediate to advanced Level that will serve them well towards tackling various problems in the discipline.

UNIT I: SOLUTION OF NONLINEAR EQUATIONS

Introduction to numbers and their accuracy; absolute, relative and percentage errors and their analysis; Bisection method; Regula- falsi method; secant method; Newton- Raphson method.

UNIT II: SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS

Gauss elimination method; Gauss-Jordan method; Jacobi's iteration method; Gauss-Seidal iteration method.

UNIT III: INTERPOLATION

Introduction to interpolation; Newton's forward and backward interpolation formulae; Stirling formula; Lagrange interpolation; Newton's divided difference formula, Central Difference and average operators..

UNIT IV: NUMERICAL DIFFERENTIATION AND INTEGRATIONEQUATION

Numerical differentiation formulae, differentiation by using forward interpolation formula; backward interpolation formula, Newton-Cotes formula for numerical integration: Trapezoidal rule; Simpson's 1/3 & $3/8^{th}$ rules.

UNIT V SOLUTION OF ORDINARY DIFFERENTIAL

Taylor series method, Euler method; Euler modified method; Runge kutta method 2^{nd} order & 4^{th}order

TEXT BOOK

Grewal, B. S., "Numerical methods in Engineering and Science",9th Edition, 2010, Khanna publishers. And Higher Engineering Mathematics: B. S. Grewal

REFERENCE BOOK

1. Jain, R.K. and Iyengar, S.R.K., "Numerical Methods for Scientific and Engg. Computations" ,5thEdition,2007, New Age International publishers.
2. Sastry, S.S.," "Introductory Methods of Numerical Analysis",3rd Edition,1999, Prentice Hall ofIndia.

Course outcomes:
1. The mathematical tools needed in evaluating multiple integrals and their usage.
2. The effective mathematical tools for the solutions of differential equations that model physical Processes.

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME –201 C	**MANUFACTURING PROCESS**	3	1	0	4

Course Objectives:

1. To provide an overview of the basic production techniques and allied / supporting techniques used to produce finished products from raw materials.
2. In addition to theory, students will be given practical training on various basic production techniques. After going through this course, the students will be in a position to understand the working of a mechanical workshop.

UNIT -I

INTRODUCTION: Basic manufacturing processes and safety in workshop. Classification of materials–their general mechanical properties and their selection

UNIT-II

CASTING PROCESSES: Sand casting process; pattern making; types of moulding sands, cores, mould making, melting and pouring of metal; Casting defects. **MACHINING PROCESSES:** Production of components involving turning; facing; taper turning; milling; shaping; planning and drilling operations.

UNIT-III

METAL FORMING PROCESSES: Sheet metal forming operations; shearing, bending, punching and blanking, forging processes as upsetting, drawing down, bending etc.

UNIT-IV

JOINING PROCESSES: Metal arc welding; gas welding; resistance welding; soldering **andmechanical fastening processes.**

UNIT-V

FITTING AND MAINTENANCE: Study of fitting tools, marking tools and measuring instruments like micrometer, vernier calipers and height gauge; introduction to some basic maintenance techniques/processes.

Course outcomes:

CO1-Select appropriate Manufacturing Processing to manufacture any component.

CO2-Interpret foundry practices like pattern making, mold making, Core making and Inspection ofdefects. CO3-Differentiate various metal forming processes such as Hot and Cold Working, Rolling, Forging,Extrusionand Drawing Processes.

CO4-Classify different plastic molding processes, Extrusion of Plastic and Thermoforming.CO5-Select appropriate Joining Processes to join Work piece.

TEXT BOOK

Raghuwanshi, B.S., "A course in Workshop Technology, Vol. I & II", Dhanpatrai & Co.

EFERENCE BOOK

Hazra &Chaudhary, "Workshop Technology Vol. I & II", Asian Book Co

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-203 C	**FLUID MECHANICS**	3	1	0	4

Course Objectives:

It imparts the basic concept; knowledge and laws of fluid flow; Fluid dynamics and kinematics and idea of estimation of various losses encountered in fluid flow PRE REQUISITES Knowledge of Thermodynamics

UNIT-1: FLUID PROPERTIES AND FLUID STATICS

Concept of fluid and flow; ideal and real fluids; Continuum concept; properties of fluids; Newtonian and non-Newtonian fluids; Pascal's Law; hydrostatic equation; hydrostatic forces on plane and curved surfaces; stability of Floating and submerged bodies; relative equilibrium; Problems

UNIT-2: FLUID KINEMATICS AND DYNAMICS

Eulerian and Lagrangian description of fluid flow; stream; streak and path lines; types of flows; flow rate and continuity equation; differential equation of Continuity; rotation; vorticity and circulation; stream and potential functions; Problems Concept of system and control volume; Euler's equation; Bernoulli's equation; venturimeter; pitot tubes; orifice meter; kinetic and momentum correction factors; Impulse momentum relationship and its applications; Problems

UNIT-3: VISCOUS FLOW

Flow regimes and Reynolds's number; Relationship between shear stress and pressure gradient; uni- directional flow between stationary and moving parallel plates; Counter flow; laminar flow through pipes.

UNIT-4: FLOW THROUGH PIPES

Friction loss in pipe flow; Darcy-Weisbach formula co-efficient of friction and friction factor: Major and minor losses in pipes; hydraulic Gradient and total energy lines; series and parallel connection of pipes; branched pipes; Equivalent pipe; power transmission through pipes; Problems

UNIT-5: BOUNDARY LAYER CONCEPT

displacement; momentum and energy thickness; von-karman momentum integral equation; laminar and turbulent boundary layer flows; drag on a flat plate; boundary layer separation; Stream linedand bluff bodies; lift and drag on a cylinder and an airfoil; Problems

TEXT BOOKS

Kumar, K.L., "Engineering Fluid Mechanics", Eurasia Publication House, 2002

REFERENCE BOOKS:

1. Kumar, D. S., "Fluid Mechanics and Fluid Power Engineering", SK Kataria and Sons,1998
2. Wylie, E. B, Streeter VL; "Fluid Mechanics";McGrawHill1983
3. SomSKandBiswasG.,"IntroductiontoFluidMechanicsandFluidMachines",TataMcGraw Hill, 1998
4. Bansal RK, "A Text Book of Fluid Mechanics" Laxmi Publications

Course outcomes:

CO 1-Students will be able to understand basic knowledge of the definition and the fundamental concepts of fluid mechanics including continuum, velocity field, surface tension, flow visualization etc.

CO 2-Students will able to apply the basic equation of fluid statics to determine forces on planer and curved surfaces that are submerged in a static fluid.

CO 3-Students will able to use conservation laws in integral form and apply them to determine forces and moments on surfaces of various shapes and simple machines

CO 4-Students will able to use Euler's and Bernoulli's equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and in viscid fluids

CO 5- Students will able design simple pipe systems to deliver fluids under specified conditions and also the loosed during the flow of the fluid.

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME – 205 C	**ENGINEERING MECHANICS**	3	1	0	4

Course Objectives:
Engineering Mechanics is one of the core subjects that introduces the student to analysis of forces and motion and prepares the student for studying strength of materials and theory of machines.

UNIT-1: FORCE SYSTEMS

Basic concepts of space, time, mass, force, particle and rigid body; scalars and vectors; principle of transmissibility; force classification; Representation of force in vector form; rectangular components of two dimensional force systems; resultant of two dimensional and concurrent force systems. moment about a point; Varignon's theorem; Representation of moment in vector form; couple. Numerical.

UNIT-2: EQUILIBRIUM

Equilibrium in two dimensions; Lame's Theorem; system isolation and the free-body-diagram; modeling the action of forces; equilibrium conditions; Numerical.

UNIT-3: PROPERTIES OF SURFACES/CROSS SECTIONS

Centre of mass; determining the center of gravity; center of gravity of areas including composite sections; moments of inertia; MI of plane figures; parallel axis & perpendicular axis theorem;; MI of composite figures. Numerical.

UNIT-4: RECTILINEAR AND CURVILINEAR MOTION

Types of motion, definitions of displacement, distance, velocity, speed, acceleration Newton's laws of motion, Uniform and non-uniform motion equations of motion, motion under gravity. Numerical.

UNIT-5: PROJECTILES

Angle of projection, Trajectory , Range of projectile , Duration of flight , Path of Projectile, Greatest height attained by a projectile. Numerica

TEXT BOOKS

Meriam, J. L. "Engineering Mechanics", John Wiley & S

REFERENCE BOOKS:

1. Beer, F.P. and Johnston, E.R. "Mechanics of Materials", Tata McGraw Hill
2. Shames, I.H. "Engineering Mechanics", 4th Edition, Pearson Education, 2003
3. Pytel, A and Kiusalaas, J. Thomsom, "Mechanics of Materials", Brooks & Cole, 2003

Course Outcome:
CO1. Solve engineering problems involving the equilibrium of particles and rigid bodies.
CO2. Solve the problems involving dry friction and virtual work.
CO3. Determine the centroid, center of gravity, and moment of inertia of various surfaces and solids.
CO4. Solve problems related to kinematics and kinetics of a rigid body.
CO5. Solve problems using the energy-momentum principle for a particle and rigid bodies in planemotion.

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-207 C	**THERMODYNAMICS**	3	0	0	3

Course Objectives:

This course introduces the student to the fundamental laws of thermodynamics, the interaction between Energy and matter, the quantitative and qualitative aspects of energy

UNIT-1: FUNDAMENTALS AND BASIC CONCEPTS

System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Exact & In exact Differentials, Quasi–static Process, Reversible and Irreversible Process, Causes of Irreversibility, Energy and its forms, Work and heat (sign convention), Equality of Temperature, Zeroth Law of Thermodynamic and its utility, Problems.

UNIT-2: FIRST LAW OF THERMODYNAMICS

Thermodynamic definition of work ,Displacement work and flow work, Displacement work for various non-flow processes, Joules' experiment, First law analysis for closed system(non-flow processes),Internal energy and enthalpy, PMM-I, Numericals Steady flow systems and their analysis, Steady flow energy equation, Boilers, Condensers, Turbine, Throttling process, Pumpsetc., Numericals.

UNIT-3: SECOND LAW OF THERMODYNAMICS AND ENTROPY

Limitations of Ist law, Thermal reservoirs, Energy conversion, Heat engines, Efficiency, Reversed heat engine, Heat pump, Refrigerator, Coefficient of Performance, Kelvin Planck and Clausius statement of second law of thermodynamics, Carnot cycle and Carnot engine, Carnot theorem and it's corollaries, Thermodynamic Temperature Scale, PMM-II. Clausius inequality ,Concept of Entropy, Entropy change of pure substance indifferent thermodynamic processes, Tds equation, Principle of entropy increase, Statement of the third law of thermodynamics, Availability and Irreversibility Problems

UNIT-4: PROPERTIES OF PURE SUBSTANCES

Pure substance, Property of Pure Substance (steam),Triple point, Critical point, Saturation states, Sub-cooled liquid state, Superheated vapour state, Phase transformation process of water, Graphical representation of pressure, volume and temperature, P-T &P- V diagrams, T-S and H-S diagrams, use of property diagram, Steam-Tables & Mollier chart, Dryness fraction and it's measurement, processes involving steam in closed and open systems. Simple Rankine cycle.

UNIT-5: THERMODYNAMIC RELATIONS, IDEAL AND REAL GASE

Maxwell Relations, Clapeyron Equation, Relations for changes in Enthalpy and Internal Energy & Entropy, Specific Heat Capacity Relations, Joule Thomson coefficient & inversioncurve.

Idealgases,Idealgaslaws, realgases,compressibility factor, compressibility charts.

TEXT BOOKS

Nag, P.K., "Engineering Thermodynamics", Tata McGraw Hill.

REFERENCE BOOKS:

1. Rao, Y VC., "Theory and Problems of Thermodynamics", Wiley Eastern Ltd, 2007
2. Arora C P., "Engineering Thermodynamics", Tata McGraw Hill; 2008
3. Domkundwar., "Thermal Engineering", Dhanpat Rai & Company, 2006
4. Estope, TD and Meconkey A., "Applied Thermodynamics for Engineers Technologists", AWL,1999

Course outcome:

Course Outcome:
CO1-Students will be able to explain the basic principles and applications of the thermody0mics to the various real life systems.
CO2-Students will be able to describe fundamental laws of thermodynamics.
CO3-Students will be able to apply the concepts such as Entropy, Energy Balance also the calculations of heat, work and other important thermodynamic properties for various ideal gas processes.
CO4-Students will be able to estimate performance of various thermody0mic gas power cycles and gas refrigeration cycle and availability in each case.
CO5-Students will be able to examine the condition of steam and performance of vapour power cycle and vapor compression cycle

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-251C	**MANUFACTURING PROCESS LAB**	0	0	2	1

LIST OF EXPERIMENTS

1. Prepare a pattern for given casting with all the necessary allowances.
2. Make a green sand mold and prepare it for the casting; investigate the casting defects andsuggest the remedies.
3. Make a casting by shell molding process.
4. Make a component involving horizontal and vertical welding (Arc welding)
5. Cut a sheet with gas welding and investigate the defects.
6. To join two sheets using resistance spot welding.
7. Make a job using turning; taper turning and facing and boring operations on lathe.
8. Prepare a job on surface grinder.
9. Development and manufacture of sheet metal component such as elbows and transitionpieces.
10. Cut external threads on a lathe

Course outcomes:

CO1.To build practical knowledge about Pattern Making; pattern material, pattern allowances andtypes of patterns casting processes

CO-2: To apply practical understanding for use of moulding tools: green sand moulding, gatingsystem, risering system, core making;

CO-3: To plan and create jobs using forging processes; CO-4: To understand and plan for machining of gears;

CO-5: To relate the job manufactured from practical relevance point of view

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-253 C	**FLUID MECHANICS LAB**	0	0	2	1

Course Objectives:
Students can able to have hands on experience in flow measurements using different devices and also perform calculation related to losses in pipes and also perform characteristic study of pumps, turbines etc.,

LIST OF EXPERIMENTS

1. To determine the meta-centric height of a floating Body
2. To verify Bernoulli's theorem
3. To find critical Reynolds number for pipe flow
4. To determine the coefficient of discharge; contraction and velocity; of an orifice
5. To determine the coefficient of discharge of a venturimeter
6. To determine the coefficient of discharge of "V" and Rectangular notches
7. To determine the friction factor for pipes
8. To determine the minor losses due to sudden enlargement; sudden contraction and bends;In pipeflow
9. To determine the coefficient of impact of jet
10. To determine the velocity and pressure variation with radius in a forced vortex flow

Course outcomes:

1. Utilize basic measurement techniques of fluid flow
2. Demonstrate practical understanding and applications of Bernoulli's Equation
3. Analyze the friction losses in pipes.
4. Gaining knowledge to calculate and design engineering applications involving fluid.
5.Understanding of analyzing flow systems in terms of mass, momentum, and energy balance.

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DEPARTMENT OF MECHANICAL ENGINEERING

IV SEMESTER

Course code	Course title	L	T	P	Credits
ME-202 C	**APPLIED THERMODYNAMICS**	3	1	0	4

Course Objectives:
It enables the students to understand the use of thermodynamic laws in design and functioning of Various equipment used in steam power systems and compressors.

UNIT-1: CLASSIFICATION OF FUELS

Classification of fuels –solid; liquid and gaseous fuels; Combustion equations; Stoichiometric air- fuel ratio; Excess air. Calorific values of fuel; Exhaust gas analysis; Orsat apparatus; Enthalpy and internal energy of combustion; Enthalpy of formation; Adiabatic flame temperature; Problems

UNIT-2: BOILER

Boiler:-Classification ;comparison between fire and water tube boilers Essentials of a good boiler; Constructional and operational details of Babcock - Wilcox; Cochran; Locomotive and Lancashire Boilers;Highpressureboilers-Benson;Lamont;LoefflerandVeloxboilers;Boilermountings and accessories; Boiler performance; Natural and Artificial Drafts; Chimney height; Maximum draft and chimney efficiency; Boiler heat balance Sheet; Problems

UNIT-3: BASIC POWER CYCLES & NOZZLES & TURBINES

Carnot and Rankine vapor cycles effect of operating Conditions on thermal efficiency of Rankine cycle; Rankine cycle with superheat; reheat And regeneration Binary Vapor cycle Problems Classification of nozzles ,Velocity and heat drop; mass discharge through a nozzle; critical pressure ratio and its significance effect of friction and nozzle efficiency; Supersaturated flow; design pressure ratio; Problems

UNIT-4: STEAM TURBINES

Classification; Impulse Turbine Flow through blades; velocity Diagram; power output and efficiency maximum blade efficiency of single stage impulse Turbine; Blade friction; compounding of impulse turbine. Reaction Turbine-Flow through Impulse reaction blades degree of reaction; velocity diagram; power output; efficiency And blade height comparison of impulse and impulse reaction turbines; Losses in steam Turbines; stage efficiency; overall efficiency and reheat factor; Governing of steam Turbines Problems

UNIT-5: CONDENSER & COMPRESSOR

Elements of a condensing plant; types of condensers and their studies comparison of jet and surface condensers; Condenser vacuum; sources of air leakage and its Disadvantages; vacuum efficiency and condenser efficiency; Problems. Working of a single stage reciprocating air compressor; calculation of work input; Volumetric efficiency; Isothermal efficiency; Advantagesof multi stage compression;

Two stage compressor with Inter-cooling; Perfect Inter cooling; Optimum intercooler pressure Problems

TEXT BOOKS

Eastop, T. D, and McConkey., "Applied Thermodynamics for Engineering Technologists", Pearson

REFERENCE BOOKS:

1 Domkundwar., "Thermal Engineering", Dhanpat Rai and Company.
2 Vasandani, V. P., and Kumar, D. S., "Heat Engineering", Metropolitan Book

Co3 Ballaney, P. L., "Thermal Engineering", Khanna Publishers,

Course outcomes:

CO1-Students will be able to explain the basic principles and applications of the thermody0mics to the various real life systems.

CO2-Students will be able to describe fundamental laws of thermodynamics.

CO3-Students will be able to apply the concepts such as Entropy, Energy Balance also the calculations of heat, work and other important thermodynamic properties for various ideal gas processes.

CO4-Students will be able to estimate performance of various thermody0mic gas power cycles and gas refrigeration cycle and availability in each case.

CO5-Students will be able to examine the

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-204 C	**STRENGTH OF MATERIALS**	3	0	0	3

Course Objectives:
The strength of materials is one of the core subjects and aim is to provide a sound foundation to design various element of mechanical equipment

UNIT-1: SIMPLE STRESSES AND STRAINS

Resistance to deformation; Hook's law and stress-strain diagram; types of stresses; stresses and strains in bars of varying sections; stresses in composite bars; lateral strain and Poisson's ratio; volumetric strain, modulus of rigidity and bulk modulus; relation between elastic constants. Numerical

UNIT-2: TORSION OF CIRCULAR SHAFTS AND REACTION OF BEAMS

Torsion formula of circular shaft, power transmission by shaft, types of beams and loads, reaction produced on supports for beams with point load uniformly distributed load, uniformly varying load and combined loads. Numerical.

UNIT-3: SHEAR FORCE & BENDING MOMENT

Definitions: SF and BM diagrams for cantilevers, simply supported beams with or without overhang and calculation of max. BM and SF and point of contra-flexure under i) concentrated loads, ii)uniformly distributed loads over wholes pan or part of it iii) combination of concentrated and uniformly distributed loads

UNIT-4: ANALYSIS OF PERFECT FRAMES

Types of frames, Assumptions made in finding out the forces in frames, Reactions of supports of a frame, Analysis of frame by Method of Joint, Analysis of frames by Method of Section.

UNIT-5: MOHR CIRCLE OF STRESSES

Mohr's circle of stress for a material under similar stresses in two mutually perpendicular plane, Mohr's circle of stress for a material under dissimilar stresses in two mutually perpendicular plane Mohr's circle of stress for a material under similar stresses in two mutually perpendicular plane along with shear stresses acting on all the planes, Mohr's circle for a material under dissimilar stresses in two mutually perpendicular plane along with shear stresses acting on all the planes. Numerical

TEXT BOOKS

Ferdinand P Beer &Russel E Johnston;—Mechanics of Materials‖, Tata McGraw Hill;2009

REFERENCE BOOKS:

1. Hibbeler, R. C.,—Mechanics of Materials ,Pearson Education, 2005
2. Ryder,G H., —Strength of Materials‖, Macmillan, 2001
3. Srinath LS,—Strength of Materials‖, Macmillan, 2001
4. Andrew / Kiusalaas, Jaan., —Mechanics of Materials‖, Thomson, 2003

Course outcomes:

CO1-Students will be able to predict mechanical behavior of the member by determining the stresses, strains and deflections produced by the loads up to the elastic limit.

CO2- Students will be able to solve the stresses in determinate and indeterminate, homogeneous and composite bars under concentrated loads, self-weight and thermal loads.

CO3-Students will be proficient to construct Shear Force and Bending Moment diagrams for statically determinate beam due to concentrated load, uniformly distributed load, uniformly varying load and couple.

CO4-Students will be able to determine bending and shear stresses in machine elements

CO5-Students will be able to Evaluate Slope and Deflection of Statically Determi0te beams subjected to concentrated load, uniformly distributed load, uniformly varying load and couple and also strain energy in members subjected to Gradual, sudden and impact loads

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-206 C	**FLUID MACHINERY**	3	1	0	4

Course Objectives: The students completing this course are expected to understand the properties of fluids, its kinematic and dynamic behavior through various laws of fluids like continuity, Euler's, Bernoulli's equations, energy and momentum equations. Further, the student shall be able to understand the theory of boundary layer, working and performance characteristics of various hydraulic machines like pumps and turbine

UNIT-1: IMPACT OF FREE JETS

Impulse– momentum principle; jet impingement-on a stationary flat plate; inclined plate and a hinged plate; at the center of a stationary vane; on a moving flat plate; inclined plate; a moving vane and a series of vanes; Jet striking tangentially at the tip of a stationary vane and moving vane(s); jet propulsion of ships Problems

UNIT-2: IMPULSE TURBINES

Classification – impulse and reaction turbines; water wheels; component parts; construction; operation and governing mechanism of a Pelton wheel; work done; effective head; available head and efficiency of a Pelton wheel; design aspects; speed ratio; flow ratio; jet ratio; number of jets; number of buckets and working proportions; Performance Characteristics; governing of impulse turbines. Problems

UNIT-3: REACTION TURBINE

Francis Turbines: Component parts; construction and operation of a Francis turbine; governing mechanism; work done by the turbine runner; working proportions and design parameters; slow; medium and fast runners; degree of reaction; inward/outward flow reaction turbines; Performance Characteristics; Problems.

Propeller and Kaplan turbines: Component parts; construction and operation of a Propeller; Kaplan turbine; differences between the Francis and Kaplan turbines; draft tube-its function and different forms; Performance Characteristics; Governing of reaction turbine;

UNIT-4: CENTRIFUGAL PUMPS

Centrifugal Pumps: Classification; velocity vector diagrams and work done; manometry efficiency; vane shape; head capacity relationship and pump losses; pressure rise in impeller; minimum starting speed; design considerations; multi-stage pumps. Similarity relations and specific speed; net positive suction head; cavitation and maximum suction lift; performance characteristics; Brief introduction to axial flow; mixed flow and submersible pumps; Problems.

UNIT-5: RECIPROCATING PUMPS

Reciprocating Pumps: Construction and operational details; discharge coefficient; volumetric efficiency and slip; work and power input; effect of acceleration and friction on indicator diagram (pressure–stroke length plot); separation; air vessels and their utility; rate of flow into or from the air vessel; maximum speed of the rotating crank; characteristic curves; centrifugal V/S reciprocating pumps; brief introduction to screw; gear; vane and radial piston pumps; Problems. **Hydraulic systems:** Function; construction and operation of Hydraulic accumulator; hydraulic intensifier; hydraulic crane; hydraulic lift and hydraulic press; Fluid coupling and Torque converter; Hydraulic ram; Problems.

TEXT BOOKS

1. Hydraulics & Fluid Mechanics– Modi & Seth; Pub.-Standard Book House; N. Delhi
2. Hydraulic Machines–Jagdish Lal; Metropolitan

REFERENCE BOOKS:

1. Fluid Mechanics and Hydraulic Machines – SS Rattan; Khanna Publishers
2.Introduction to Fluid Mechanics and Fluid Machines– SK Som and G Biswas; Tata McGraw Hill
3. Fluid Mechanics and Fluid Power Engineering– D S Kumar; SK Kataria and Sons

Course outcomes:

CO1.Students can able to Examine Single Acting &Double Acting Compressor
CO2.Students can able to understand the basic concepts of Gas power cycles
CO3. Students can able to compare various steam Turbine & Steam Nozzle

CO4. An overall idea about fluid machinery and the knowledge about the calculation of efficiency, power developed by a turbines and power required by a pump.

CO-5: Able to understand basic working principles of various hydraulic machines

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-208 C	**KINEMATICS OF MACHINES**	3	1	0	4

Course Objectives:

1. To understand the basic components and layout of linkages in the assembly of a system /machine.
2. To understand the principles in analyzing the assembly with respect to the displacement,velocity, and acceleration at any point in a link of a mechanism.
3. To understand the basic concepts of toothed gearing and kinematics of gear trains and

UNIT-1: INTRODUCTION OF MECHANISMS AND MACHINES

Concepts of Kinematics and Dynamics, Mechanisms and Machines, Planar and Spatial Mechanisms, Kinematic Pairs, Kinematic Chains, Kinematic Diagrams, Kinematic Inversion, Four bar chain and Slider Crank Mechanisms. And their Inversions, Degrees of Freedom, Mobility and range of movement-Kutzbach and Grubler's criterion, Number Synthesis, Grashoff's criterion Position analysis of Four bar, slider crank mechanisms, transmission angle, MechanicalAdvantage.

UNIT-2: VELOCITY AND ACCELERATION ANALYSIS

Velocity and Acceleration Analysis: Velocity and Acceleration Diagrams, Instantaneous Centre of Velocity, Rubbing Velocity, Corioli's component of acceleration. **Special Mechanisms:** Straight line mechanisms, Hooke's Joint, Steering Mechanisms.

UNIT-3: CAMS AND FOLLOWERS

Cams and Followers: Introduction: Classification of cams and followers, nomenclature, displacement diagrams of follower motion. Synthesis and Analysis: Determine of basic dimensions and synthesis of cam profiles using graphical methods, cams with specified contours.

UNIT-4: Gears & Gears Train

Gears: Terminology, Law of Gearing, Characteristics of involute and cycloidal action, Interference and undercutting, center distance variation, minimum number of teeth, path of contact, contact ratio, **Gear Trains:** Synthesis of Simple, compound &reverted gear trains, Analysis of epicyclic gear trains.

UNIT-5:

Friction: Types of friction, laws of friction, motion along inclined plane, screw threads, efficiency on inclined plane, friction in journal bearing, friction circle and friction axis, pivots and collar friction, uniform pressure and uniform wear.

Belts and pulleys: Open and cross belt drive, velocity ratio, slip, material for belts, crowning of pulleys, law of belting, types of pulleys, length of belts, ratio of tension, centrifugal tension, power transmitted by belts and ropes, initial tension, creep, chain drives, chain length, classification of chains.

TEXT BOOKS

1. Rattan S.S, Theory of Machines,Tata McGraw-Hill Publishing Company Ltd., New Delhi, 4thEdition, 2014.
2. Ambekar A. G., Mechanism and Machine Theory, PHI, 2009.

REFERENCE BOOKS:

- Shigley, J.E and Uicker, J.J: Theory of Machines and Mechanisms, Oxford University Press
- Rattan S.S.: Theory of Machines Tata McGraw-Hill Publishing Co. Ltd. NewDelhi
- Rao J.S. and Dukkipati R.V: Mechanisms and theory Machines theory, Wiley Eastern Ltd.
- Mabie H.H and Ocvirk, F.W: Kinematic and Dynamics of Machinery, 3rd EditionJohnwiley and sons.
- Green, W.G: Theory of Machines, 2nd Edition, Blackie, London, 1992.
- Hollowenko, A.R: Dynamics of Machinery, John wiley and sons. Inc. NewYork, 1955.
- Wilson, Kinematics and Dynamics of Machinery, 3rd Edition, Pearson Education.
- Bevan Thomas, Theory of Machines

Course outcomes:	
1.	Upon completion of this course, the students can able to apply fundamentals of mechanismfor the design of new mechanisms and analyze them for optimum design.
2.	Students can able to understand the effects of friction in motiontransmission andin machine components.
3.	Understand the motion resulting from a specified set of linkages, design few linkage mechanisms and cam

	mechanisms for specified output motions
4.	It enables design of **cam** mechanisms for specified output motions and solving of problems in toothed gear trains and the effects of friction in machine components.
5.	Gain knowledge on the basic concepts of mechanisms, cam, gear train and their kinematics.

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
HSS-202	**ENGINEERING ECONOMICS AND MANAGEMENT**	3	0	0	3

Course Objectives:
To gain an understanding and appreciation of the principles and applications relevant to the planning, design, and operations of manufacturing/service firms. To develop skills necessary to effectively analyze and synthesize the many inter-relationships

UNIT 1: WORKSTUDY

Method study; Principle of motion economy; techniques of method study– various charts; THERBLIGS; Work measurement–various methods; time study PMTS; determining standard time; work sampling; Numerical.

UNIT 2: PRODUCTIVITY AND MANUFACTURING COST ANALYSIS

Productivity– Definition; various methods of measurement; Factors affecting productivity; Strategies for improving productivity; various methods of job evaluation and meritrating; Various incentive payments schemes; behavioral aspects; financial incentives

Fixed and variable costs; Direct; indirect and overhead costs; Process and Job costing; Recovery of overheads; Standard costing; cost control; cost variance Analysis; Labour; material overheading volume; rate and efficiency; breakeven analysis; marginal costing and contribution; numerical

UNIT 3: MATERIALS MANAGEMENT

Relevant costs; inventory control models– economic order quantity (EOQ); Economic batch quantity (EBQ) with and without shortage; Purchase discounts; sensitivity analysis; inventory control systems– PQSs Systems; Service level; Stock out risk; determination of order point and safety stock; selective inventory control– ABC; FSN; SDE; VED and three dimensional; Numerical.

UNIT 4: QUALITY MANAGEMENT

Definition of quality; various approaches; concept of quality assurance systems; costs of quality; statistical quality control (SQC); Variables and Attributes; X;R;P and C– charts; Acceptance sampling; OC–curve; concept of AOQL; Sampling Plan– single; double and sequential; introduction to TQM and ISO 9000

UNIT 5: PRODUCTION PLANNING & CONTROL

Basic concept its relations with other decision areas; decision options – Basic and Mixed strategies; Master production schedule (MPS) Scheduling Operations Various methods for line and intermittent production systems; Gantt chart; sequencing– Johnson algorithm for n- Jobs-2 machines ;n-jobs-3 machines; 2 jobs machines n-Jobs m-machines; various means of measuring effectiveness of PPC; Introduction to JIT; Numerical.

TEXT BOOK:

Chary. "Production and Operations Management", Tata McGraw Hill.

REFERENCE BOOKS:

1 Buffa, S. S., "Modern Production Management", John Wiley
2 Sadagopan,"Management Information Systems", Prentice Hall of India.3 Schroeder., "Operations Management", McGraw Hill ISE.
4 Monks., "Operation Management", McGraw Hill ISE.
5 Martinich. "Production and Operations Management", John Wiely SE
6 Turner, MIZE, CHASE. ,"Industrial and Systems Engineering", Prentice Hall of India.

Course outcomes:	
1.	Explain the various parts of the operations and production management processes and their interaction with other business functions (strategy, engineering, finance, marketing, HRM, project management and innovation)
2.	Develop the ability to identify operational methodologies to assess and improve an organizations performance

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-252 C	**APPLIED THERMODYNAMICS LAB**	0	0	2	1

Course Objectives:
To supplement the principles learnt in Energy conversion. To understand how turbines are working.

LISTOF EXPERIMENTS

1. To study low pressure boilers with their accessories and mountings
2. To study high pressure boilers with their accessories and mountings
3. To prepare heat balance sheet for a given boiler
4. To study impulse and reaction steam turbines
5. To find out dryness fraction of steam by throttling calorimeter
6. To calculate power output and efficiency of a steam turbine
7. To study and determine the condenser efficiency
8. To study and determine the volumetric efficiency of a reciprocating air compressor
9. To study cooling tower and determine its efficiency
10. To determine calorific value of a sample of fuel using bomb calorimeter
11. To determine composition of flue gases by orsat Apparatus

Course outcomes:

CO1. To apply the knowledge of mathematics, science and engineering fundamentals to model theenergy conversion phenomenon.

CO2. To identify and formulate power production based on the fundamentals laws of thermal engineering

CO3.Students can able to understand the basic concepts of Gas power cycles
CO4.Students can able to compare various steam Turbine & Steam Nozzle
CO5. Students can able to Examine Single Acting &Double Acting Compressor

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-254 C	**STRENGTH OF MATERIALS LAB**	0	0	2	1

Course Objectives:
To expose the students to the testing of different materials under the action of various forces and determination of their characteristics experimentally.

LIST OF EXPERIMENTS

1. To perform the Brinell Hardness Test
2. To perform the Rockwell Hardness Test
3. To study the Impact Testing Machine and perform the Impact Tests (IZOD &CHARY)
4. To study UTM and Torsion Testing Machine
5. To perform the Tensile Test on UTM
6. To perform the Shear Test on UTM
7. To perform the torsion test on Torsion Testing Machine
8. To determine the Moment of Inertia of a Flywheel about its own axis of rotation
9. To study the Erichsen Sheet Metal Testing Machine and Perform the Erichsen Sheet MetalTest;
10. To verify support reactions for different types of loads at different locations on the beam

Course outcomes:

CO1 Able to study the stress-strain curves of different materials used in the field under differentloading conditions.

CO2. Ability to function on multi-disciplinary teams in the area of materials testing.

CO3. Students will have the required knowledge in the area of testing of materials and componentsof structural elements experimentally

CO4. Test the different materials under the action of various forces and determine their characteristics experimentally

CO5Apply theoretical knowledge about the Mechanics of Solids with practical testing for determining the strength of materials under externally applied loads.

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-256 C	**FLUID MACHINERY LAB**	0	0	2	1

Course Objectives:
To have hands on experience in flow measurements using different devices and also perform characteristic study of pumps, turbines etc..

LIST OF EXPERIMENTS

1. To study the constructional details and draw characteristic and constant efficiency curves ofPelton turbine
2. To study the constructional details and draw characteristic and constant efficiency curvesof a Francis turbine
3. To study the constructional details and draw characteristic and constant efficiency curves ofa Kaplan turbine
4. To study the constructional details and draw characteristic curve of centrifugal pump
5. To study the constructional details and draw characteristic curve of a reciprocating pump
6. To study the constructional details and draw performance curve of gear oil pump
7. To study the constructional details and determine the efficiency of a hydraulic Ram
8. To study the constructional details of a centrifugal compressor
9. To study the model of hydro power plant and draw it's layout
10. To determine the volumetric efficiency of a reciprocating compressor

Course outcomes:

CO1.Ability to use the measurement equipment's for flow measurement C O2.Ability to use the measurement equipment's for flow measurement CO3.Ability to do performance trust on different fluid machinery

CO4. Identify importance of various fluid properties at rest and in transit. Understand the concept of boundary layer theory and flow separation. Plot velocity and pressure profiles for any given fluid flow.

CO5. Evaluate the performance characteristics of hydraulic turbines and pumps

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-258 C	**KINEMATICS OF MACHINE LAB**	0	0	2	1

Course Objectives:
To supplement the principles learnt in kinematics and Dynamics of Machinery. To understand how certain measuring devices are used for dynamic testing.

1. To study inversions of four bar chain: Coupling Rod, Beam Engine
2. To study Steering Mechanisms; Davis and Ackerman.
3. Study of quick return mechanism and draw velocity and acceleration diagram.
4. Study of inversion of Double slider chain Oldham Coupling, Scotch Yoke andElliptical Trammel.
5. Study of various cam-follower arrangements.
6. To plot displacement v/s angle of rotation curve for various cams
7. To determine co-efficient of friction using two roller oscillating arrangement.
8. Study of various types of dynamometers, Brakes and Clutches.
9. To determine moment of inertia of the given object using of Trifler suspension.
10. Perform study of the following using VirtualLabhttp://www.vlab.co.in/
11. Position, velocity and acceleration analysis of Grash off our bar mechanism
12. Position, velocity and acceleration analysis of Slider Crank mechanism

Course outcome:
CO1. Ability to demonstrate the principles of kinematics and dynamics of machineryCO2. Ability to use the measuring devices for dynamic testing CO3. To provide a foundation for the study of machine design. CO4. To provide a foundation for the study of machine design.

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-260 C	**MACHINE DRAWING**	0	0	2	1

Course Objectives:
This course makes the student to learn the presentation of components and assemblies in to various views and vice versa. This will enable the student to learn to conceive an object and go For its production. AutoCAD is introduced to facilitate this process

1. INTRODUCTION

Introduction to Graphic language, Sectional views, Types of sectional views, Hatching, Isometric scale, Isometric drawing of Circles; Conversion of isometric to orthographic and vice versa.

2. TOLERENCE AND MACHINE COMPONENTS

Standard abbreviation – Limits , Fits and Tolerance, Surface finish; Gear terminology, types of gear;Draw the gear profile; Springs, Belts & Pulleys, Bearings.

3. KEYS AND COTTERS

Various types of keys and cotters, Spigot and socket joint, Gib and cotter joint, Knuckle joint

4. JOINTS AND COUPLINGS

Rivets and Riveted Joints, Caulking and fullering of riveted joints, Types of riveted joints, Bolts and nuts, Welded Joint, Flange coupling (Protected and non-protected), muff coupling and half-lap muff Coupling.

5. ASSEMBLY DRAWING

Assembly of Lathe Tail stock, Machine vice; Cylinder, Piston, rings and Connecting rod; Steam stop valve, Stuffing box, Drill jigs and Milling fixture, Screw Jack.

LIST OF EXERCISES

1. Introduction of AUTOCAD and drawing simple figures by using Draw and Modify tools inAUTOCAD
2. To make complex / Engineering; Objects by using Layers with proper dimensioning tools
3. Conversion of Isometric views to orthographic views
4. Conversion of Orthographic views to Isometric views
5. Objects are given in Isometric views and that are to be converted in sectional views
6. Excises on Threads; Bolts and nuts
7. Excises on Riveted Joints and welded joints
8. Excises on Shafts; keys cotter and pin joints
9. Excises on Couplings
10. Geometrical tolerance; Limits and fits
11. Excises on springs; belts and Pulleys
12. Excises on Gears and bearings

13. Assembly drawing of Cylinder; Piston; rings and connected rod And part drawing ofcrank shaft
14. Assembly drawing of screws Jack
15. Block Diagrams;(Power plant; Civil ;Electronics etc)
16. Assembly drawing of stop valve
17. Assembly drawing of spring loaded safety Valve
18. Assembly drawing of Tailstock of Lathe
19. Assembly drawing of Shaper tool slide
20. Conversion of Assembly drawing to part drawing sand vice versa

TEXT BOOK

Singh, Ajeet., "Machine Drawing", McGraw-Hill2008

REFERENCE BOOKS

1. Gill, P. S., "Machine Drawing", SK Katariaand Sons, 2008
2. Bhatt, N. D, and Panchal, V. M., "Machine Drawing", Charotar Publishing House, 2008

Course outcomes:

CO1. Upon completion of this course, the students can able to perform free hand sketching of basic geometrical constructions and multiple views of objects.

CO2. Students can able to prepare isometric and perspective sections of simple solids
CO3. Students can able to demonstrate computer aided drafting

CO4. Students will get insight of technical skills regarding assembly, production and part drawings.
CO5. Students will be familiarized with various limits, fits and tolerances.

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

V- SEMESTER

Course code	Course title	L	T	P	Credits
ME-301 C	**DYNAMICS OF MACHINES**	3	1	0	4

Course Objectives:
To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms. To understand the undesirable effects of unbalances resulting from prescribed motions in mechanism.

UNIT-1: SATIC AND DYNAMIC FORCE ANALYSIS

Static force analysis of planer mechanisms, dynamic force analysis including inertia and frictional forces of planer mechanisms.

Dynamics of Reciprocating Engines : engine types, indicator diagrams, gas forces, equivalent masses, inertia forces, bearing loads in a single cylinder engine, crankshaft torque, engine shaking forces. Introduction to flywheel

UNIT-2: GOVERNORS

Watt, Porter, Proell, Hartnell and spring controlled governors, governor effort, power, stability, inertia effects. Hunting of governors and Isochronism, Intertia Governors

UNIT-3: BRAKES

Types of brakes, shoe brake, band brake, band and block brake, internal expanding shoe brake andeffect of braking

Dynamometers: types of dynamometers, Prony brake, rope brake and band brake dynamometers,belt transmission dynamometer, torsion dynamometer, hydraulic dynamometer.

UNIT-4: GYROSCOPE

Principle of gyroscopic couple, effect of gyroscopic couple and centrifugal force on vehicle taking a turn, gyroscopic stabilization, stabilization of sea vessels stability of four wheel and two wheel vehicles moving on curved paths.

UNIT-5: BALANCING OF ROTATING COMPONENTS

Static/dynamic balancing; Balancing of rotating masses; Two plane balancing –graphical and analytical methods; balancing of rotors; field balancing; balancing machines.

BALANCING OFRECIPROCATING PARTS: Balancing of single cylinder engine, balancingof multi- cylinder inline/radial/V-type engines, firing order.

TEXT BOOKS

1. Uicker, J.J., Pennock G.R and Shigley, J.E., "Theory of Machines and Mechanisms" ,3rdEdition, Oxford University Press, 2009.
2. Rattan, S.S, "Theory of Machines", 3rd Edition, Tata McGraw-Hill,

REFERENCE BOOKS

1. Grover. G.T., "Mechanical Vibrations", Nem Chand and Bros.,
2. William T. Thomson, Marie Dillon Dahleh, Chandramouli Padmanabhan, "Theory ofVibrationwith Application", 5th edition, Pearson Education, 2011
3. V.Ramamurthi, "Mechanics of Machines", Narosa Publishing House,
4. Khurmi, R.S.,"Theory of Machines", 14th Edition, S Chand Publications,

Course outcomes:

CO1. Upon completion of this course, the Students can able to predict the force analysis in mechanical system and related vibration issues and can able to solve the problem.

CO2. Implement the concept of Cam systems and their analysis of Forced vibration.
CO3. Apply principles of governors and gyroscopes.

CO4. Students will be equipped with fundamental knowledge of dynamics of machines so that student canappreciate problems of dynamic force balance, transmissibility of forces, isolation of systems, vibrations.

CO5. Develop knowledge of analytical and graphical methods for calculating balancing of rotaryandreciprocating masses.

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME- 303 C	**MANUFACTURING TECHNOLOGY**	3	0	0	3

Course Objectives:

1. To gain theoretical and practical knowledge in material casting processes and develop an understanding of the dependent and independent variables which control materials casting in a production setting.
2. Introduce students to good foundry practices and product design considerations.
3. Provide an overview of joining processes; discuss in detail the weld the welding process and the physics of welding.
4. Introduce students to different welding processes weld testing and advanced processes to be able to appreciate the practical applications of welding.

UNIT-1: SAND CASTING PROCESSES

Advantages and limitations; sand mold making procedure; patterns And core; pattern materials; pattern allowances; types of patterns; color coding; molding materials; Molding sand composition; sand preparation; sand properties and testing; sand molding processes

UNIT-2: MOULD MAKING AND INSPECTION

Types of cores; core prints ; chaplets and chills; Gating system; gates and risers; Melting practice; cupola and induction furnace; charge calculations; casting cleaning and casting defects; fettling; defects in casting and their remedies; methods of testing of casting for their soundness

UNIT-3: SPECIAL CASTING PROCESSES

Shell molding; precision investment casting; permanent mold casting; die casting; centrifugal casting; and continuous casting.

UNIT-4: PLASTICS

Classification and Properties of Plastics, Principle, Selection Operation, Advantages and Limitations of various Moulding Processes, Design Considerations for plastic moulded parts.

UNIT-5: WELDING

Classification; oxy-acetylene welding equipment sand techniques; Electric arc welding Electrodes; manual metal arc welding; inert gas shielded arc welding ;tungsten inert gas welding (TIG); metal inert gas welding (MIG); Submerged arc welding (SAW) Principle; resistance spot welding; resistance seam welding; upset welding; flash welding Other welding processes; introduction of thermit welding; electro slag welding; electron beam welding; friction welding; diffusion welding; brazing and soldering.

TEXT BOOKS

Rao PN., "Manufacturing Technology – Foundry, Forming and Welding", Tata McGraw Hill

REFERENCE BOOKS:

1. Ghosh. A. Mallik A.K., "Manufacturing Science", Affiliated East West Press, 2005
2. Sinha, K P, Goel D B., "Foundry Technology", Standard Publishing, New Delhi, 2005Richard, L Little., "Welding and Welding Technology", Tata McGraw Hill, 2000
3. Rosenthal; "Principle of Metal Casting", Tata McGraw Hill, 2001 Raghuwanshi B S., "Workshop Technology", VolI., Dhanpat Rai, 2004

Course outcomes:

CO1. Upon completion of this course, the students can able to apply the different manufacturingProcess and use this in industry for component production.

CO2. Students can able to understand the concepts of basic manufacturing processes and fabricationtechniques

CO3.The main objective of this course is to emphasize the importance manufacturing sciences in theday-to-day life, and to study the basic manufacturing processes and tools used.

CO4. The course is delineated particularly to understand the conventional manufacturing processeslike casting, metal forming, and welding process.

LINGAYA'S VIDYAPEETH
choose to know

DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-305 C	**HEAT TRANSFER**	3	1	0	4

Course Objectives:
This course imparts basic knowledge of heat transfer the knowledge imparted will him to reduce or increase heat transfer in existing equipment as the need may be and be able to gofor preliminary design of heat exchanger.

UNIT-1: BASICS AND LAWS

Modes of heat transfer, Steady State Heat Conduction: Boundary conditions in heat transfer; I-D heat conduction: a plane wall; long hollow cylinder; hollow sphere and composite structures; Overall htc. Conduction equation in Cartesian; polar and spherical co-ordinate systems; Initial and Boundary conditions; Critical Thickness of Insulation, Log Mean Area of Cylinder sand Spheres, Numerical

UNIT-2: STEADY STATEANDUNSTEADY STATEHEAT CONDUCTION

Introduction;1–D heat conduction with heat sources; Plane wall; hollow cylinder and sphere; Current carrying conductor ;Extended surfaces(fins);Fin effectiveness Numericals, Systems with negligible internal resistance; Transient heat conduction in plane walls; cylinders; spheres with convective boundary Conditions; Chart solutions only; Periodic heat transfer in one dimension; Numericals

UNIT-3: CONVECTION (WITH AND WITHOUT PHASE CHANGE)

Forced convection-Thermal and hydro-dynamic boundary layers; Equation of continuity; Momentum and energy equations; some results for flow over a flat plate and flow through tube; Fluid friction and heat transfer (Colburnanalogy);Use of; Empirical relations for free convection from vertical and horizontal planes and cylinders; Numericals, Laminar film condensation on a vertical plate; Drop-wise condensation; Boiling regimes; Free convective; Nucleate and film boiling; Numericals

UNIT-4: THERMAL RADIATION

Absorptivity; Reflectivity; Transmissivity; Black body; emissive power; radiosity; laws of thermal radiation; intensity of radiation; Shape factor and its properties; Hottel's Method; Radiation exchange between black and gray surfaces; Two body; three body enclosures; Radiation shielding; Numericals

UNIT-5: HEAT EXCHANGERS

Classification; Performance variables; Analysis of a parallel and counter flow heat exchanger usingLMTD and NTU; Heat exchanger effectiveness; Use of charts for multipass exchanger and

Cross flow heat exchanger; Fouling factor; Compact heat exchangers; Plate heat exchangers; Heat Pipe, Numericals

TEXT BOOK

NAG, P. K., "Heat Transfer", McGraw Hill

REFERENCE BOOKS

1. Arpasi, VS., "Conduction Heat Transfer", Addison Wesley
2. Domkundwar., "Heat Transfer",
3. Holman, J. P., "Heat Transfer", Tata McGraw Hill
4. Goshdastidar, P.S., "Heat Transfer", Oxford Univ Press
5. Lienhard, J.V, J. H. Lienhard. V., " A Heat Transfer Text Book

Course outcomes:

CO-1: To develop solutions for transient heat conduction in simple geometries, without heat generation.

CO-2: Understand the fundamentals of convective heat transfer process; evaluate heat transfer coefficients for natural and forced convection; deriving and analysing momentum and energy equations in two dimensions.

CO-3: Analysis of dimensionless quantities of heat transfer.

CO-4: Upon completion of this course, the students can able to understand and apply different heat and mass transfer principles of different applications.

CO-5. Students can able to understand the various heat transfers and also the Heat exchangers.

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-307C	**SOLID MECHANICS**	3	1	0	4

Course Objectives:
The strength of materials is one of the core subjects and aim is to provide a sound foundation todesign various elements of mechanical equipment

UNIT-1: BENDING STRESS

Flexural formula for straight beam under pure bending, Flexural formula for curved beam under pure bending, Development of bending stress in rectangular, I-sectional and T-sectional beams. Numerical

UNIT-2: TRANSVERSE SHEAR AND BIAXIAL STRESSES

The shear formula; shear stress in beams for rectangular cross section , shear stress in beams for I- section , Shear flow in rectangular section ,I-Section , C-section , T-section. . Numerical

UNIT-3: SLOPE AND DEFLECTION OF BEAMS

Relationship between bending moment; slope and deflection, Calculations of slope and deflection by method of integration; Calculations of slope and deflection by Macauley's method, Castigliango's theorem to find slope; deflection of beams. Numerical.

UNIT-4: COLUMNS AND STRUTS

Column under axial load, Concept of instability and buckling, slenderness ratio; Euler's formula for elastic buckling load for a column hinged at both the ends, Euler's formula for elastic buckling load for a column fixed at one end and free at other end, Euler's formula for elastic buckling load for a column fixed at both ends, Euler's formula for elastic buckling load for a column fixed at one end and hinged at other end, Equivalent length of a column, Slenderness Ratio, Rankines formula.Numerical.

UNIT-5: THIN & THICK CYLINDERS

Thin walled pressure vessels; Hoop stress and longitudinal stress for A thin cylindrical vessel ,Hoop stress and longitudinal stress for a thin spherical vessel, Derivations of Lame's equations for thick cylinders; Radial and hoop stresses and strains in thick cylinders,

TEXT BOOKS

Ferdinand P Beer & Russel E Johnston;—Mechanics of Materials, Tata McGraw Hill;2009

REFERENCE BOOKS:

1. Hibbeler, R. C.,— Mechanics of Materials ,Pearson Education, 2005
2. Ryder,G H., —Strength of Materials‖, Macmillan, 2001
3. Srinath LS, —Strength of Materials‖, Macmillan, 2001
4. Andrew / Kiusalaas, Jaan., —Mechanics of Materials‖, Thomson, 2003

Course outcomes:

1. Learn about the elastic and plastic behavior of material and evaluate stress invariants, principalstresses and their directions.
2. Determine strain invariants, principal strains and their directions.
3. Develop constitutive relationships between stress and strain for linearly elastic solid.
4. Analyze theories of failure and design components for safe operation.
5. Examine the properties of ideally plastic solid and apply the concepts of energy methods insolving structural problems.

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-309 C	**DESIGN OF MACHINE ELEMENTS**	3	1	0	4

Course Objectives:
The objectives are to study characteristics of principle types of mechanical elements under variable loading and to prevent their failure under static and variable loading.

UNIT-1: DESIGN PHILOSOPHY

Design procedure, Preferred numbers; Stress-Strain Curves of various materials; Static loading; Factor of safety; Limits, Fits and Tolerances; Hole basis and shaft basis system; Types of fits; Numericals.

UNIT-2: MECHANICAL JOINTS

ISO Metric screw threads ; Bolted joints intension; Eccentrically Loaded bolted Joints in shear and under combined stresses; Design of spigot and Socket joints; Design of knuckle joints; Design-case study.

UNIT-3: WELDED AND RIVETED JOINTS (UNDER STATIC LOADING):

Introduction to Welding and Riveting; their advantages, disadvantages and applications; Types of Welded Joints; Design of various types of welded joints; eccentric loaded welded joints; Types of Rivets; caulking and fullering; Design of various types of riveted joints under different static loading conditions; eccentrically loaded riveted joints; Design- case study.

UNIT-4: DESIGN OF POWER TRANSMISSION COMPONENTS:

Belts; chains; ropes; design of belt drives; Flat and V Belt drives; condition for transmission of max. power; selection of belt; design of rope drives; design of chain drives with sprockets; Designof Power screws; Design of Screw Jack; Case Study

UNIT-5: DESIGN OF CLUTCHES AND BRAKES:

Types of clutches in use; Design of friction clutches- Disc; Multidisc; Cone and centrifugal; Torque transmitting capacity of clutches; various types of brakes; Self energizing condition of brakes; design of shoe brakes- Internal and external expanding; band brakes; thermal considerations in brake designing; design-case study common alloys.

TEXT BOOK

Bhandari, V. B., "Design of machine elements", Tata McGraw Hill, 2nd edition, 2007

REFERENCE BOOKS:

1. Chitale, A. K, & Gupta, R. C., "Product Design and Manufacturing", Prentice Hall of India.
2. Robert, L. Norton., "Machine Design An Integrated Approach", Addison Wesley
3. Robert, C. Juvinall., "Fundamentals of Machine Component Design"
4. Shigley, J.E., "Mechanical Engg Design", Tata McGraw Hill 8th edition.

Course outcomes:

CO1. Gain knowledge of Steady Stresses and Variable Stresses in Machine Members.
CO2. Study characteristics of Temporary and Permanent Joints and analyze simple joints. CO3. Upon completion of this course, the students can able to successfully design machinecomponents

CO4. To inculcate an ability to design belt drives and selection of belt, rope and chain drives
CO5. To achieve an expertise in design of Sliding contact bearing in industrial application.

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-351 C	**DYNAMICS OF MACHINES LAB**	0	0	2	1

Course Objectives:
To understand how certain measuring devices are used for dynamic testing.

LIST OF EXPERIMENTS

1. To study various types of links; pairs; chains and mechanisms
2. To study planar four bar mechanism and its inversions (four bar mechanism; single and double slider crank mechanism Graphical synthesis of i)4barmechanismii) radial cam with roller follower Kinematic study of mechanisms i) shaper machine mechanism ii) power hacksaw mechanism
3. To study various types of cam and follower arrangement and plot follower displacement v/scam rotation for various cam follower systems
4. To study various types of gears and generate spur gear involute tooth profile using simulated gear shaping process and study standard and non-standard involute gear tooth profile
5. To study various types of gear laws; simple; compound; reverted; epicyclic anddifferential
6. To perform experiment for static balancing /dynamic balancing on balancing apparatus
7. Determine M O I of connecting rod by compound pendulum method and tri filersuspension pendulum
8. Determine gyroscopic couple on motorized Gyroscope.

Course outcomes:

CO1.Ability to demonstrate the principles of kinematics and dynamics of machinery.
CO2.Ability to use the measuring devices for dynamic testing.

CO3. To equip the student with fundamental knowledge of dynamics of machines so that student can appreciate problems of dynamic force balance, transmissibility of forces, isolation of systems, vibrations.

CO4. Develop knowledge of analytical and graphical methods for calculating balancing of rotaryand reciprocating masses.

CO5. Understand balancing of reciprocating and rotary masses.

Course code	Course title	L	T	P	Credits
ME-353 C	**MANUFACTURING TECHNOLOGY LAB**	0	0	2	1

Course Objectives:
To Study and acquire knowledge on various basic machining operations in special purpose machines and its applications in real life manufacture of components in the industry

LIST OFEXPERIMENTS

1. To make a pattern for a given casting with all the necessary allowances
2. To make a component involving gas welding joints and to study the welding defects andsuggesting their remedies.
3. To make a component involving MIG welding and study the welding defects and suggesttheir Remedies.
4. Development and manufacture of a Complex sheet metal component such as, five pieceelbow
5. To make a casting of aluminum material.
6. To study defects in a casting and suggest the remedial measures.
7. To make a sand mold with a core for making a hollow job.

Course outcomes:

1. Students will understand lathe and its working
2. Students will get aware about different tools used in manufacturing.
3. Student will understand the concept of tool wear.
4. Students will learn the use of machineries.
5. Students will learn the different methods of manufacturing

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-355 C	**HEAT TRANSFER LAB**	0	0	2	1

Course Objectives:
To study the heat transfer phenomena predict the relevant coefficient using implementation.To study the performance of refrigeration cycle / components.

LIST OF EXPERIMENTS

1. To determine the thermal conductivity of a metallic Rod. To determine thethermal conductivity of an insulating power
2. To find out the heat transfer and effectiveness of a pin fin under naturalconvection condition
3. To calculate the heat transfer and effectiveness of a pin fin under forcedconvection condition
4. To determine the emissivity of a given specimen body
5. To verify the Stefen-Boltzman constant for thermal radiation
6. To determine the overall heat transfer coefficient and effectiveness of a givenheat exchanger under parallel flow condition
7. To determine the overall heat transfer coefficient and effectiveness of a givenheat exchanger under counter flow condition
8. To determine the convective heat transfer coefficient for a horizontal rod
9. To determine the overall thermal resistance of a composite wall

Course outcomes:

- Ability to demonstrate the fundamentals of heat and predict the coefficient used in that transfer application and also design refrigeration cycle.
- Students can apply their heat transfer knowledge in industries.
- Analyze different methods to calculate the heat transfer coefficient in various heat transfer problems.
- Analyze the theoretical knowledge and apply it in conducting experiments in the forms of heat transfer
- Test Emissivity, Stefan Boltzmann Constant and Critical Heat flux. Asses the performance of Refrigeration and Air conditioning and to determine the overall heat transfer coefficient for a composite slab.

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DEPARTMENT OF MECHANICAL ENGINEERING

B. Tech Mechanical Engineering (VI SEMESTER)

Course code	Course title	L	T	P	Credits
ME 302C	**MATERIAL SCIENCE**	3	0	0	3

Course Objectives:

The course provides the knowledge on the composition; testing and applications of materials; It also provides knowledge about the structure of materials and the effect of temperature; composition and time on various metallurgical processes. The study of this course will help the students to identify and select suitable materials for various engineering applications.

UNIT-1: METALS & STRUCTURE OF MATERIALS

Ferrous Metals: Plain carbon steel; high speed steel and cast iron; Crystal structure; Crystal imperfections and their classifications; point defects; line defects; edge & screw dislocations; surface defects; volume defects & effects of imperfections on metal properties

UNIT-2: SOLID SOLUTIONS AND PHASE DIAGRAM

Solid solution and its types; importance and objectives of phase diagram; systems; phase and structural constituents; cooling curves; Gibbs's phase rule; Lever rule; Iron Carbon equilibrium diagram and TTT diagram.

UNIT-3: HEAT TREATMENT

Principles; purpose; classification of heat treatment processes; annealing; normalizing; hardening; tempering; carburizing;nitriding;cyaniding; flame and induction hardening. Allotropy of iron. Martempering and Austempering

UNIT-4: DEFORMATION OF METALS

Elastic and plastic deformation; mechanism of plastic deformation; yield point phenomena; strain ageing; work hardening; Bauschinger effect; season cracking. Recovery; re-crystallization and grain growth.

UNIT-5: CORROSION, CREEP, FATIGUE & ALLOY PROPERTIES

Phenomenon of Corrosion ; Creep concept and creep curve; mechanism of creep; creep testing and prevention against creep ; fatigue; fatigue limit; mechanism of fatigue; factors affecting fatigue; fatigue testing and SN curve. Effect of alloying elements on steel and stainless steel; Properties and applications of non ferrous metals – Aluminium; Copper and their common alloys.

TEXT BOOKS

Narula, Narula and Gupta., "Material Science", Tata McGraw Hill, 2009

REFERENCE BOOKS

1 Budinski, K. G, & Budinski MK., "Engineering Materials Properties and Selection", PMI;2010
2 VanVlack., "Elements of Material Science and Engineering", Wesley Pub Comp
19983 Raghuwanshi, B. S., "Workshop Technology", VolI Dhanpat Rai & Co.

Course outcomes:	
1.	Understand the constitution of alloys and phase diagrams and Phase rules.
2.	Understand the deformation mechanisms of materials.
3.	Upon completion of this course, the students can able to apply the different materials, theirprocessing, heat treatments in suitable application in mechanical engineering fields.

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
MES-304C	**PLC for Automation**	4	0	0	4

Course Objectives:
1 To learn the basic concepts of PLC

UNIT I- INTRODUCTION:

Introduction to hardware & software in automation

Hardware identification, PLC, Parts of PLC, PLC Hardware components (I/O section, Discreate I/O module Analog I/O module,special I/O module,I/O specifications,CPU memory design.

UNIT II- PLC PROGRAMMING

Fundamentals of logics, AND,OR,NOT,XOR,NAND,NOR Boolean algebra functions,Hardware Logics verses Programmed logic.

Programming languages, Relay type instructions, Instruction Addressing Branch instruction

UNIT III- PROGRAMMING SOFTWARE

RX logics, studio 5000, TIA, GX WORKS3, Ladder programming examine if closed and examine if open modes of operation, PLC operated water filling and discharge process**.**

UNIT IV - DEVELOPING FUNDAMENTAL PLC WIRING DIAGRAMS & LADDERLOGIC PROGRAM

Smart sensors, Electromagnetic control relays, Proximity sensor, Magnetic read switch. light sensor, Ultrasonic sensor, strain /weight sensors, temp, flow , velocity & position sensors.converting relays schematics into PLC ladder programs.

UNIT V

PROGRAMMING TIMERS & COUNTERS,MECHANICAL TIMING RELAY TIMER INSTRUCTION, COUNTER INSTRUCTION,CASCADING COUNTER.

TEXT BOOK

Programmable Logic Controllor Frank D. Petrusella Tata McGraw –Hill Publication. Introduction to programming logic controller Gary dunning.Thomson Asia pvt Ltd.

Course outcomes:	
1.	Configure the I/O for a PLC project using PLC software
2.	Restore and monitor a PLC processor file using PLC programming software. Identify thebasic components of the PLC and how they function

MES-306C	IOT for Smart Manufacturing	L T P	Cr
		4 0 0	4

Course Objectives:

- To understand and have a clear vision to IOT. Data and Knowledge Management and useof Devices in IOT Technology. To build State of the Art architecture
- Application of IOT in real world, understand IOT Design Constraints and Industrial Automation. To meet the evolving IOT industry needs by addressing the challenges in Security in IOT, Integration of large scale heterogeneous network, Integration and interaction of uncertain data, and Service adaptation in the dynamic system environment.

Unit 1:

Smart Manufacturing; Introduction, advantages, key characteristics, Corporate Adaption process, manufacturing challenges vs technologies. Introduction to Internet of Things IOT, Sensing, Actuation, Machine to Machine Communication (M2M), Industrial Internet of Things (IIOT)

Unit-2:

Sensors and Data Acquisition for IOT, Wireless Sensors and Transducers, Signal Conditioning Circuits, Data Acquisition Systems, Analog-to-Digital Converter (ADC) and – Digital-to-Analog Converter (DACs), Microcontrollers Interfaces for Data Communication

Unit -3:

Sensors interfacing, Actuators interfacing, Communication Protocol study for IOT: UART Communication, RS485 Communication, I2C Protocol, Introduction to Arduino, Integration of Sensors and Actuators with Arduino, Fundamental of IoT Development with ThingWorkx

Unit -4:

Case study & advanced IOT Applications: Case Study: Agriculture, Healthcare, Activity Monitoring Sensors, Smart Environment Sensors, Smart Industrial Sensors, Smart Water Sensors, Smart Home Automation, Smart Security Solutions

Unit- 5:

Implementation of Real Time IOT Based Projects

Textbook & Reference Books:

[1] Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, ―From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence‖, 1st Edition, Academic Press, 2014.

[2] Vijay Madisetti and ArshdeepBahga, ―Internet of Things (A Hands-on-Approach)‖, 1stEdition, VPT, 2014.

[3] Francis daCosta, ―Rethinking the Internet of Things: A Scalable Approach to Connecting Everything‖, 1st Edition, Apress Publications, 2013

[4] https://nptel.ac.in/courses/106105166/

[5] https://www.ptcu.com/enrollment/student/fundamentals-of-iot-development-with-thingworx

Course outcome:

CO1. Students are encouraged to do Real Time Projects related to IOT based on above CourseLearning and Understanding.

CO2. The students will be thorough about the technology behind the IOT and associatedtechnologies.

CO3.The students will be able to use the IOT technologies in practical domains of society.
CO4.The students will be able to gain knowledge about the state of the art methodologies in IOT application domains.

CO5. Energy Efficiency and Cost Savings with IOT

MES-308C	Python for Automation	L-T-P	Credit
		4-0-0	4

OBJECTIVE

To build programming logic and thereby developing skills in problem solving using Python programminglanguage.

UNIT 1: Introduction to Python:

Structure of a Python Program, Elements of Python. Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms,

UNIT 2: Overview of Python Programming:

Identifiers and keywords, Literals, Strings, Operators; Arithmetic Operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator.

UNIT 3: Creating Python Programs:

Input and Output Statements, Control Statements; Looping- while Loop, for Loop, Loop Control, Conditional Statement-if...else, Difference between break, continue and pass.

UNIT4: Structures & Functions:

Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions,Exit function, default arguments.

UNIT 5: Classes, Object-oriented Programming and Exception:

Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding, Handlingexceptions

Reference Books;

1. Numerical Python by Robert Johansson, published by Apress
2. Python Data Analysis by Fabio Nelli, published by Apress
3. Introduction to Computation and Programming Using Python by John V Guttag,published by Prentice Hall of India

Websites for references;

1. Scientific Computing using Python; NUMPY, SCIPY, PANDAS, SCIKIT-LEARN
2. Python Tutorial/Documentation www.python.org. 2010
3. http://docs.python.org/3/tutorial/index.html

a) Account class and call different method to test the class

Course outcome

CO1. Explain basic principles of Python programming language

CO2. Implement object oriented concepts,

CO3. Implement database and GUI applications.

CO4. Students will be able to develop the skill of designing Graphical user Interfaces in Python

CO5. To develop the ability to write database applications in Python

ME 6E11C	**Industry 4.0**	**L-T-P**	**Credit**
		3-0-0	**3**

Learning Objectives

This course is designed to offer learners an introduction to Industry 4.0, its applications in the business world. Learners will gain deep insights into how smartness is being harnessed from data and appreciate what needs to be done in order to overcome some of the challenges.

Module 1: Introduction to Industry 4.0

The various Industrial Revolutions, Internet of Things (IoT) & Industrial Internet of Things, Overview on Technologies of Industry 4.0. Comparison of Industry 4.0 Factory and Today's Factory

Module 2: Drivers and Enablers

Drivers, Enablers, Reference Architecture and Standards

Module 3: Convergence of Automation & IoT

Smart Manufacturing**;** key characteristics, challenges, stages. Smart Machines; Characteristics, Technologies, interfaces, augmented reality. Cyber physical system (CPS). **IIoT;** smart factory connectivity, key ingredients, Digital Twins, Predictive Maintenance

Module 4: Data Exchange With Machines

Communication Protocols; OPC-UA, MQTT, Ethernet/IP, ProfiiNet, EtherCat IT infrastructure, databases, Cloud Computing Basics, Cloud Computing and Industry 4.0

Module 5: Smart Manufacturing Applications and Opportunities

Internet of things & Internet of Services, Smart Manufacturing, Smart Devices and Products, Smart Logistics, Smart Cities, Predictive Analytics. Opportunities, Challenges, and skills for workers in the Industry 4.0, Supply Chain Management, Readiness of Industry.

Course Outcomes

1. Understand the journey of Industry 4.0 and its drivers, enablers and roadmap.
2. Appreciate the smartness in smart factories, smart manufacturing, smart products,smart services and smart cities,
3. Able to understand various technologies associated with industry 4.0.
4. Understand the opportunities, challenges and future skills required for Industry 4.0.
5. Appreciate the power of Cloud Computing in a networked economy

Reference Books;

1 The Fourth Industrial Revolution by Klaus Schwab2 The Industries of Future by Alec Ross

3. A course on "industry 4.0: How to Revolutnize your business" on edx

Course outcomes:	
1.	Design and validate technological solutions to defined problems and communicate clearly and effectively for the practical application of their work.
2.	Review and document the knowledge developed by scholarly predecessors and critically assess the relevant technological issues
3	Students will be able to apply knowledge about Computer Aided Quality control andProcessPlanning Control
4	Students will be able to Design Flexible manufacturing cell after carrying out Grouptechnology study and finally creating FMS
5	To develop habit of individual critical thinking in analyzing a complex problem in thecomputer aided designing, manufacturing and optimization.

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-352C	**MATERIAL SCIENCE LAB**	0	0	2	1

Course Objectives:
To expose the students to the testing of different materials under the action of various forces anddetermination of their characteristics experimentally.

LIST OF EXPERIMENTS

1. To study the creep deformation of the solder wire
2. To study the Bravais Lattices
3. To study the arrangement of atoms in simple crystal with the aid of models
4. To study the chemical methods of corrosion
5. To normalize a given specimen and check its toughness
6. To temper the given hardened steel specimen at 300^{o}C and measure hardness
7. To temper the given hardened steel specimen at 500^{o}C and measure hardness
8. To study the microstructure of heat treated steel
9. To harden a given specimen and check its hardness
10. To anneal a given specimen and check its hardness

Course outcomes:	
1.	Interpret the hardness values obtained from differentheat treatment processe
2.	Identify the materials based on their microstructures.

ourse code	Course title	L	T	P	Credits
ME-354C	**Automation Lab**	0	0	2	1

List of Experiments

1.PLC Program to Implement Various Logic Gates

2.PLC Program to Implement Binary to BCD Converter3.PLC Program for a Car Parking System

4. PLC Program to Control Traffic Lights

5. PLC Program for Burglar Alarm Security System

6. PLC Program to Control Mixing in a Tank.

7. PLC Program to Operate Light as an Emergency Signal

8. PLC Program to Implement an Automatic Car-Wash Process

9. PLC Program to Operate Drilling of Parts

10. PLC Program to Operate Screwing of Parts

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
ME-356C	**IoT for smart manufacturing Lab**	0	0	2	1

LIST OF EXPERIMENTS:-

1 Security Access using MFRC522 RFID Reader with Arduino.

2 Securely connecting an Arduino MKR Wi-Fi 1010 to AWS IoT core.

3 Temperature Sensor with Arduino UNO

4 Temperature data logger using ESP8266 and LM35 and monitoring using Thing speakIoT server

5 Interfacing of Moisture sensor with Arduino.

6 Use an Arduino and an ultrasonic sensor to make a door alarm.

7 Use an Arduino and gas sensor.

8 DHT11 interfacing with Arduino weather station.

9 Heart beat sensor interfacing using Arduino.

10 Switch on/off an electric bulb using Relay interfacing with Arduino.

MES-358C	Python Prog. Lab	L-T-P	Credits:1
	0	-0-2	

List of Experiments

Program 1: Programs using if else structure Program 2: programs using for and while loop

Program 3: Program using List and String data structure

Program 5: Using Function in Python:

Program 6: Program using concept of Class, object, class variable, class method, static method

Program 7: Program using the concept of Inheritance

Program 8: Program using the concept of Polymorphism, operator overloading

Program 9: Program on file handling in Python

Program 10: Program on Exception handling

Program 11: Program on Multithreading

Reference Books:

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011

2 . Allen Downey, Jeffrey Elkner, Chris Meyers ,How to think like a computer scientist :Learning with Python,Freelyavailableonline.2012

4. John V Guttag. "Introduction to Computation and Programming Using Python", PrenticeHall ofIndia

SYSTEM REQUIREMENTS:

Hardware Requirement:

Intel Pentium IV processor based CPU or faster min. 128 MB of RAM, min 2 GB space on yourHDD

Software Requirement:

Microsoft Windows 9x or higher with PyChem /Eclipse with python or any other environment, oracle/MYSQL database

Or

UNIX/LINUX OS with Compatible python environment

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DEPARTMENT OF MECHANICAL ENGINEERING

B.Tech Mechanical Engineering (VII SEMESTER)

Course code	Course title	L	T	P	Credits
MEOE-401C	**INDUSTRIAL ROBOTS**	4	0	0	4

Course Objectives:
1. To impart knowledge on numerical methods to find the numerical solution of the problemsthatarises in engineering and technology. 2. To familiarize the advanced mathematical methods to solve engineering research problems.

UNIT – I

Introduction: Automation and Robotics, Robot anatomy, robot configuration, motions joint notation work volume, robot drive system, control system and dynamic performance, robot activation and feedback components.

UNIT – II Motion Analysis and Control: Manipulator kinematics, position representation, robot dynamics, configuration of robot controller, Positions sensors, velocity sensors, actuators sensors, power transmission system.

UNIT – III

End Effectors: Grippers-types, operation, mechanism, force analysis, tools as end effectors consideration in gripper selection and design. SENSORS: Desirable features, tactile, proximity and range sensors, uses sensors in robotics.

UNIT – IV:

Robot Programming: Lead through programming, Robot programming as a path in space, Motion interpolation, WAIT, SINONAL AND DELAY commands, Branching capabilities and Limitations. Robot Languages: Textual robot Languages, Generation, Robot language structures, Elements in function

UNIT – V

Collaborative Robots, Need of COBOTS, Difference between COBOTS and traditional industrial robots, Automation solutions with collaborative Robots.

Robot Application: Material transfer, Machine loading/unloading. Processing operation, Assembly and Inspection, Feature Application

TEXT BOOKS

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Introduction to Robotic Mechanics and Control by JJ Craig, Pearson, 3rd edition.
3. Robotics / Fu K S/ McGraw Hill.
4. Robotic Engineering / Richard D. Klafter, Prentice Hall
5. Robot Analysis and Intelligence / Asada and Slotine / Wiley Inter-Science.

Reference Books:

1. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons(ASIA) Pte Ltd.
2. Robotics and Control / Mittal R K & Nagrath I J / TMH3
3. Industrial Automation and robotics, Er. A.K. Gupta and S.K. Arora, University Science

Course outcomes:	
1.	Acquire more knowledge in basic concept of engineering mathematics.
2.	Improvement in problem evaluation technique.
3	Choose an appropriate method to solve a practical problem
4	Upon completion of this course, the students can able to apply the basic engineering
5	To learn about application of robot

.

		L T P	Cr
MES 403C	SMART MANUFACTURING SYSTEMS	4 0 0	4

Course Objectives:

- To understand the basics of smart manufacturing systems in context of Industry 4.0
- To understand the Architecture of Cyber- Physical system (CPS)
- Overall brief description of some associated technologies of smart manufacturing systems
- To understand IoT connectivity for Industry 4.0

Unit-I

Concepts of Smart Manufacturing: Definition and key characteristics of smart manufacturing**, C**orporate adaptation processes, manufacturing challenges, challenges vs technologies, Stages in smart manufacturing. Minimizing Six big losses in manufacturing with Industry 4.0, and their benefits

Unit-II

Smart Machines and Smart Sensors: Concept and Functions of a Smart, Machine Salient features and Critical Subsystems of a Smart Machine, **Smart sensors;** smart sensors ecosystem, need, benefits and applications of sensors in industry, Sensing for Manufacturing Process in IIoT, Block Diagram of a IoT Sensing Device, Sensors in IIoT Applications, Smart Machine Interfaces

Unit-III

Architecture of Cyber- Physical system (CPS): Functions of CPS, 5C Architecture; Smart Connection Level, Data-to- Information Level, Cyber Level, Cognition Level, Configuration Level. Design of PHM based CPS systems. Comparison of today's factory and Industry 4.0 factory by the implementation of 5C CPS architecture

Unit-IV

Digital Twin: Introduction, applications of digital twins, impact zones of digital twins in manufacturing (factories/plants and OEMs), advantages of digital twins, basic steps of digital twin technology

Machine Learning (ML) and Artificial Intelligence (AI) in Manufacturing: Introduction, benefits and applications of ML in industries, common approaches of ML; supervised and unsupervised, semi-supervised and reinforced ML

Predictive Maintenance: Introduction of predictive maintenance, difference between preventive and predictive maintenance, working and various components of predictive maintenance, benefits and tools of predictive maintenance. Common approaches to IoT predictive maintenance; Rule-based (condition monitoring) and AI (artificial intelligence) based predictive maintenance.

Condition Monitoring (CM): Introduction and benefits of CM, CM techniques, Condition monitoring vsCondition assessment,

Augmented Reality in Maintenance (Electrical & Mechanical)

Unit-V

IoT connectivity for Industry 4.0: Industrial communication requirement and its infrastructure, an overview of different types of networks, mesh network in industrial IoT, IoT protocols and the internet, TCP/IP (transmission control protocol/internet protocol) model, IoT connectivity standards: common protocols, application layer protocols, internet/network layer protocols, physical layer IoT protocols, choosing the right IoT connectivity protocol

Reference Books

1. Industry 4.0 the Industrial Internet of Things by Alasdair Gilchrist, Apress

2. Industrial Internet of Things, Cyber Manufacturing System by Sabina Jeschke, Christian Brecher, Houbing Song Danda B. Rawat, Springer

Course Outcomes:

On successful completion of this course, the students should be able to:

- Have a knowledge of smart manufacturing systems' components and can handle it moreeffectively.in context of Industry 4.0
- After understanding the Architecture of Cyber- Physical system (CPS) they can makemachines more oriented towards Industry 4.0, which increases productivity
- Overall brief description of associated technologies of smart manufacturing systemsenhance their workability knowledge in the industries
- After understanding IoT connectivity for Industry 4.0 they are able to make a systemTaylor made as per requirement of the industry
- Eventually knowledge of smart manufacturing systems enhances their employabilityopportunities as a whole.

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DEPARTMENT OF MECHANICAL ENGINEERING

Course Code	Course title	L	T	P	Credits
MES-405C	ADDITIVE MANUFACTURING	4	0	0	4

Course Objectives	
1.	Additive Manufacturing (AM) is an economically viable alternative to conventional manufacturing technologies for producing highly complex parts.
2.	The objective of the course is to impart fundamentals of additive manufacturing processes along with the various file formats, software tools, processes, techniques and applications.
3.	The main objective of this course is to acquaint students with the concept of AM, various AM technologies, selection of materials for AM, modeling of AM processes, and their applications in various fields.

UNIT-1: INTRODUCTION OF AM

Introduction to the Basic Principles of Additive Manufacturing, Additive Manufacturing Processes, Extrusion, Beam Deposition.

UNIT-2: OPERATIONS IN AM

Jetting, Sheet Lamination, Direct-Write, Photo-polymerization, Sintering, Powder Bed Fusion

UNIT-3: DESIGN/FABRICATION PROCESSES

Data Sources, Software Tools, File Formats, Model Repair and Validation, Pre- & Post-processing, Designing for Additive Manufacturing, Multiple Materials, Hybrids, Composite Materials, current and future directions.

UNIT-4: PROCESS AND MATERIAL

Process & Material Selection, Direct Digital Manufacturing and Distributed Manufacturing, Related Technologies: Mold-making, Rapid Tooling, Scanning.

UNIT-5: APPLICATIONS OF AM

Aerospace, Automotive, Biomedical Applications of AM. Product Development, Commercialization, Trends and Future Directions in Additive Manufacturing.

TEXT BOOKS:

1. Ian Gibson, David W. Rosen and Brent Stucker, Additive manufacturing technologies: rapidprototyping to direct digital manufacturing, Springer, 2010.
2. C.K. Chua, K.F. Leong and C.S. Lim, Rapid prototyping: Principles and applications, 3rdEdition, World Scientific, 2010.

REFERENCE BOOKS:

1. Hopkinson, Hague, Dickens, Rapid Manufacturing: An Industrial Revolution for the DigitalAge. Wiley, 2005.
2. Gibson, Advanced Manufacturing Technologies for Medical Applications. Wiley, 2005
3. Andreas Gebhardt, Understanding additive manufacturing: rapid prototyping, rapid tooling,rapid manufacturing, Hanser Publishers, 2011.
4. J.D. Majumdar and I. Manna, Laser-assisted fabrication of materials, Springer Series in Material Science, 2013.
5. L. Lu, J. Fuh and Y. S. Wong, Laser-induced materials and processes for rapid prototyping,Kluwer Academic Press, 2001.
6. Zhiqiang Fan and Frank Liou, Numerical modeling of the additive manufacturing (AM) processes of titanium alloy, lnTech, 2012.

Course Outcomes:	
1.	Students will be able to decide between the various trade-offs when selecting AM processes, devices and materials to suit particular engineering requirements.
2.	Students will have in-depth knowledge in latest trends and opportunities in AM, including distributed and direct digital manufacturing, mass customization, and how to commercialize their ideas.
3	Students will demonstrate a basic technical understanding of the physical principles, materials, and operation of the types of AM processes
4	Students will demonstrate the ability to identify characteristics of parts that are fabricated by AM processes
5	Explain the processes used in additive manufacturing

Course code	Course title	L	T	P	Credits
MES- 407 C	**Smart Sensors for Automation**	4	0	0	4

Course Objectives:
To makes students familiar with the constructions and working principle of different types of sensors. To make students aware about the measuring instruments and the methods of measurement andthe use of different sensors in automation

Unit-I

Introduction: Definition and characteristics of sensors, static characteristics, dynamic characteristics, sensor classification, Definition of actuator, classification of actuators, electro-hydrostatic actuation, electro-pneumatic systems

Unit-II

Next Generation Sensors: Need for Next Generation Sensors, Definition, Limitations of smart sensors, intelligent sensors, advantages of intelligent sensors, applications of next generation sensors, design challenges

Unit-III

Smart sensors: Definition, configurations involved in smart sensors, smart sensor node, and Smart sensors functions, accessing sensors and actuators, utility in industrial subunits, Examples of industrial sensors: navigation industry, agricultural industries, healthcare industry, retail industry

Unit-IV

Smart sensors in industrial automation: temperature sensor, accelerometer sensor, gas sensor and their interfacing circuit, sensors in industrial applications: magnetostrictive sensors, torque sensor, speed sensor, PIR sensor, image sensor,

Unit-V

Measurement of proximity, pressure, velocity and displacement: proximity sensors, pressure sensor/flow sensors, ultrasonic sensor, photoelectric sensors, photomicro sensors, industrial applications and control

TEXT BOOKS

1. Sensor & transducers, D. Patranabis, 2nd edition, PHI

Reference Books:

2. Instrument transducers, H.K.P. Neubert, Oxford University press.
3. Measurement systems: application & design, E.A.Doebelin, Mc Graw Hill

Course outcomes:	
1.	Use concepts in common methods for converting a physical parameter into an electricalquantity
2.	Classify and explain with examples of transducers, including those for measurement oftemperature, motion and gas
3	Choose proper sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc

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DEPARTMENT OF MECHANICAL ENGINEERING

Course code	Course title	L	T	P	Credits
MES-455C	**ADDITIVE MANUFACTURING LAB**	0	0	2	1

Course Objectives:
Students will gain a practical knowledge of various manufacturing processes in a hands-on environment through experiments and simulations.

LIST OF EXPERIMENTS

1. Measurement of Cutting Force and Temperature in Turning
2. Experiments on Wire-EDM
3. Experiments on Laser Beam Machining
4. Design and manufacture of products using Additive Manufacturing
5. Study of Temperature distribution in arc welding
6. Weld quality tests
7. Part to CAD comparison using contact/non-contact digitization methods
8. Sheet metal bending experiments
9. Mechanical properties of powder compacts
10. Experiments on Rolling, Deep Drawing, Extrusion
11. Mold Flow simulation for Injection molding process planning
12. Design and representation of assembly of objects. Assembly sequencing, disassembly sequencing.

	Course outcomes: At the end of the course, a student will be able to:
1	Study cutting forces in machining processes
2	Develop a practical understanding of advanced manufacturing processes.
3	Identify and rectify defects in parts and manufacturing processes related problems.
4	Simulate flow of molten polymer materials to identify the problems in injection moulding Processes.
5	Additive manufacturing allows the creation of lighter, more complex designs that are too difficult or too expensive to build using traditional dies, molds, milling and machining.

Text Books:

1. M. P. Groover, Principles of Modern Manufacturing, 5th edition, Wiley, 2014. ISBN:978-1-118-47420-4.
2. E. P. DeGarmo, J. T. Black, R. A. Kohser, DeGarmo's materials and processes in manufacturing, 11thedition, John Wiley & Sons, 2011. ISBN: 978-0470924679.

Reference Book:

1. S. Kalpakjian, and Schmid, Manufacturing processes for engineering materials, 5th edition, Pearsoneducation, 2010. ISBN: 978-0132272711.

Course code	Course title	L	T	P	Credits
MES 459 C	**AUTOMATION LAB-II**	0	0	4	1
Course Objectives:					
Students will gain a practical knowledge of various Automation systems and IoT					

List of Experiments

1. To Study the Pneumatic control components
2. Pneumatic control of single Acting Cylinder through 3/2 Push button valve and 3/2 Leveroperated valve
3. Pneumatic control of Double Acting Cylinder through 5 Port double pilot valve and isoperated through limit switches
4. Pneumatic control of Double Acting Cylinder through Solenoid operated valves
5. Hydraulic control of Single Acting Cylinder through 4 Way Manifold Block
6. Digital and Analog LED Glow with the help of Nodemcu esp8266
7. Working of InfraRed (IR) sensor with LED Glow with the help of Nodemcu esp8266
8. Making of Server and Remotely control the devices
9. Control the devices through Blynk App
10. Control the devices through Google Assistant

Course outcomes: At the end of the course, a student will be able to:	
1	Knowledge of Pneumatic systems
2	Knowledge of Hydraulic systems
3	Knowledge of IoT applications in Home Automation

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DEPARTMENT OF MECHANICAL ENGINEERING

SCHEME FOR M. TECH.

M. TECH. MECHNICAL ENGINEERING			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ME-501	Simulation, Modelling & Analysis	3	0	0	3
2	AM-501	Advanced Engineering Mathematics	3	1	0	4
3	ME-503	Advanced Heat & Mass Transfer	3	1	0	4
4	ME-505	CAD/CAM	3	0	0	3
5	RM-501	Research Process & Methodology	3	1	0	4
6	ME-517	Mechanical Engineering Lab-I	0	0	4	2
		Total				**20**

M. TECH. MECHNICAL ENGINEERING			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ME-502	Statistical Quality Control	3	1	0	4
2	ME-504	Advanced Mechanics of Solids	3	1	0	4
3	ME-506	Power Plant Engineering	3	1	0	4
4		Elective I	3	0	0	3
5	ME-514	Seminar I	0	0	2	1
6	ME-518	Mechanical Engineering Lab-II	0	0	4	2
		Total				**18**

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M. TECH. MECHNICAL ENGINEERING			Semester			III
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	ME-601	Smart Manufacturing Systems	3	1	0	4
2	ME-603	Finite Element Method	3	1	0	4
3	ME-605	Production Planning and Control	3	1	0	4
4		Elective II	3	0	0	3
5	ME-617	Mechanical Engineering Lab-III	0	0	4	2
6	ME-619	Dissertation I	0	0	4	2
		Total				**19**

M. TECH. MECHNICAL ENGINEERING			Semester			III
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	ME-612	Seminar II	0	0	2	1
2	ME-620	Dissertation II	0	0	40	20
		Total				**19**

SN	**Course Code**	**Elective- I Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	ME5E12	Vibration Engineering	3	0	0	3
2	ME5E14	Smart Sensors	3	0	0	3
3	ME5E16	Industrial Robotics	3	0	0	3

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SN	Course Code	Elective- II Course Name	Periods			Credits
			L	T	P	
1	ME6E21	3-D Printing/Additive Manufacturing	3	0	0	3
2	ME6E23	Properties and Selection of Engineering Material	3	0	0	3
3	ME6E25	Industry 4.0	3	0	0	3

	Simulation, Modelling & Analysis	L- T- P	Cr

ME-501		**3- 1 - 0**	**4**

Unit-I

Introduction: Simulation: a tool, advantages and disadvantages of simulation, areas of application, systems and system environment, components of a system, discrete and continuous systems, discrete event system simulation.

General Principles: Concepts in discrete event simulation, time advance algorithm, manual simulation using event scheduling, basis properties and operations.

Unit-II

Models In Simulation: Terminology and concepts, statistical models: queuing systems; inventory systems; reliability and maintainability, limited data, discrete distributions: Bernoulli distribution; Bionomial distribution; Geometric distribution, continuous distribution: Uniform distribution; Exponential distribution; Gamma distribution; Normal distribution; Weibull distribution; Triangular Distribution; Lognormal distribution, poisson process,

Unit-III

Queueing Models: Characteristics of queuing systems, the calling population, system capacity, arrival process, service mechanism, queuing notations, long run measures of performance of queuing systems, server utilization in G/G/1/∞/∞ queues, server utilization in G/G/C/∞/∞ queues, server utilization and system performance, costs in queuing problems, Larkovian models.

Unit-IV

Random Number Generation: Properties of random numbers, Pseudo random numbers, techniques of generating random numbers, tests of random numbers.

Random Variate Generation: Inverse transform technique, Direct transformation for the Normal and Lognormal distribution, Convolution Method, Acceptance rejection technique.

Unit-V

Input Modelling And Validation: Steps in the development of model, data collection, Distribution identification, Parameter estimation, Goodness of Fit Tests, selecting input models without data, verification and validation of simulation models.

Text Books: Simulation Modelling and Analysis by Law and Kelton, Mc Graw Hill.

Reference Books:

1. Simulation Model Design& execution by Fishwich, Prentice Hall.
2. Discrete event system simulation by Banks, Carson, Nelson and Nicol.

E-Resources: https://nptel.ac.in/courses/112/107/112107220/Latest

Journals:

https://scholar.google.co.in/scholar?q=Simulation+Modelling+and+Analysis+latest+journals&hl=en&as_sdt=0&as_vis=1&oi=scholart

Advancement of Course: https://link.springer.com/book/10.1007/978-3-319-64182-9

Ethical Things:

https://www.researchgate.net/publication/255683782_Responsibility_Ethics_and_Simulation Latest Things:

https://www.sciencedirect.com/book/9780123705235/simulation-modeling-and-analysis-with-arena

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DEPARTMENT OF MECHANICAL ENGINEERING

AM-501	**Advanced Engineering Mathematics**	**L- T- P**	**Cr**
		3- 1 - 0	**4**

UNIT I:

Integration in series, ordinary and singular points, power series, frobenius method to find the general solution of higher order linear ordinary differential equation with constant variable coefficients, Legendre and Bassels equation, Legendre polynomials, Bessel functions, Boundary value, Strum-Liouville problem, Orthogonal eigen function expansions.

UNIT II:

Laplace Transform, Laplace Inverse Transform, Application of Laplace Transform and Inverse Laplace Transform in the particular solution of integral equation and integro- differential equations, Infinite Fourier sine and cosine transforms and its applications, Fourier-Legendre series, Fourier-Bessel series.

UNIT III:

Interpolation, Extrapolation, Lagrangs method, Missing-terms problems, Hermite interpolation, Spline interpolation, Cubic spline, Fitting of a curve in given sub-interval using cubic spline interpolation, Representation of a tabulated function in power of (x-a) using Newtons divided difference formula.

UNIT IV:

Numerical integration using Romberg method, Gauss-Legendre and Lobatto methods, Gaussian integration and numerical; double integration, Numerical solution of a system of non-linear equations using Newton Raphson method, Solution of system of linear equations in four variables using Gauss-Jordan and Crout's methods.

UNIT V:

Partial Differential Equations, Modeling, Vibrating String, Wave Equations. Product solutions o1'Laplaceequations, heat conduction equations, wave equations, Poisson'sequations by the method of separation of valiables and its applications in boundary value problems, Conversiou of a differeirtial equation into integral equation and vice versa, Solutions of Fredholur and Volterra integral equations of first and second kind.

Text Books: Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers

Reference Books: 1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Eastern-lndia.

2. Numerical Methods for Scientific and Engineering Computation, M. K. Jain, S. R. K. Iyengar and R.K..Jain, New Age International (P) Ltd.

E-Resources: ***https://nptel.ac.in/courses/111/105/111105035/***

Latest Journals: **https://www.springer.com/journal/10665**

Ethical Things:
https://soaneemrana.org/onewebmedia/ADVANCED%20ENGINEERING%20MATHEMATICS%20BY%20ERWIN%20ERESZIG1.pdf

Latest Things: ***https://www.wolfram.com/books/profile.cgi?id=8784***

ME-503	**Advanced Heat & Mass Transfer**	**L- T- P**	**Cr**
		3- 1 - 0	**4**

Review: Reviews of basic laws of Conduction, Convection and Radiation

Conduction: One dimensional steady state conduction with variable thermal conductivity and with internal distributed heat source, Local heat source in non-adiabatic plate, Thermocouple conduction error, Extended Surfaces-Review, Optimum fin of rectangular profile, straight fins of triangular and parabolic profiles, Optimum profile, Circumferential fin of rectangular profile, spines, design considerations. 2D steady state conduction, semi-infinite and finite flat plates, Temperature fields in finite cylinders and in infinite semi-cylinders, spherical shells, Graphical method, relaxation technique. Unsteady state conduction, Sudden changes in the surface temperatures of infinite plates, cylinders and spheres using Groeber's and Heisler charts for plates, cylinders and spheres suddenly immersed in fluids.

Radiation: Review of radiation principles, Diffuse surfaces and the Lambert's cosine law. Radiation through non-absorbing media, Hottel's method of successive reflections, Gebhart's unified method, Poljak's method. Radiation through absorbing media, Logarithmic decrement of radiation, Apparent absorptive of simple shaped gas bodies, Net heat exchange between surfaces separated by absorbing medium, Radiation of luminous gas flames.

Convection: Heat transfer in laminar flow, free convection between parallel plates, Forced internal flow through circular tubes, Fully developed flow, Velocity and thermal entry length, solutions with constant wall temperature and with constant heat flux, Forced external flow over a flat plate, two-dimensional velocity and temperature boundary layer equations, Karman Pohlhousen approximate integral method. Heat transfer in turbulent flow, Eddy heat diffusivity, Reynold's analogy between skin friction and heat transfer, Prandtl-Taylor, Von Karman and Martineli's analogies, Turbulent flow through circular tubes.

Text Books:

1. Heat Transfer/RK Rajput/S.Chand
2. Engg. Heat & Mass Transfer/ Sarit K. Das/Dhanpat Rai

Reference Books:

1. Heat Transfer / Necati Ozisik / TMH
2. Heat Transfer / Nellis & Klein / Cambridge University Press / 2012.
3. Heat Transfer/ P.S. Ghoshdastidar/ Oxford Press

E-Resources: ***https://nptel.ac.in/courses/103/103/103103032/***

Latest Journals: **https://www.sciencedirect.com/journal/international-journal-of-heat-and-mass-transfer**

Ethical Things: ***https://www.journals.elsevier.com/international-journal-of-heat-and-mass-transfer***

Latest Things: http://www.thermalfluidscentral.org/e-resources/download.php?id=28

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DEPARTMENT OF MECHANICAL ENGINEERING

ME- 505	**CAD/CAM**	**L- T- P**	**Cr**
		3- 1 - 0	**4**

Mathematical Elements, CAD, Solid modeling methods, Database structures for CAD, CSG formulation, B-rep and wire frame methods, Intersection surface generation methods, Boundary file generation methods, Feature based modeling systems, Surface modeling, B- splines, Coons and Bezier surfaces, NURBS and surface patches, fitting surfaces for arbitrary digested points, Offset surfaces, Fillet surfaces, Sewn surfaces.

Features recognition from the databases, IGES, STEP, PDES, and DXF data exchange formats, Graphic standards for CAD/CAM such as GKS, PHIGS and VDI.

Concurrent engineering integration of manufacturing principles and analytical principles in design,

Manufacturing

information generation from CAD data, Planar sectioning, Penalty functions, cavity milling, Optimization of cutter path, Effect of tool profile geometry, Methods for multi-axis machining, Methods for software design for CAD/CAM system, use of software libraries, Development of software package for a specific problem as part of course using software libraries.

Introduction to automation, CAM/CIM, Part programming, Interpolator & Control.

Text Books:

1. CAD/CAM Theory and Practice Ibrahim Zeid & R Sivasubramanian Tata McGraw-Hill
2. CAD/CAM H P Groover and E W Zimmers Prentice Hall

Reference Books:

1. Computer Aided Engineering & Design Jim Browne New ATC International
2. Computer Integrated Design and Manufacture D Bedworth, M Henderson & P Wolfe MacGraw Hill Inc.

E-Resources: ***https://nptel.ac.in/courses/112/102/112102101/***

Latest Journals: **https://www.journals.elsevier.com/computer-aided-design**

Ethical Things: ***https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3029271***

Latest Things:
https://www.researchgate.net/publication/297614687_Advancements_in_CADCAM_technology_Options_for_practical_implementation.

		L- T- P	Cr
RM-501	**Research Process And Methodology**	**3- 1 - 0**	**4**

Unit- 1

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit- 1I

Effective literature studies approaches, analysis Plagiarism, Research ethics,

Unit- 1II

Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit- 1V

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit- V

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs

Text Books:

1. "Research Methodology: An Introduction"□ Ranjit Kumar, 2 nd Edition,
2. "Research Methodology: A Step by Step Guide for beginners & engineering students'" Wayne Goddard and Stuart Melville.
3.

Reference Books:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science.

2. "Resisting Intellectual Property", Taylor & Francis Ltd .

E-Resources: ***https://nptel.ac.in/courses/121/106/121106007/***

Latest Journals: https://ijrm.humanjournals.com/

Ethical Things: ***https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/1471-2288-14-127***

Latest Things:
https://www.researchgate.net/publication/334519601_Modern_Trends_in_Research_Methodology

ME-517	**Mechanical Engineering Lab-I**	**L- T- P**	**Cr**
		0- 0 - 4	**2**

1. To create a 2-Dimensional Sketch with the help of all geometrical Shapes.

2. To calculate the heat transfer coefficient under natural convection for a given heat transfer condition. 3.To calculate the heat transfer coefficient under forced convection for a given heat transfer condition. 4.To study the EDM Machine and calculate the erosion of electrode.

5.To perform the experiment on EDM machine and find out the

MRR. 6.Simulation of hydraulic systems.

7.Simulation of pneumatic systems

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DEPARTMENT OF MECHANICAL ENGINEERING

		L- T- P	Cr
ME-502	**Statistical Quality Control**	**3- 1 - 0**	**4**

OBJECTIVE: The students are provided with an opportunity to acquire deeper knowledge of quality and to control quality in industry by using inspection, control charts and acceptance sampling techniques.

Course Outcome
CO1:- Given a set process data, characterize the process behavior using descriptive statistics
CO2:- Given sampled process data over time, establish control charts for monitoring processes
CO3:- Identify if the process is in control. If not, identify special patterns that may exist
CO4:- Given a process that is in control and the process specification, identify if a process is capable
CO5:- Given a measurement system, design a plan to identify if the measurement system is capable

Unit-I

Introduction: Statistical concepts in Quality Control, Graphical Representation of Grouped Data, Continuous and Discrete Probability Distributions, control limit Theorem

Unit-II

Control Charts For Variables-I: Introduction to Quality Control, process Control and Product Control, Chance and Assignable causes of Quality variation, Advantages of shewhart control charts, Process Control charts for variables, X, R charts ;. Fixation of control limits. Type I and Type II Errors, Theory of runs, Interpretation of out of Control points. Probability limits, Initiation of control charts, Trial control limits, Determination of aimed at value of Process Setting, Rational method of sub grouping, control chart parameters, control limits and specification limits, Natural tolerance limits, Relationship of a process in Control to upper and lower specification limits, process capability studies.

Unit-III

Control Charts For Variables-II: Special control charts for variables, group control chart, arithmetic moving X- Bar and R charts. Geometric moving chart, control chart with reject limits, steady trend in Process average with constant dispersion, trend chart with sloping limits, variable subgroup size.

Unit-IV

Variables Inspection And Attributes Inspection: Variables inspection and attributes inspection ;Relative merits and demerits, Control charts for Attributes, p chart and np chart, varying control limits, high defectives and low defectives, special severe test limits, C chart, U chart, Dodge demerit chart. Quality rating, CUSUM or Cumulative sum control chart, Average run length (ARL) Relative efficiency or sensitivity of control chart.

Unit-V

Acceptance Sampling: Probability theory, binomial and Poisson distribution, Acceptance Inspection, 100% Inspection, No Inspection and sampling Inspection, operating characteristic curve (O.C. curve). Effect of sample size and Acceptance number, type A and type B(O.C. curves), Single, Double and Multiple sampling Plans, SS Plan. Acceptance/Rejection and Acceptance/Rectification Plans, Producers Risk and Consumer's Risk, Indifference Quality level, Average Outgoing quality (AOQ) curve, AOQL, quality protection offered by a sampling Plan, Average sample Number (ASN) curve, Average Total Inspection (ATI) curve

REFERENCE:

1. Statistical Quality control by E.L. Grant
2. Quality control and Industrial Statistics, by A.J. Duncan
3. Quality control by Dale H. Bestefield
4. Total Quality Control by A.Y. Feigenboum
5. Elementary S.O.L. by I.W.Burr, M. Dekkar

		L- T- P	Cr
ME-504	**Advanced Mechanics of Solids**	**3- 1 - 0**	**4**

OBJECTIVE

This course will provide a firm foundation to the students in mechanics of deformable solids to enable them to analyse and solve a variety of strength related design problems encountered in practice.

Unit-I

Analysis Of Stress And Strain: Definition; Notation; Symmetry of the stress array and stress on an arbitrarily oriented plane; Transformation of stress, principal stresses and other properties; Differential equation of motion of a deformable body; Deformation of a deformable body; Strain theory, transformation of strain and principal strains; Small displacement theory; strain measurement and strain rosettes.Generalized Hooke's law; stress-strain relations; strain energy density of isotropic elastic materials; equations of thermo elasticity for isotropic materials. Inelastic Material Behavior: Limitations on the use of uniaxial stress-strain data; Nonlinear material response; yield criteria; various theories of failure; comparison and interpretation.

Unit-II

ENERGY METHODS: Principle of stationary potential energy; Castigliano's theorem on deflections for Linear Load-Deflection relations; Deflections of statically determinate and indeterminate structures.

Unit-III

Torsion: Torsion of a prismatic bar of circular cross section; Saint-venants' semi inverse method; Linear elastic solution, elliptical cross section, equilateral triangle cross section; The Prandtl Elastic-Membrane (Soap-Film Analogy); Narrow rectangular cross section; Hollow thin-wall torsion members and multiply connected crosssections.

Unit-IV

Bending Of Straight And Curved Beams: Symmetrical bending; Unsymmetrical bending; shear centre for thin-wall beam cross sections; circumferential stresses in a curved beam; Deflections of curved beams; stresses in a closed ring and chain link.

Unit-V

Flat Plates: Stress resultants in a flat plate; strain-displacement relations, Rotation of a plate surface element; Equilibrium equations for small displacement theory; Stress strain relations for isotropic plates; Boundary conditions for plates; Solution of rectangular plate and circular plate problems.

REFERENCE BOOKS:

1. Boresi, Arthur, P & Schmidt, Richard J., "Advanced Mechanics of Materials", Wiley, Asia.
2. Srinath, L.S, "Advanced Mechanics of Solids", Tata McGraw Hill
3. Raju, N, Krishan and Gururaje, "Advanced Mechanics of Solids and Structures", Narosa.

	Power Plant Engineering	**L- T- P**	**Cr**
ME-506		**3- 1 - 0**	**4**

Unit-I

Coal Based Thermal Power Plants: Rankine cycle – improvisations, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles and Cogeneration systems.

Unit-II

Diesel, Gas Turbine And Combined Cycle Power Plants: Otto, Diesel, Dual & Brayton Cycle – Analysis & Optimisation. Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants. Integrated Gasifier based Combined Cycle systems.

Unit-III

Nuclear Power Plants: Basics of Nuclear Engineering, Layout and subsystems of Nuclear Power Plants, Working of Nuclear Reactors : Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), CANadaDeuterium- Uranium reactor (CANDU), Breeder, Gas Cooled and Liquid Metal Cooled Reactors. Safety measures for Nuclear Power plants.

Unit-IV

Power From Renewable Energy: Hydro Electric Power Plants – Classification, Typical Layout and associated components including Turbines. Principle, Construction and working of Wind, Tidal, Solar Photo Voltaic (SPV), Solar Thermal, Geo Thermal, Biogas and Fuel Cell power systems.

Unit-V

Energy, Economic And Environmental Issues Of Power Plants: Power tariff types, Load distribution parameters, load curve, Comparison of site selection criteria, relative merits & demerits, Capital & Operating Cost of different power plants. Pollution control technologies including Waste Disposal Options for Coal and Nuclear Power Plants.

OUTCOMES:

Upon the completion of this course the students will be able to

CO1 Explain the layout, construction and working of the components inside a thermal power plant.

CO2 Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.

CO3 Explain the layout, construction and working of the components inside nuclear power plants.

CO4 Explain the layout, construction and working of the components inside Renewable energy power plants.
CO5 Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.

TEXT BOOK:

1. Nag. P.K., "Power Plant Engineering", Third Edition, Tata McGraw – Hill Publishing Company Ltd., 2008.

ME-518	**Mechanical Engineering Lab-II**	**L- T- P**	**Cr**
		0- 0 - 4	**2**

1. To study the constructional detail & working of two-stroke/ four stroke diesel engines.

2. To prepare heat balance sheet on multi-cylinder diesel engine/petrol engine.

3. To find the indicated horse power (IHP) on multi-cylinder petrol engine/diesel engine by Morse Test.

4. To perform the bending test and calculate the bending stresses developed for a given beam.5.To calculate and draw the shear stress distribution for a given beam.

6. To perform experiment on M1TR with DRO system

7. Cutting of gears using simple indexing method on the Milling Machine

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DEPARTMENT OF MECHANICAL ENGINEERING

ME-501	**Simulation, Modelling & Analysis**	**L- T- P**	**Cr**
		3- 1 - 0	**4**

Unit-I

Introduction: Simulation: a tool, advantages and disadvantages of simulation, areas of application, systems and system environment, components of a system, discrete and continuous systems, discrete event system simulation.

General Principles: Concepts in discrete event simulation, time advance algorithm, manual simulation using event scheduling, basis properties and operations.

Unit-II

Models In Simulation: Terminology and concepts, statistical models: queuing systems; inventory systems; reliability and maintainability, limited data, discrete distributions: Bernoulli distribution; Bionomial distribution; Geometric distribution, continuous distribution: Uniform distribution; Exponential distribution; Gamma distribution; Normal distribution; Weibull distribution; Triangular Distribution; Lognormal distribution, poisson process,

Unit-III

Queueing Models: Characteristics of queuing systems, the calling population, system capacity, arrival process, service mechanism, queuing notations, long run measures of performance of queuing systems, server utilization in G/G/1/∞/∞ queues, server utilization in G/G/C/∞/∞ queues, server utilization and system performance, costs in queuing problems, Larkovian models.

Unit-IV

Random Number Generation: Properties of random numbers, Pseudo random numbers, techniques of generating random numbers, tests of random numbers.

Random Variate Generation: Inverse transform technique, Direct transformation for the Normal and Lognormal distribution, Convolution Method, Acceptance rejection technique.

Unit-V

Input Modelling And Validation: Steps in the development of model, data collection, Distribution identification, Parameter estimation, Goodness of Fit Tests, selecting input models without data, verification and validation of simulation models.

Text Books: Simulation Modelling and Analysis by Law and Kelton, Mc Graw Hill.

Reference Books:

3. Simulation Model Design& execution by Fishwich, Prentice Hall.
4. Discrete event system simulation by Banks, Carson, Nelson and Nicol.

E-Resources: https://nptel.ac.in/courses/112/107/112107220/Latest

Journals:

https://scholar.google.co.in/scholar?q=Simulation+Modelling+and+Analysis+latest+journals&hl=en&as_sdt=0&as_vis=1&oi=scholart

Advancement of Course: https://link.springer.com/book/10.1007/978-3-319-64182-9

Ethical Things:
https://www.researchgate.net/publication/255683782_Responsibility_Ethics_and_Simulation Latest Things:

https://www.sciencedirect.com/book/9780123705235/simulation-modeling-and-analysis-with-arena

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DEPARTMENT OF MECHANICAL ENGINEERING

AM-501	**Advanced Engineering Mathematics**	**L- T- P**	**Cr**
		3- 1 - 0	**4**

UNIT I:

Integration in series, ordinary and singular points, power series, frobenius method to find the general solution of higher order linear ordinary differential equation with constant variable coefficients, Legendre and Bassels equation, Legendre polynomials, Bessel functions, Boundary value, Strum-Liouville problem, Orthogonal eigen function expansions.

UNIT II:

Laplace Transform, Laplace Inverse Transform, Application of Laplace Transform and Inverse Laplace Transform in the particular solution of integral equation and integro- differential equations, Infinite Fourier sine and cosine transforms and its applications, Fourier-Legendre series, Fourier-Bessel series.

UNIT III:

Interpolation, Extrapolation, Lagrangs method, Missing-terms problems, Hermite interpolation, Spline interpolation, Cubic spline, Fitting of a curve in given sub-interval using cubic spline interpolation, Representation of a tabulated function in power of (x-a) using Newtons divided difference formula.

UNIT IV:

Numerical integration using Romberg method, Gauss-Legendre and Lobatto methods, Gaussian integration and numerical; double integration, Numerical solution of a system of non-linear equations using Newton Raphson method, Solution of system of linear equations in four variables using Gauss-Jordan and Crout's methods.

UNIT V:

Partial Differential Equations, Modeling, Vibrating String, Wave Equations. Product solutions o1'Laplaceequations, heat conduction equations, wave equations, Poisson'sequations by the method of separation of valiables and its applications in boundary value problems, Conversiou of a differeirtial equation into integral equation and vice versa, Solutions of Fredholur and Volterra integral equations of first and second kind.

Text Books: Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers

Reference Books: 1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Eastern-lndia.

2. Numerical Methods for Scientific and Engineering Computation, M. K. Jain, S. R. K. Iyengar and R.K..Jain, New Age International (P) Ltd.

E-Resources: ***https://nptel.ac.in/courses/111/105/111105035/***

Latest Journals: **https://www.springer.com/journal/10665**

Ethical Things:
https://soaneemrana.org/onewebmedia/ADVANCED%20ENGINEERING%20MATHEMATICS%20BY%20ERWIN%20ERESZIG1.pdf

Latest Things: ***https://www.wolfram.com/books/profile.cgi?id=8784***

ME-503	**Advanced Heat & Mass Transfer**	**L- T- P**	**Cr**
		3- 1 - 0	**4**

Review: Reviews of basic laws of Conduction, Convection and Radiation

Conduction: One dimensional steady state conduction with variable thermal conductivity and with internal distributed heat source, Local heat source in non-adiabatic plate, Thermocouple conduction error, Extended Surfaces-Review, Optimum fin of rectangular profile, straight fins of triangular and parabolic profiles, Optimum profile, Circumferential fin of rectangular profile, spines, design considerations. 2D steady state conduction, semi-infinite and finite flat plates, Temperature fields in finite cylinders and in infinite semi-cylinders, spherical shells, Graphical method, relaxation technique. Unsteady state conduction, Sudden changes in the surface temperatures of infinite plates, cylinders and spheres using Groeber's and Heisler charts for plates, cylinders and spheres suddenly immersed in fluids.

Radiation: Review of radiation principles, Diffuse surfaces and the Lambert's cosine law. Radiation through non-absorbing media, Hottel's method of successive reflections, Gebhart's unified method, Poljak's method. Radiation through absorbing media, Logarithmic decrement of radiation, Apparent absorptive of simple shaped gas bodies, Net heat exchange between surfaces separated by absorbing medium, Radiation of luminous gas flames.

Convection: Heat transfer in laminar flow, free convection between parallel plates, Forced internal flow through circular tubes, Fully developed flow, Velocity and thermal entry length, solutions with constant wall temperature and with constant heat flux, Forced external flow over a flat plate, two-dimensional velocity and temperature boundary layer equations, Karman Pohlhousen approximate integral method. Heat transfer in turbulent flow, Eddy heat diffusivity, Reynold's analogy between skin friction and heat transfer, Prandtl-Taylor, Von Karman and Martineli's analogies, Turbulent flow through circular tubes.

Text Books:

3. Heat Transfer/RK Rajput/S.Chand
4. Engg. Heat & Mass Transfer/ Sarit K. Das/Dhanpat Rai

Reference Books:

4. Heat Transfer / Necati Ozisik / TMH
5. Heat Transfer / Nellis & Klein / Cambridge University Press / 2012.

6. Heat Transfer/ P.S. Ghoshdastidar/ Oxford Press

E-Resources: ***https://nptel.ac.in/courses/103/103/103103032/***

Latest Journals: **https://www.sciencedirect.com/journal/international-journal-of-heat-and-mass-transfer**

Ethical Things: ***https://www.journals.elsevier.com/international-journal-of-heat-and-mass-transfer***

Latest Things: http://www.thermalfluidscentral.org/e-resources/download.php?id=28

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ME- 505	**CAD/CAM**	**L- T- P**	**Cr**
		3- 1 - 0	**4**

Mathematical Elements, CAD, Solid modeling methods, Database structures for CAD, CSG formulation, B-rep and wire frame methods, Intersection surface generation methods, Boundary file generation methods, Feature based modeling systems, Surface modeling, B- splines, Coons and Bezier surfaces, NURBS and surface patches, fitting surfaces for arbitrary digested points, Offset surfaces, Fillet surfaces, Sewn surfaces.

Features recognition from the databases, IGES, STEP, PDES, and DXF data exchange formats, Graphic standards for CAD/CAM such as GKS, PHIGS and VDI.

Concurrent engineering integration of manufacturing principles and analytical principles in design,

Manufacturing

information generation from CAD data, Planar sectioning, Penalty functions, cavity milling, Optimization of cutter path, Effect of tool profile geometry, Methods for multi-axis machining, Methods for software design for CAD/CAM system, use of software libraries, Development of software package for a specific problem as part of course using software libraries.

Introduction to automation, CAM/CIM, Part programming, Interpolator & Control.

Text Books:

3. CAD/CAM Theory and Practice Ibrahim Zeid & R Sivasubramanian Tata McGraw-Hill
4. CAD/CAM H P Groover and E W Zimmers Prentice Hall

Reference Books:

3. Computer Aided Engineering & Design Jim Browne New ATC International
4. Computer Integrated Design and Manufacture D Bedworth, M Henderson & P Wolfe MacGraw Hill Inc.

E-Resources: ***https://nptel.ac.in/courses/112/102/112102101/***

Latest Journals: **https://www.journals.elsevier.com/computer-aided-design**

Ethical Things: ***https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3029271***

Latest Things:
https://www.researchgate.net/publication/297614687_Advancements_in_CADCAM_technology_Options_for_practical_implementation.

		L- T- P	Cr
RM-501	**Research Process And Methodology**	**3- 1 - 0**	**4**

Unit- 1

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit- 1I

Effective literature studies approaches, analysis Plagiarism, Research ethics,

Unit- 1II

Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit- 1V

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit- V

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs

Text Books:

3. "Research Methodology: An Introduction"□ Ranjit Kumar, 2 nd Edition,
4. "Research Methodology: A Step by Step Guide for beginners & engineering students'" Wayne Goddard and Stuart Melville.
3.

Reference Books:

3. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science.

4. "Resisting Intellectual Property", Taylor & Francis Ltd .

E-Resources: ***https://nptel.ac.in/courses/121/106/121106007/***

Latest Journals: https://ijrm.humanjournals.com/

Ethical Things: ***https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/1471-2288-14-127***

Latest Things:
https://www.researchgate.net/publication/334519601_Modern_Trends_in_Research_Methodology

ME-517	**Mechanical Engineering Lab-I**	**L- T- P**	**Cr**
		0- 0 - 4	**2**

3. To create a 2-Dimensional Sketch with the help of all geometrical Shapes.

4. To calculate the heat transfer coefficient under natural convection for a given heat transfer condition. 3.To calculate the heat transfer coefficient under forced convection for a given heat transfer condition. 4.To study the EDM Machine and calculate the erosion of electrode.

5.To perform the experiment on EDM machine and find out the

MRR. 6.Simulation of hydraulic systems.

7.Simulation of pneumatic systems

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DEPARTMENT OF MECHANICAL ENGINEERING

		L- T- P	Cr
ME-502	**Statistical Quality Control**	**3- 1 - 0**	**4**

OBJECTIVE: The students are provided with an opportunity to acquire deeper knowledge of quality and to control quality in industry by using inspection, control charts and acceptance sampling techniques.

Course Outcome
CO1:- Given a set process data, characterize the process behavior using descriptive statistics
CO2:- Given sampled process data over time, establish control charts for monitoring processes
CO3:- Identify if the process is in control. If not, identify special patterns that may exist
CO4:- Given a process that is in control and the process specification, identify if a process is capable
CO5:- Given a measurement system, design a plan to identify if the measurement system is capable

Unit-I

Introduction: Statistical concepts in Quality Control, Graphical Representation of Grouped Data, Continuous and Discrete Probability Distributions, control limit Theorem

Unit-II

Control Charts For Variables-I: Introduction to Quality Control, process Control and Product Control, Chance and Assignable causes of Quality variation, Advantages of shewhart control charts, Process Control charts for variables, X, R charts ;. Fixation of control limits. Type I and Type II Errors, Theory of runs, Interpretation of out of Control points. Probability limits, Initiation of control charts, Trial control limits, Determination of aimed at value of Process Setting, Rational method of sub grouping, control chart parameters, control limits and specification limits, Natural tolerance limits, Relationship of a process in Control to upper and lower specification limits, process capability studies.

Unit-III

Control Charts For Variables-II: Special control charts for variables, group control chart, arithmetic moving X- Bar and R charts. Geometric moving chart, control chart with reject limits, steady trend in Process average with constant dispersion, trend chart with sloping limits, variable subgroup size.

Unit-IV

Variables Inspection And Attributes Inspection: Variables inspection and attributes inspection ;Relative merits and demerits, Control charts for Attributes, p chart and np chart, varying control limits, high defectives

and low defectives, special severe test limits, C chart, U chart, Dodge demerit chart. Quality rating, CUSUM or Cumulative sum control chart, Average run length (ARL) Relative efficiency or sensitivity of control chart.

Unit-V

Acceptance Sampling: Probability theory, binomial and Poisson distribution, Acceptance Inspection, 100% Inspection, No Inspection and sampling Inspection, operating characteristic curve (O.C. curve). Effect of sample size and Acceptance number, type A and type B(O.C. curves), Single, Double and Multiple sampling Plans, SS Plan. Acceptance/Rejection and Acceptance/Rectification Plans, Producers Risk and Consumer's Risk, Indifference Quality level, Average Outgoing quality (AOQ) curve, AOQL, quality protection offered by a sampling Plan, Average sample Number (ASN) curve, Average Total Inspection (ATI) curve

REFERENCE:

6. Statistical Quality control by E.L. Grant
7. Quality control and Industrial Statistics, by A.J. Duncan
8. Quality control by Dale H. Bestefield
9. Total Quality Control by A.Y. Feigenboum
10. Elementary S.O.L. by I.W.Burr, M. Dekkar

		L- T- P	Cr
ME-504	**Advanced Mechanics of Solids**	**3- 1 - 0**	**4**

OBJECTIVE

This course will provide a firm foundation to the students in mechanics of deformable solids to enable them to analyse and solve a variety of strength related design problems encountered in practice.

Unit-I

Analysis Of Stress And Strain: Definition; Notation; Symmetry of the stress array and stress on an arbitrarily oriented plane; Transformation of stress, principal stresses and other properties; Differential equation of motion of a deformable body; Deformation of a deformable body; Strain theory, transformation of strain and principal strains; Small displacement theory; strain measurement and strain rosettes.Generalized Hooke's law; stress-strain relations; strain energy density of isotropic elastic materials; equations of thermo elasticity for isotropic materials. Inelastic Material Behavior: Limitations on the use of uniaxial stress-strain data; Nonlinear material response; yield criteria; various theories of failure; comparison and interpretation.

Unit-II

ENERGY METHODS: Principle of stationary potential energy; Castigliano's theorem on deflections for Linear Load-Deflection relations; Deflections of statically determinate and indeterminate structures.

Unit-III

Torsion: Torsion of a prismatic bar of circular cross section; Saint-venants' semi inverse method; Linear elastic solution, elliptical cross section, equilateral triangle cross section; The Prandtl Elastic-Membrane (Soap-Film Analogy); Narrow rectangular cross section; Hollow thin-wall torsion members and multiply connected crosssections.

Unit-IV

Bending Of Straight And Curved Beams: Symmetrical bending; Unsymmetrical bending; shear centre for thin-wall beam cross sections; circumferential stresses in a curved beam; Deflections of curved beams; stresses in a closed ring and chain link.

Unit-V

Flat Plates: Stress resultants in a flat plate; strain-displacement relations, Rotation of a plate surface element; Equilibrium equations for small displacement theory; Stress strain relations for isotropic plates; Boundary conditions for plates; Solution of rectangular plate and circular plate problems.

REFERENCE BOOKS:

1. Boresi, Arthur, P & Schmidt, Richard J., "Advanced Mechanics of Materials", Wiley, Asia.
2. Srinath, L.S, "Advanced Mechanics of Solids", Tata McGraw Hill
3. Raju, N, Krishan and Gururaje, "Advanced Mechanics of Solids and Structures", Narosa.

	Power Plant Engineering	**L- T- P**	**Cr**
ME-506		**3- 1 - 0**	**4**

Unit-I

Coal Based Thermal Power Plants: Rankine cycle – improvisations, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles and Cogeneration systems.

Unit-II

Diesel, Gas Turbine And Combined Cycle Power Plants: Otto, Diesel, Dual & Brayton Cycle – Analysis & Optimisation. Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants. Integrated Gasifier based Combined Cycle systems.

Unit-III

Nuclear Power Plants: Basics of Nuclear Engineering, Layout and subsystems of Nuclear Power Plants, Working of Nuclear Reactors : Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), CANadaDeuterium- Uranium reactor (CANDU), Breeder, Gas Cooled and Liquid Metal Cooled Reactors. Safety measures for Nuclear Power plants.

Unit-IV

Power From Renewable Energy: Hydro Electric Power Plants – Classification, Typical Layout and associated components including Turbines. Principle, Construction and working of Wind, Tidal, Solar Photo Voltaic (SPV), Solar Thermal, Geo Thermal, Biogas and Fuel Cell power systems.

Unit-V

Energy, Economic And Environmental Issues Of Power Plants: Power tariff types, Load distribution parameters, load curve, Comparison of site selection criteria, relative merits & demerits, Capital & Operating Cost of different power plants. Pollution control technologies including Waste Disposal Options for Coal and Nuclear Power Plants.

OUTCOMES:

Upon the completion of this course the students will be able to

CO1 Explain the layout, construction and working of the components inside a thermal power plant.

CO2 Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.

CO3 Explain the layout, construction and working of the components inside nuclear power plants.

CO4 Explain the layout, construction and working of the components inside Renewable energy power plants.
CO5 Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.

TEXT BOOK:

1. Nag. P.K., "Power Plant Engineering", Third Edition, Tata McGraw – Hill Publishing Company Ltd., 2008.

ME-518	**Mechanical Engineering Lab-II**	**L- T- P**	**Cr**
		0- 0 - 4	**2**

5. To study the constructional detail & working of two-stroke/ four stroke diesel engines.

6. To prepare heat balance sheet on multi-cylinder diesel engine/petrol engine.

7. To find the indicated horse power (IHP) on multi-cylinder petrol engine/diesel engine by Morse Test.

8. To perform the bending test and calculate the bending stresses developed for a given beam.5.To calculate and draw the shear stress distribution for a given beam.

8.To perform experiment on M1TR with DRO system

9. Cutting of gears using simple indexing method on the Milling Machine

ME-601	**Smart Manufacturing Systems**	**L- T- P**	**Cr**
		3- 1 - 0	**4**

Course Objectives:

- To understand the basics of smart manufacturing systems in context of Industry 4.0
- To understand the Architecture of Cyber- Physical system (CPS)
- Overall brief description of some associated technologies of smart manufacturing systems
- To understand IoT connectivity for Industry 4.0

Unit-I

Concepts of Smart Manufacturing: Definition and key characteristics of smart manufacturing**,** Corporate adaptation processes, manufacturing challenges, challenges vs technologies, Stages in smart manufacturing. Minimizing Six big losses in manufacturing with Industry 4.0, and their benefits

Unit-II

Smart Machines and Smart Sensors: Concept and Functions of a Smart, Machine Salient features and Critical Subsystems of a Smart Machine, **Smart sensors;** smart sensors ecosystem, need, benefits and applications of sensors in industry, Sensing for Manufacturing Process in IIoT, Block Diagram of a IoT Sensing Device, Sensors in IIoT Applications, Smart Machine Interfaces

Unit-III

Architecture of Cyber- Physical system (CPS): Functions of CPS, 5C Architecture; Smart Connection Level, Data-to- Information Level, Cyber Level, Cognition Level, Configuration Level. Design of PHM based CPS systems. Comparison of today's factory and Industry 4.0 factory by the implementation of 5C CPS architecture

Unit-IV

Digital Twin: Introduction, applications of digital twins, impact zones of digital twins in manufacturing (factories/plants and OEMs), advantages of digital twins, basic steps of digital twin technology

Machine Learning (ML) and Artificial Intelligence (AI) in Manufacturing: Introduction, benefits and applications of ML in industries, common approaches of ML; supervised and unsupervised, semi-supervised and reinforced ML

Predictive Maintenance: Introduction of predictive maintenance, difference between preventive and predictive maintenance, working and various components of predictive maintenance, benefits and tools of predictive maintenance. Common approaches to IoT predictive maintenance; Rule-based (condition monitoring) and AI (artificial intelligence) based predictive maintenance.

Condition Monitoring (CM): Introduction and benefits of CM, CM techniques, Condition monitoring vs Condition assessment,

Augmented Reality in Maintenance (Electrical & Mechanical)

Unit-V

IoT connectivity for Industry 4.0: Industrial communication requirement and its infrastructure, an overview of different types of networks, mesh network in industrial IoT, IoT protocols and the internet, TCP/IP (transmission control protocol/internet protocol) model, IoT connectivity standards: common protocols, application layer protocols, internet/network layer protocols, physical layer IoT protocols, choosing the right IoT connectivity protocol

Reference Books

1. Industry 4.0 The Industrial Internet of Things by Alasdair Gilchrist, Apress

2. Industrial Internet of Things, Cyber Manufacturing System by Sabina Jeschke, Christian Brecher,Houbing Song Danda B. Rawat, Springer

Course Outcomes:

On successful completion of this course, the students should be able to:

- Have a knowledge of smart manufacturing systems' components and can handle it more effectively.in context of Industry 4.0
- After understanding the Architecture of Cyber- Physical system (CPS) they can make machines moreoriented towards Industry 4.0, which increases productivity
- Overall brief description of associated technologies of smart manufacturing systems enhance their workability knowledge in the industries
- After understanding IoT connectivity for Industry 4.0 they are able to make a system Taylor made as per requirement of the industry
- Eventually knowledge of smart manufacturing systems enhances their employability opportunities as a whole

1. Massachusetts. Third Edition 1992

ME-603	**Finite Element Method**	**L- T- P**	**Cr**
		3- 1 - 0	**4**

OBJECTIVE

To develop expertise on application of finite element techniques for mechanical system analysis, design and integration.

Unit-I

ONE-DIMENSIONAL FINITE ELEMENT MODELING: Coordinates and shape functions; the potential energy approach; the Galerkins approach; assembly of the global stiffness matrix and load vector; the finite element equations; treatment of boundary conditions; quadratic shape functions, temperature Effects.

Unit-II

TWO DIMENSIONAL PROBLEMS: Using constant strain triangular; isoparametic representation; potential energy approach; element stiffness; Galerkin approach; stress calculation temperature effects; problem modeling and boundary conditions; orthotropic materials; temperature effects.

Unit-III

AXISYMMETRIC SOLIDS: Subjected to axisymmetric loading; formulation; finite element modeling; triangular element; potential energy approach; rotating flywheel surface traction Galerkin approach; stress calculation temperature efforts cylinder subjected to internal pressure; press fit on rigid and elastic shafts.

Unit-IV

DYNAMIC CONSIDERATIONS: Formulation; element mass matrices; Eigen values and eigenvectors evaluation generalized Jacobi method; tridiagonalization; implicit symmetric QR step with Wilkinson; shift for diagonalization; Guyan reduction.

Unit-V

PREPROCESSING AND POST PROCESSING MESH GENERATION: Post processing deformed configuration and mode shape contour plotting; nodal values from known constant element values; least Square fit for a four noded quadrilateral.

REFERENCE BOOKS

1. Jungen, Bath Klaus, "Finite Element Procedures", Prentice Hall of India, 1997
2. Chandru Patla, Tirupathi, R and Belegundu, Ashok D, "Introduction to Finite Elements in Engineering", Prentice Hall of India, 2000
3. Reddy, "An Introduction to the Finite Element Method", Second Ed., McGraw Hill
4. Zienkiewicz, "The Finite Element Method", Third Ed., McGraw Hill.
5. Rao, S.S., "The Finite Element Method Engineering", Third Ed, Butterworth Heinemann, 1999.
6. DIxit, “Finite Element Methods for Engineers”, Cengage Learning India

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DEPARTMENT OF MECHANICAL ENGINEERING

		L- T- P	Cr
ME-605	**Production Planning and Control**	**3- 1 - 0**	**4**

Objectives:	1. To provide students knowledge about various types of productions like job,batch, continuous etc 2. To introduce students to sales, operations, production and distribution resourceplanning 3. To enable the students acquire the knowledge of value analysis, valueengineering and break even analysis 4. To teach students about various types of controls toward inventory planning	
Outcome:	Student will be able to 1. Identify and suggest correct type of production planning technique 2. Analyze the concepts of production planning 3. Control and implement in crucial areas of the industry	
Unit- I	Production systems and Preplanning	
Introduction: Production systems -types and characteristics. Objective and functions ofProduction, Planning & Control. 2 Preplanning: Demand Forecasting- need, forecasting models- Delphi method, Navie quantitative models, forecast error, costs and accuracy of forecasts. Plant Location & itslayout- brief idea. 4		
Unit- II	Production Planning	
Production Planning: Aggregate Planning- concept, goal and strategies. Master Production Schedule (MPS), Material Resource Planning (MRP), Routing, scheduling and dispetching.		
Unit- III	Capacity Management	
Capacity,measuring capacity, determination of available capacity, Load-planned and unplanned, Capacity expansion strategy, capacity management,Capacity requriement planning,input and output Resource requirement planning (RRR), rough cut capacity planning (RCCP), benefits and pitfalls of RCCP.		
Unit- IV	Inventory Control	
Concepts, types , costs associated with inventory, inventory cost relationships, inventorymodels, safety stock, inventory control system, selective control of inventory.		
Unit- V	Productivity and Ergonomics	

Productivity- Importance, factors affecting productivity, productivity measurements and advantages Ergonomics-objective, productivity and environmental factors, workplace design.	
Text Book	
Eilon (1991), 'Elements of Production Planning and Control' Ubc	
References	
1. Production Planning and Control Text and Cases by SK Mukhopadhyay-PHI Privatelimited **2.** Industrial Engineering and Production Management by-Martand Telsang, S Chand &Company Ltd. **3.** Operations Management – Buffa. **4.** Production System – J.L. Riggs. **5.** Human Factors in Engineering and Design by Mark S.Sanders and Ernest J. Mc Cormick,seventh Edition McGraw Hill	

ME-617	**Mechanical Engineering Lab-III**	**L- T- P**	**Cr**
		0- 0 - 4	**2**

1. To temper a hardened material at 400^0 centigrade

2. To increase the hardness of a given soft specimen.

3. To increase the toughness of a given specimen.

4. To increase the softness of a given hard

specimen.

5. Geometric Modeling of 2D & 3D objects by using any CAD packages

6. Identification of chip formation and cutting forces of different metals at different cutting condition.

7. To calculate the modulus of rigidity for a given specimen.

Elective-I

		L- T- P	Cr
ME5E12	**Vibration Engineering**	**3- 0 - 0**	**3**

OBJECTIVE

To develop knowledge of vibration management, i.e. to understand basics of vibration and control vibration within limits. It also provides exposure to dynamics of vibration, validation of vibration measurement techniques and mathematical modeling of vibration signatures.

Unit-I

INTRODUCTION: Unwanted mechanical vibrations and their harmful effects including those on human beings; Experimental and theoretical routes to vibration engineering; vibration testing.

Unit-II

SPATIAL MODAL AND RESPONSE MODELS OF VIBRATING SYSTEMS: Lumped parameter and

distributed parameter modeling of mechanical vibratory systems; free vibrations and forced response solutions of single degree-of-freedom models including modeling of damping.

Unit-III

FREE AND FORCED VIBRATION of multi degree of freedom system with and without damping**.** Determining natural frequencies and mode shapes; Finite Element Method for dynamic analysis; distributed parameter model of rods, bars and beams.

Unit-IV

VIBRATION CONTROL SOLUTIONS: Balancing of rotating and reciprocating machines; design of vibration isolators; auxiliary mass systems including tuned dampers for vibration control; application of damping treatment for vibration control in machines and structures; dynamic instability control.

Unit-V

INTRODUCTION TO MODAL TESTING: Model updating and structural dynamic modification to improve dynamic design of machine structures.

REFERENCE BOOKS

1. Rao, S.S., "Mechanical Vibration", IV Edition, Pearson, 2004.
2. Meirowitch, L., "Elements of Vibration Analysis", Mc Graw Hill, 1974.
3. Malik, Ashok Kumar, "Principles of vibration control", Affiliated EWP, 1990
4. Thomson, W T, "Theory of Vibration with Applications", CBS, 2002
5. Murthy, Rama, "Mechanical Vibration Practice with Basics", Narosa, 2001.
6. Dukkipati, R.V., "Vibration Analysis", Narosa, 2002.
7. Rao, J.S., "Advanced Theory of Vibrations", John Wiley, 1992.
8. Harris, Cyril M, "Harris' Shock and Vibration Handbook", 5th Ed., McGraw Hill.

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DEPARTMENT OF MECHANICAL ENGINEERING

		L- T- P	Cr
ME5E14	**Smart Sensors**	**3- 0 - 0**	**3**

Course Objectives:
.To makes students familiar with the constructions and working principle of different types sensors. •To make students aware about the measuring instruments and the methods of measurement and the use of diff

Unit-I

Introduction: Definition and characteristics of sensors, static characteristics, dynamic characteristics, sensor classification, Definition of actuator, classification of actuators, electro-hydrostatic actuation, electro- pneumatic systems

Unit-II

Next Generation Sensors: Need for Next Generation Sensors, Definition, Limitations of smart sensors, intelligent sensors, advantages of intelligent sensors, applications of next generation sensors, design challenges

Unit-III

Smart sensors: Definition, configurations involved in smart sensors, smart sensor node, and Smart sensors functions, accessing sensors and actuators, utility in industrial subunits, Examples of industrial sensors: navigation industry, agricultural industries, healthcare industry, retail industry

Unit-IV

Smart sensors in industrial automation: temperature sensor, accelerometer sensor, gas sensor and their interfacing circuit, sensors in industrial applications: magnetostrictive sensors, torque sensor, speed sensor, PIR sensor, image sensor,

Unit-V

Measurement of proximity, pressure, velocity and displacement: proximity sensors, pressure sensor/flow sensors, ultrasonic sensor, photoelectric sensors, photomicro sensors, industrial applications and control

TEXT BOOKS

1. Sensor & transducers, D. Patranabis, 2nd edition, PHI

Reference Books:

2. Instrument transducers, H.K.P. Neubert, Oxford University press.
3. Measurement systems: application & design, E.A.Doebelin, Mc Graw Hill

Course outcomes:	
1.	Use concepts in common methods for converting a physical parameter into an electricalquantity
2.	Classify and explain with examples of transducers, including those for measurement of temperature, motion and gas
3	Choose proper sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc

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DEPARTMENT OF MECHANICAL ENGINEERING

		L- T- P	Cr
ME5E16	**Industrial Robots**	**3- 0 - 0**	**3**

Course Objectives:
To impart knowledge on numerical methods to find the numerical solution of the problems that arise in engineering and technology. To familiarize the advanced mathematical methods to solve engineering research problems.

UNIT – I

Introduction: Automation and Robotics, Robot anatomy, robot configuration, motions joint notation work volume, robot drive system, control system and dynamic performance, precision of movement. Control System and Components: basic concept and medias controllers control system analysis, robot activation and feedback components. Positions sensors, velocity sensors, actuators sensors, power transmission system.

UNIT – II Motion Analysis and Control: Manipulator kinematics, position representation forward transformation, homogeneous transformation, manipulator path control, robot dynamics, configuration of robot controller

UNIT – III

End Effectors: Grippers-types, operation, mechanism, force analysis, tools as end effectors consideration in gripper selection and design. SENSORS: Desirable features, tactile, proximity and range sensors, uses sensors in robotics. Machine Vision: Functions, Sensing and Digitizing-imaging, Devices, Lighting techniques, Analog to digital single conversion, image storage, Image processing and Analysis-image data reduction, Segmentation feature extraction. Object recognition, training the vision system, Robotics application

UNIT – IV:

Robot Programming: Lead through programming, Robot programming as a path in space, Motion interpolation, WAIT, SINONAL AND DELAY commands, Branching capabilities and Limitations. Robot Languages: Textual robot Languages, Generation, Robot language structures, Elements in function

UNIT – V

Robot Cell Design and Control: Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work design, Work and control, Inter locks, Error detect ion, Work wheel controller. Robot Application: Material transfer, Machine loading/unloading. Processing operation, Assembly and Inspection, Feature Application

TEXT BOOKS

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Introduction to Robotic Mechanics and Control by JJ Craig, Pearson, 3rd edition.
3. Robotics / Fu K S/ McGraw Hill.
4. Robotic Engineering / Richard D. Klafter, Prentice Hall
5. Robot Analysis and Intelligence / Asada and Slotine / Wiley Inter-Science.

Reference Books:

1. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pte Ltd.
2. Robotics and Control / Mittal R K & Nagrath I J / TMH3
3. Industrial Automation and robotics, Er. A.K. Gupta and S.K. Arora, University Science

Course outcomes:	
1.	Acquire more knowledge in basic concept of engineering mathematics.
2.	Improvement in problem evaluation technique.
3	Choose an appropriate method to solve a practical problem

.

Elective-II

ME6E21	**3-D printing/Additive Manufacturing**	**L- T- P**	**Cr**
		3- 0 - 0	**3**

Course Objectives	
1.	Additive Manufacturing (AM) is an economically viable alternative to conventional manufacturing technologies for producing highly complex parts.
2.	The objective of the course is to impart fundamentals of additive manufacturing processes along with the various file formats, software tools, processes, techniques and applications.
3.	The main objective of this course is to acquaint students with the concept of AM, variousAM technologies, selection of materials for AM, modeling of AM processes, and their applications in various fields.

Unit-1: INTRODUCTION OF AM

Introduction to the Basic Principles of Additive Manufacturing, Additive Manufacturing Processes, Extrusion, Beam Deposition. **(8)**

Unit-2: OPERATIONS IN AM

Jetting, Sheet Lamination, Direct-Write, Photopolymerization, Sintering, Powder Bed Fusion **(8)**

Unit-3: DESIGN/FABRICATION PROCESSES

Data Sources, Software Tools, File Formats, Model Repair and Validation, Pre- & Post-processing, Designing for Additive Manufacturing, Multiple Materials, Hybrids, Composite Materials, current and future directions.

(11)

Unit-4: PROCESS AND MATERIAL

Process & Material Selection, Direct Digital Manufacturing and Distributed Manufacturing, Related Technologies: Mold-making, Rapid Tooling, Scanning. **(8)**

Unit-5: APPLICATIONS OF AM

Aerospace, Automotive, Biomedical Applications of AM. Product Development, Commercialization, Trends and Future Directions in Additive Manufacturing. **(9)**

TEXT BOOKS:

1. Ian Gibson, David W. Rosen and Brent Stucker, Additive manufacturing technologies: rapid prototyping to direct digital manufacturing, Springer, 2010.
2. C.K. Chua, K.F. Leong and C.S. Lim, Rapid prototyping: Principles and applications, 3rd Edition, WorldScientific, 2010.
3. Additive Manufacturing by P. N. Pandey

REFERENCE BOOKS:

1. Hopkinson, Hague, Dickens, Rapid Manufacturing: An Industrial Revolution for the Digital Age. Wiley, 2005.
2. Gibson, Advanced Manufacturing Technologies for Medical Applications. Wiley, 2005
3. Andreas Gebhardt, Understanding additive manufacturing: rapid prototyping, rapid tooling, rapid manufacturing, Hanser Publishers, 2011.
4. J.D. Majumdar and I. Manna, Laser-assisted fabrication of materials, Springer Series in Material Science, 2013.
5. L. Lu, J. Fuh and Y. S. Wong, Laser-induced materials and processes for rapid prototyping, Kluwer Academic Press, 2001.
6. Zhiqiang Fan and Frank Liou, Numerical modeling of the additive manufacturing (AM) processes of titanium alloy, lnTech, 2012.

Course Outcomes:	
1.	Students will be able to decide between the various trade-offs when selecting AM

	processes, devices and materials to suit particular engineering requirements.
2.	Students will have in-depth knowledge in latest trends and opportunities in AM, including distributed and direct digital manufacturing, mass customization, and how tocommercialize their ideas.

		L- T- P	Cr
ME6E23	**Properties & Selection of Engineering Materials**	**3- 0 - 0**	**3**

OBJECTIVE

To develop knowledge of different engineering materials, their properties and selection vis-à-vis applications. Unit-I

PROPERTIES OF MATERIALS: Strength; ductility; toughness; stiffness; hardness; fracture toughness; fatigue strength; creep strength; oxidation resistance; corrosion resistance; friction and wear, weldability; etc.

Unit-II

PROCESSING OF ENGINEERING MATERIALS: Plain carbon steel and alloyed structural steels and stainless steels; high strength; high temperature materials.

Unit-III

NON-FERROUS MATERIALS: Properties and processing of non-ferrous materials Cu Alloys; Al-Alloys; Ti-Alloys; engineering ceramics.

Unit-IV

POLYMERIC MATERIALS: Properties and processing of polymeric materials; metal matrix composites; polymer matrix composites; new materials.

Unit-I

MATERIAL SELECTION PRINCIPLES: Case studies in material selection, e.g. materials for structural applications; power plants; chemical plants; machineries; transport industries etc.

REFERENCE BOOKS

1. Ashby, M.F., "Material Selection in Mechanical Design", Second Ed., Elsevier, 2001
2. Sharma, "Engineering Materials Properties and Application of Metals and Alloys", Prentice Hall of India
3. NIIT, "Properties and Application of Engineering Materials – Metals, Alloys, Polymers, Ceramics and Composites", NIIT, Prentice Hall of India
4. Budinski, K.G. and Budinski, M.K., "Engineering Material Properties and Selection", Seventh Ed., Prentice Hall of India

ME-6E25	**Industry 4.0**	**L-T-P**	**Credit**
		3-0-0	**3**

Learning Objectives

This course is designed to offer learners an introduction to Industry 4.0, its applications in the business world. Learners will gain deep insights into how smartness is being harnessed from data and appreciate what needs tobe done in order to overcome some of the challenges.

Learning Outcomes

1. Understand the journey of Industry 4.0 and its drivers, enablers and roadmap.
2. Appreciate the smartness in smart factories, smart manufacturing, smart products, smart servicesand smart cities,
3. Able to understand various technologies associated with industry 4.0.
4. Understand the opportunities, challenges and future skills required for Industry 4.0.

UNIT 1: Introduction to Industry 4.0

The various Industrial Revolutions, Internet of Things (IoT) & Industrial Internet of Things, Overview on Technologies of Industry 4.0. Comparison of Industry 4.0 Factory and Today's Factory

UNIT 2: Drivers and Enablers

Drivers, Enablers, Reference Architecture and Standards

UNIT 3: Convergence of Automation & IoT

Smart Manufacturing**;** key characteristics, challenges, stages. Smart Machines; Characteristics, Technologies, interfaces, augmented reality. Cyber physical system (CPS). **IIoT;** smart factory connectivity, key ingredients, Digital Twins, Predictive Maintenance

UNIT 4: Data Exchange With Machines

Communication Protocols; OPC-UA, MQTT, Ethernet/IP, ProfiiNet, EtherCat IT infrastructure, databases, Cloud Computing Basics, Cloud Computing and Industry 4.0

UNIT 5: Smart Manufacturing Applications and Opportunities

Internet of things & Internet of Services, Smart Manufacturing, Smart Devices and Products, Smart Logistics, Smart Cities, Predictive Analytics. Opportunities, Challenges, and skills for workers in the Industry 4.0, Supply Chain Management, Readiness of Industry.

Reference Books;

1 The Fourth Industrial Revolution by Klaus

Schwab

2 The Industries of Future by Alec Ross

4. A course on “industry 4.0: How to

Revolutnize your business” on edx

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SCHEME FOR (BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION)

B.JMC			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BA (JMC) 101	Communication: Concepts & Processe	4	0	0	4
2	BA (JMC) 103	Contemporary India: An Overview	4	0	0	4
3	BA (JMC) 105	Basics of Design and Graphics	4	0	0	4
4	BA(JMC) 113	Human Values and Ethics (NUES)*	2	-		2
PRACTICAL/SEMINARS/VIVA VOCE						
4	BA (JMC) 151	Communication Skills Lab	-	-	2	2
5	BA (JMC) 153	Contemporary India: Issues and Debates(Seminars/ Presentations)	-	-	2	2
6	BA (JMC) 15	Design & Graphics Lab – I	-	-	2	2
ELECTIVE COURSES (Select any one from the following)						
7	BA (JMC) 107	Personality Development	4	-	-	4
8	BA (JMC) 109	Writing Skills	4	-	-	4
9	BA (JMC) 111	Indian Culture (For Foreign Students Only)*	4	-	-	4
PRACTICAL/VIVA VOCE (Select Corresponding Lab based on Elective Course)						
10	BA (JMC) 157	Personality Development Lab	4		2	2
11	BA (JMC) 159	Writing Skills La	4		2	2
		Total	**16**		**16**	**26**

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SCHEME FOR (BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION)

B.JMC			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BA (JMC) 102	Print Journalism	4	-	-	4
2	BA (JMC) 104	Media Laws and Ethics	4	-	-	4
3	BA (JMC) 10	Still Photography	4	-	-	4
PRACTICAL/VIVA VOCE						
4	BA (JMC) 152	Print Journalism Lab	-	2		2
5	BA (JMC) 154	Still Photography Lab	-	2		2
6	BA (JMC) 156	Design and Graphics Lab – II	-	2		2
ELECTIVE COURSES (Select any one from the following)						
7	BA (JMC) 108	Health Communication	4	-	-	4
8	BA (JMC) 110	Sports Journalism	4	-	-	4
PRACTICAL/VIVA VOCE (Select Corresponding Lab based on Elective Course)						
9	BA (JMC) 158	Health Communication Lab	-	2		2
10	BA (JMC) 160	Sports Journalism Lab	-	2		2
		Total	**16**		**16**	**24**

Soon after the End-Term Examination of the Second Semester, the student shall undergo training/internship in Print Media for a period of four weeks. She/he shall submit in duplicate hard copy and a soft copy of Summer Training Report (STR) along with the DVD of multi-media presentation incorporating the work done during the training/ internship, at least four weeks before the commencement of End Term Examination of the Third Semester. The Summer Training Report shall be supervised by the internal faculty appointed by the Director/ Principal of the institute/ college.

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SCHEME FOR (BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION)

B.JMC			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BA (JMC) 201	Development Communication	4	-	-	4
2	BA (JMC) 203	Basics of Radio Programming and Production	4	-	-	4
3	BA (JMC) 205	Basics of Video Camera, Lights and Sound	4	-	-	4
PRACTICAL/VIVA VOCE						
4	BA (JMC) 251	Radio Production Lab	-	2		2
5	BA (JMC) 253	Video Production Lab	-	2		2
6	BA (JMC) 255	Summer Training Report****	-	-		4
ELECTIVE COURSES (Select any one from the following)						
7	BA (JMC) 207	Radio Jockeying and News Reading	4	-		4
8	BA (JMC) 209	Video Editing	4	-		4
PRACTICAL/VIVA VOCE (Select Corresponding Lab based on Elective Course)						
9	BA (JMC) 257	Radio Jockeying and News Reading Lab	-	2		2
10	BA (JMC) 259	Video Editing Lab	-	2		2
		Total	**16**		**12**	**26**

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SCHEME FOR (BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION)

B.JMC			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BA (JMC) 202	Basics of Advertising	4	-		4
2	BA (JMC) 204	Basics of Public Relations	4	-		4
3	BA (JMC) 206	Television Programming and Production	4	-		4
PRACTICAL/VIVA VOCE						
4	BA (JMC) 252	Advertising Lab	-	2		2
5	BA (JMC) 254	Public Relations Lab	-	2		2
6	BA (JMC) 256	TV Production Lab	-	2		2
ELECTIVE COURSES (Select any one from the following)						
7	BA (JMC) 208	Television News: Reporting and Anchoring	4	-		4
8	BA (JMC) 210	Corporate Communication	4	-		4
PRACTICAL/VIVA VOCE (Select Corresponding Lab based on Elective Course)						
9	BA (JMC) 258	Television News: Reporting and Anchoring Lab	-	2		2
10	BA (JMC) 260	Corporate Communication Lab	-	2		2
		Total	**16**	**10**		**24**

Soon after the End Term Examination of the Fourth Semester, each student shall undergo a Functional Exposure Training/ Internship for four weeks in Radio/TV/Advertising /Public Relations/NGO. She/ he shall submit in duplicate hard copy and a soft copy of Functional Exposure Report [FER] along with the DVD of multi-media presentation containing the actual experiential learning, at least 4 weeks before the commencement of End Term Examination of the Fifth Semester. The Functional Exposure Report shall be supervised by the internal faculty appointed by the Director/ Principal of the Institute/ College.

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SCHEME FOR (BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION)

B.JMC			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BA (JMC) 301	Basics ofNew Media	4	-		4
2	BA (JMC) 303	Media Research	4	-		4
3	BA (JMC) 305	Event Management	4	-		4
PRACTICAL/VIVA VOCE						
4	BA (JMC) 351	New Media Lab	-	2		2
5	BA (JMC) 353	Media Research Lab	-	2		2
6	BA (JMC) 355	Event Management Lab	-	2		2
7	BA (JMC) 357	Functional Exposure Report*****	-	-		4
ELECTIVE COURSES (Select any one from the following)						
8	BA (JMC) 307	Digital Media Marketing	4	-		4
9	BA (JMC) 309	Film Appreciation	4	-		4
PRACTICAL/VIVA VOCE (Select Corresponding Lab based on Elective Course)						
10	BA (JMC) 359	Digital Media Marketing Lab	-	2		2
11	BA (JMC) 361	Film Appreciation Lab	-	2		2
		Total	**16**		**16**	**28**

*****The Functional Exposure Report [FER] carries 100 marks. The report shall be evaluated out of 50 marks eachby a Board of Examiners comprising of Director/Principal or her/his nominee and one External Examiner separately out of 50 marks each. The External Examiner shall be appointed by the Competent Authority.**

Each student shall be assigned the Final Project at the end of the Fifth Semester. The Final Project shall be pursued by her/him under the supervision of internal faculty in the Sixth Semester. The student shall make her/his Final Project on the theme/topic approved by the Director of the Institute/Principal in the Fifth Semester. She/ he shall submit the hard &soft copy of the Final Project in duplicate and also make the multi-media presentation on the same at least four weeks before the date of commencement of the End-Term Examination of the Sixth Semester. The project would be continuously monitored through tutorials and assignments and the record of the same would be submitted at the time of external examination duly certified by the internal faculty.

The Comprehensive Viva shall be based on all the courses of the programme and future projections of Media & Entertainment industry

SCHEME FOR (BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION)

B.JMC			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BA (JMC) 302	Media Management and Entrepreneurship	4	-		4
2	BA (JMC) 304	Global Media: An Overview	4	-		4
3	BA (JMC) 306	Environment Communication	4	-		4
PRACTICAL/VIVA VOCE						
5	BA (JMC) 352	Final Project and Comprehensive Viva******	-	-	-	16
		Total	**12**			**28**

******The Final Project and Comprehensive Viva carries 100 Marks. It shall be evaluated by the Board of Examiners comprising of the Internal Examiner and External Examiner.**

Note: The Board of Examiners shall comprise of the Director/ Principal or her/his nominee and two External Experts out of which one would preferably be from the corporate world i.e. media organisation operating in the country. The quorum shall be deemed to have met if two out of three members are present. The External Examiners shall be appointed by the Competent Authority.

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FIRST SEMESTER

COMMUNICATION: CONCEPTS & PROCESSES

COURSE CODE: BA (JMC) 101	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define Communication and Mass Communication
- describe the process of Communication and Mass Communication
- explain various Models and Theories of Communication and Mass Communication
- utilize knowledge on emerging trends in Communication and Mass Communication

Unit I: [Introduction to Communication] **L: 12**

1. Communication: Concept, Definition, Elements and Process
2. Types of Communication
3. Barriers to Communication
4. 7 C's of Communication

Unit II: [Mass Communication] **L: 12**

1. Mass Communication: Concept, Definition, Elements and Process
2. Characteristics and Functions of Mass Communication
3. Means of Mass Communication: Folk and Traditional Media, New Media
4. Mass Media Activism

Unit III: [Models of Communication] **L: 12**

1. Communication Models: definition, scope and purpose
2. Basic Communication Models: Aristotle's Classical Model; Shannon-Weaver's Mathematical Model; Wilbur Schramm's Model; Laswell's Model
3. Advanced Communication Models: Newcomb's Model; Westley-Mclean's Model; George Gerbner's Model; Mccombs and Shaw's Agenda Setting Model; Spiral of Silence Model
4. Relevance of Communication Models

Unit IV: [Theories of Mass Communication] **L: 12**

1. Bullet Theory, Two-Step, Multi Step Theory
2. Cognitive Dissonance Theory
3. Uses and Gratification Theory, Cultivation Theory
4. Normative Theories: Authoritarian, Libertarian, Soviet-Communist, Social Responsibility, Developmental, Democratic Participation

Suggested Readings & E-resources:

1. Aggarwal, V. B., & Gupta, V. S. (2001). Handbook of Journalism and Mass Communication. New Delhi: Concept Publishing.
2. Baran, S. J. (2002). Introduction to Mass Communication: Media Literacy and Culture. Boston: McGraw Hill Education.
3. Hasan, S. (2013). Mass Communication Principles and Concepts. New Delhi: CBS Publishers & Distributors.
4. Heller, R. (2015). Commentary. Journalism & Communication Monographs, 17(3).
5. Kumar, K. J. (2000). Mass Communication in India. Mumbai: JaicoPublishing House.

6. McQuail, D. (2002). McQuail's Reader in Mass Communication Theory. London: Sage Publications.
7. Naqvi, Hena. (2012). Journalism & Mass Communication: UpkarPrakashan
8. Rayudu, C. S. (2011). Media and Communication Management. Mumbai: Himalaya Publishing House.
9. Stone, G., Singletary, M. W., & Richmond, V. P. (1999). Clarifying Communication Theories: A Hands-onApproach. Ames: Iowa State University Press.

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CONTEMPORARY INDIA: AN OVERVIEW

COURSE CODE: BA (JMC) 103	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- debate on various aspects of Indian history, art and culture
- critically engage with various socio-economic and political issues in India
- utilize knowledge gained to appreciate understand and debate the social fabric of the country

Unit I: [Indian History & Culture] **L: 12**

1. Socio-cultural Configuration of Contemporary India: Unity, Diversity, Multi-Culturalism
2. Art, Culture& Politics: Contemporary Issues and Debates
3. Scientific Temper: Concept, Relevance and Practice
4. Indian Freedom Movement (1857-1947) Landmarks

Unit II: [Indian Polity] **L: 14**

1. Indian Constitution: Preamble; Fundamental Rights and Duties; Directive Principles
2. Federalism: Centre and State Relations
3. Presidential System and Parliamentary Democracy
4. General Elections and Electoral Reforms, National and State Political Parties in India

Unit III: [Indian Economy] **L: 12**

1. The Nature and Ideological Contours of Indian Economy
2. Five Year Plans, Mixed Economy
3. Liberalisation, Privatisation and Globalisation (FDI, BPOs and KPOs)
4. Current Five Year Plan and New Economic Initiatives

Unit IV: [Social Movements & Activism] **L: 10**

1. Marginalisation, Socio-Economic Equality and Reservation
2. Women Safety, Gender Equality and Activism
3. Public Health, Hygiene & Sanitation: *Swachh Bharat Abhiyaan*
4. Judicial Activism

Suggested Readings:

1. Agrawal, A. N. (1983). Indian Economy: Problems of Development &Planning. Delhi: VikasPublishing House.
2. Bakshi, P. M. (2007). The Constitution of India: Selective Comments. Delhi: Universal Law Publishing.
3. Basu, D. D. Introduction to the Constitution of India. Prentice Hall.
4. Dhingra, I. C. (1986). Indian Economics and Development. New Delhi: Sultan Chand & Sons.
5. Fadia. B.L. (2016). Indian Government and Politics: SahityaBhawan.
6. Narang, A.S. (1985). Indian Government and Politics. New Delhi: Gitanjali Publishing House.
7. Singhal, A., & Rogers, E. M. (2001). India's Communication Revolution: From Bullock Carts to Cyber Marts. New Delhi: SagePublications.
8. Verma, N., &Bhalla, A. (2000). India and Europe: Selected Essays. Shimla: Centre for the Study of IndianCivilization and Indian Institute of Advanced Study.

BASICS OF DESIGN AND GRAPHICS

COURSE CODE: BA (JMC) 105	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- describe basics of Design and Graphics
- utilize knowledge gained in the application of elements and principles of design in different forms of visual andgraphic communication for Print and Web Media

Unit I: [Introduction to Design and Graphics] **L: 12**

1. Basics of Design and Graphics
2. Elements and Principles of Design
3. Typography: Physical Form, Letter Form, Aesthetics and Classifications
4. Colour: Physical Forms, Psychology, Colour Scheme and Production

Unit II: [Layout] **L: 12**

1. Components of Layout and Layout Planning
2. Publication Design: Newspaper, Tabloid, Magazine, Book and Print Ad
3. Package Design
4. Layout Design for Web Banner

Unit III: [Visuals and Design] **L: 12**

1. Visuals: Physical Forms, Functions, Editing and Ethics
2. Poster Design
3. Logo Design
4. Brochure Design

Unit IV: [DTP and Printing] **L: 12**

1. History of Printing Process
2. Basics of Desktop Publishing: WYSIWYG, Hardware and Software
3. Paper and Finishing
4. Contemporary Printing Methods: Letterpress, Offset and Digital

Suggested Readings & E-resources:

1. Davis, M.(2012). Graphic Design Theory. London: Thames& Hudson
2. Joss, M., Nelson, L. (1977). Graphic Design Tricks & Techniques. Cincinnati, OH: North Light Books.
3. Sarkar, N. N. (1998). Designing Print Communication. New Delhi: S. Publications.
4. Sarkar, N. N. (2012). Art and Print Production. Oxford. University Press.
5. http://design.tutsplus.com/graphic Design Illustration Tutorials

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COMMUNICATION SKILLS LAB

COURSE CODE: BA (JMC) 151	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- demonstrate proficiency of effective Communication Skills
- utilize knowledge gained in planning, designing and presenting a multi-media presentation

Exercises/Assignments

1. Presentation on Self: Extempore (1-2 minutes)
2. Dialogue: to be recorded on mobile camera
3. Group discussion
4. Listening and reviewing of an audio programme
5. Identify and analyse newspaper/magazine content based on one or more models of communication
6. Identify and analyse newspaper/magazine content based on one or more theories of mass communication
7. Letter to the Editor
8. Multi-media presentation

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The student will also be evaluated on general awareness and current affairs. The marks assigned for internal evaluation are 40.

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CONTEMPORARY INDIA: ISSUESAND DEBATES(SEMINARS/ PRESENTATIONS)

COURSE CODE: BA (JMC) 153	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- debate on various aspects of Indian history, art and culture
- critically examine various socio-economic and political issues in India
- demonstrate critical thinking abilities to analyse and suggest alternatives

Exercises/Assignments

1. Prepare a Multi-media and oral presentation for seminars on:
   a) Public Health, Hygiene & Sanitation: *Swachh Bharat Abhiyaan*
   b) Marginalisation, Socio-economic Equality & Reservation
   c) National Freedom Movement (1857-1947)
2. Organise a seminar on Current Five Year Plan/ New Economic Initiatives. Write a report in 250-300 words.
3. Conduct and participate in a debate/ group discussion on issues related to Judicial Activism.
4. Conduct and participate in a debate/ group discussion on issues related to Women Safety and Gender Equality.
5. Prepare a Poster presentation on Indian Art and Culture.

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

DESIGN AND GRAPHICS LAB - I

COURSE CODE: BA (JMC) 155	L: 0	T/P: 2	CREDITS: 2
External Evaluation: 60 Marks	Internal Evaluation: 40 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- apply knowledge gained of photo editing software in design and layout
- demonstrate proficiency of skills in designing and creating layouts using page layout softwares for print media

Exercises/Assignments

A. Photoshop

1. Design a Poster
2. Design a set of Flash Cards (8)
3. Design a Web Banner
4. Add Effects to Photographs (Minimum-5)

B. QuarkXpress

1. Design a Brochure
2. Design a Tabloid/Broadsheet (4 Pages)

Visit a printing press and write a report on the visit.

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

PERSONALITY DEVELOPMENT

COURSE CODE: BA (JMC) 107	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define basics of Personality Development
- understand listening, speaking &writing etiquettes
- utilize knowledge gained in developing a positive personal attitude

Unit I- [Personality Development and Understanding the Self] **L: 12**

1. Meaning, Definition and Basics of Personality
2. Types of Personality
3. Models of Self Introspection: Johari Window, SWOT Analysis
4. Development of Positive Personal Attitude

Unit II: [Communicative Persona & Communication] **L: 12**

1. Communicative Persona: Semantics, Syntax, Phonetics, Para-Language and Body Language
2. Inter-personal and Inter-Cultural Communication
3. Professional Communication: Resume Writing Skills, Offline and Online Writing Etiquettes
4. Personality and Professional Skill Development for MediaEntrepreneurs

Unit III: [Life Skills] **L: 12**

1. Importance of Time Management for Media
2. Significance of Team Work and Leadership
3. Decision Making, Problem Solving Techniques and Supportive Supervision
4. Managing Peer Relationships and Non-Violent Conflict Resolution

Unit IV: [Social Behaviour and Attitude] **L: 12**

1. Role of Different Institutions in Personality Development: Home, School, Society and Media
2. Art of Negotiation
3. Working on Attitudes: Aggressive, Assertive and Submissive, Coping with Emotions
4. Coping Skills: Coping with Emotions and Coping with Stress

Suggested Readings:

1. Gupta Rajat (2012). Soft Skills: Tools for Success. Yking Books, Jaipur.
2. Hurlock, E. B. (1973). Personality Development. New York: McGraw-Hill.
3. Singh, Abha (2012). Behavioural Science: Achieving Behavioural Excellence for Success: Wiley India Private Limited.
4. Sharma, S. (2013). Body language and Self-Confidence. Jaipur: Sublime Publications.
5. Training manual. (2005). Self-Development and Interpersonal Skills: ILO, New Delhi.

WRITING SKILLS

COURSE CODE: BA (JMC) 109	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- describe the writing process for various media
- describe the process of translation
- utilize knowledge gained in writing accurately and creatively for mass media

Unit I- [Understanding Writing] **L: 12**

1. Fundamentals of Media Writing: Descriptive, Narrative, Objective and Reflective
2. ABCD of Media Writing: Grammar and Vocabulary (remedial exercises based on print and electronic media)
3. Writing for News and Non-news Mediums (print and electronic media)
4. Ethics in Media Writing

Unit II: [Understanding Writing Process] **L: 12**

1. Process Writing: Brainstorming for Ideas, Idea Organization and Audience Analysis
2. Writing Mechanism: Opening, Developing and Winding up the Argument/ Narrative
3. Editing and Formatting: APA Style Sheet Basics
3. Abstract, Summary, Paragraph, Essay and Column Writing

Unit III: [Online Writing Skills] **L: 12**

1. Introduction to Online Writing: Social Media Writing Skills and Etiquettes
2. Online Official Correspondence
3. Social Media and Language Change: e-mail, SMS, Emoticons, Blogs, Social Networking Sites
4. Maintaining Digital Databases

Unit IV: [Translation] **L: 12**

1. Translation Practices: Translation, Transliteration and Trans-Creation; Concept, Forms and Manifestations
2. The Location, Scope and Significance of Translation in Indian Media
3. Process of Translation from English to Hindi and vice - versa

Suggested Readings & E-resources:

1. Choudhary, R. (2010). Media Writing. New Delhi: Centrum Press.
2. Howard, P. (1986). Perfect your Punctuation. Melbourne: Longman Cheshire.
3. Sinha, P. K. (2006). Media Writing. Delhi: Indian Distributors.
4. VanderMey, R. (2004). The College Writer: A guide to Thinking, Writing and Researching. Boston: Houghton Mifflin.
5. W., M., & V., P. R. (2008). High School English: Grammar &Composition. Batu Caves, Selangor: Crescent News..
6. Whitaker, W. R., Ramsey, J. E., & Smith, R. D. (2012). Media writing: Print, Broadcast, and Public Relations. New York: Routledge.

INDIAN CULTURE

COURSE CODE: BA (JMC) 111	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- describe salient features of Indian culture
- explain the concept of diversity and underlying unity in Indian culture
- describe the process of integration of elements from other cultures in Indian culture

Unit I- [Indian Culture: An Introduction] **L: 12**

1. Characteristics of Indian Culture, Significance of Geography on Indian Culture
2. Society in India through Ages- Ancient period- Varna and Jati, Family and Marriage in India, Position of Women in Ancient India, Contemporary Period
2. Religion and Philosophy in India: Ancient Period, Pre-Vedic and Vedic Religion, Buddhism and Jainism, Indian Philosophy – Vedanta and Mimansa School of Philosophy
4. Religious Reform Movements in India

Unit II: [Indian Language and Literature] **L: 12**

1. Evolution of Script and Languages in India: Harappan Script and Brahmi Script
2. Short History of the Sanskrit Literature: The Vedas, The Brahmanas and Upanishads & Sutras, Epics: Ramayana and Mahabharata &Puranas
3. History of Buddhist and Jain Literature in Pali, Prakrit and Sanskrit,Sangama Literature
4. Contemporary Indian Literature

Unit III: [Indian Arts and Architecture] **L: 12**

1. Indian Art & Architecture: Gandharva School and Mathura School of Art; Hindu Temple Architecture, Buddhist Architecture, Medieval Architecture and Colonial Architecture
2. Indian Painting Tradition: Ancient, Medieval, Modern Indian Painting and Regional Painting Tradition
3. Performing Arts: Divisions of Indian Classical Music: Hindustani and Carnatic, Dances of India: Various Dance forms: Classical and Regional, Rise of Modern Theatre and Indian Cinema
4. Contemporary Indian Art andArtists

Unit IV: [Contemporary Indian Society] **L: 12**

1. Spread of Indian Culture Abroad-Causes, Significance and Modes of Cultural Exchange – Through Traders, Teachers, Emissaries, Missionaries, Sports, Films, Artists and Gypsies
2. Indian Social Structure-Socio-Cultural Issues
3. Education in India
4. Science and Technology in Contemporary India

Suggested Readings:

1. Basham, A. L. (2007). The Illustrated Cultural history of India. New Delhi: Oxford University Press.
2. Ghosal, H. R. (1962). An Outline History of the Indian people. Delhi: Publications Division, Ministry of Information& Broadcasting, Govt. of India.
3. Guha, R. (2007). India after Gandhi: The History of the World's Largest Democracy. Perennial.
4. Kothari, R. (1970). Caste in Indian Politics. New Delhi: Orient Longman.
5. Nehru, J. (1946). The Discovery of India. New York: The John Day Company.

6. Thapar, R. (2003). The History of Early India: From the Origins to AD 1300. London: Penguin.
7. Vohra, D. B. (1987). History of the Freedom Movement. Delhi: Delhi Administration.

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PERSONALITY DEVELOPMENT LAB

COURSE CODE: BA (JMC) 157	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- demonstrate professional conduct
- apply knowledge gained of professional ethics in media industry

Exercises/Assignments

1. Role plays
2. Presentation and group discussion Etiquettes
3. Thematic Appreciation Tests (TAT)
4. Team building exercises and crisis management
5. Situation based behaviour& its analysis
6. Writing letters and e-mails - official and non-official
7. Mock interviews
8. Professional Resume Writing
9. Portfolio Development

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

WRITINGSKILLS LAB

COURSE CODE: BA (JMC) 159	L: 0	T/P: 2	CREDITS: 2
External Evaluation: 60 Marks	Internal Evaluation: 40 Marks		Total Marks: 100

Objective of the Course

On completion of this course, the student should be able to:

- demonstrate proficiency of skills to translate and write for various media effectively

Exercises/Assignments

Organise/attend a Media Writing Workshop to:

1. Translation Exercises:
   a) Translate a Hindi news story to English (approx. 200 words) from a daily newspaper
   b) Translate an English news story to Hindi (approx. 200 words) from a daily newspaper
2. Transliteration and trans-creation exercise:
   a) Adaptation from one medium to another
3. Translation for academic purposes: formal and informal letter writing in Hindi and English language
4. Writing for various online platforms: e-mails, blog, social networking sites

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

SECOND SEMESTER

PRINT JOURNALISM

COURSE CODE: BA (JMC) 102	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define Journalism and News
- describe techniques of writing & reporting beats
- explain the structure and functions of a news room
- utilize knowledge gained in editing & designing of a print layout of newspaper, magazine and journal

Unit I: [Introduction to Journalism and News] **L: 12**

1. Evolution and Growth of Print Journalism in India
2. Journalism: Definition, Roles and Responsibilities of a Journalist/ Reporter
   a. Journalism as a Fourth Estate
   b. Citizen Journalism, Penny Press and Yellow Journalism
3. News: Meaning, Definition and Nature
   a. Elements of News and News Values
   b. Types of News: Hard and Soft
   c. Difference between News, Features, Articles and Backgrounders
4. News Sources: Attribution and its types; Credibility and Quotations, By Line, Credit Line and Embargo

Unit II: [News Reporting and Writing] **L: 12**

1. News Reporting: Reporting for Various Beats
2. Types of News Reports: Objective, Investigative and Interpretative
3. Reporting for Newspapers, Magazines and News Agencies
4. Structure and Style of News Writing
   a. Types of Headlines, Leads and Body
   b. Guidelines for Headline Writing

Unit III: [Structure of a News Room] **L: 12**

1. Set up and functions of a City Reporting Room in a Daily and a Bureau
2. Functions and Responsibilities of a News Editor, Sub-Editor and Chief Sub-Editor
3. Editorial Writing and its Importance
   a. Letter to the Editor
   b. Book Review and Film Review
4. Style sheet: Definition, Purpose and Relevance

Unit IV: [Editing and Layout Design] **L: 12**

1. Editing: Definition, Objectives and Principles

   a. Editing Symbols and Proofreading Symbols
   b. Advent of Electronic Editing
2. Copy Editing for Newspapers, Magazines and Journals
3. Use of Graphics, Cartoons and Info graphics in Print
   a. Photo Caption and Cutline: Definition, Relevance and Guidelines
4. Design and Layout for Newspaper, Magazine and Journal

Suggested Readings & E-resources:

1. Ahuja, B. N. (1996). History of Indian Press: Growth of Newspapers in India. Delhi: S.S. Chhabra for Surjeet Publications.
2. Aggarwal, V. B., & Gupta, V. S. (2001). Handbook of Journalism and Mass Communication. New Delhi: Concept Publications.
3. Lorenz, A. L., & Vivian, J. (1995). News: Reporting and Writing. Boston, MA: Allyn& Bacon.
4. Natarajan, J. (1955). History of Indian Journalism. Delhi: Publications Division, Ministry of Information and Broadcasting.
5. Raman, U. (2010). Writing for the Media. New Delhi, India: Oxford University Press.
6. Handbook of Print Media - Technologies and Production Methods /Helmut Kipphan/ Springer. Retrieved February 01, 2016, from http://www.springer.com/in/book/9783540673262

MEDIA LAWS AND ETHICS

COURSE CODE: BA (JMC) 104	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define Freedom of Press as per Article 19(1) (a) of the Indian Constitution
- explain reasonable restrictions in freedom of press
- describe the need & importance of the Press Council of India
- utilize knowledge gained in coverage of judicial proceedings, Parliament and State Legislature

Unit I: [Freedom of Press & Indian Constitution] **L: 12**

1. Legal Terminology: Bills and Acts, Ordinance, Regulations, Statute, Code, Norms, Conventions, Affidavit, Accused, Acquittal, Bail, Conviction, Defendant, Evidence, Plaintiff, Prosecution, Prima Facie, Sub-Judice
2. Press Laws Before and After Independence
3. Bill to Act: Case Study of Lokpal
4. Freedom of the Press and the Indian Constitution, Freedom of Speech and Expression: Article 19(1) (a) and Reasonable Restrictions Article 19 (2)

Unit II: [Press Commissions and Committees] **L: 12**

1. Press Commissions and Press Council of India
2. Committees: Chanda Committee, P.C. Joshi Committee, Sengupta Committee and Verghese Committee
3. The State: Sedition-incitement to violence (section 124A IPC)
   Legislature: Parliamentary Privileges - Article 361A, Article 105 (Parliament), Article 194 (State Legislation),
   Judiciary: Contempt of Court 1971

Unit III: [Media Acts and Laws] **L: 12**

1. Press & Registration of Books Act 1867 and 1955, Copyright Act 1957
2. Working Journalists Act 1955 & 1958, Young Persons Harmful Publications Act 1956
3. Prasar Bharati Act 1990 and Cinematograph Act 1952
4. Official Secrets Act 1923 and Right to Information Act 2005 (Case studies)
5. Defamation, Libel & Slander(Case studies)

Unit IV: [Regulatory Bodies] **L: 12**

1. Defining Media Ethics: Social Responsibility of Press
2. Legal Rights and Responsibilities of Journalists
3. Code of Ethics: Editors' Guild, Press Council of India, AIR &Doordarshan Code
4. Regulatory Framework: TRAI, BCCC, News Broadcasters Association (NBA) and their functioning

Suggested Readings:

1. Aggarwal, S. K. (1989). Media Credibility. New Delhi, India: Mittal Publications.
2. Basu, D. D. Introduction to the Constitution of India. Prentice Hall.
3. Ghosh, K. (1973). Freedom or Fraud of the Press. Calcutta: Rupa & Co.
4. Mankekar, D. R. (1973). The Press under Pressure. New Delhi: Indian Book.
5. Mass Media Laws and Regulations in India. (2000). Singapore: Asian Media Information and Comm. Centre.
6. Rayudu, C. S., & B., N. R. (1995). Mass Media Laws and Regulations. Bombay: Himalaya Publication House.
7. Shrivastava, K. M. (2005). Media Ethics: Veda to Gandhi & beyond. New Delhi: Publications Division, Ministry of Information and Broadcasting, Government of India.

8. Thakurta, P. G. (2011). Media Ethics: Truth, Fairness, and Objectivity. New Delhi: Oxford University Press.
9. Venkateswaran, K. S. (1993). Mass Media Laws and Regulations in India. Singapore: Asian Mass Communication Research and Information Centre.

STILL PHOTOGRAPHY

COURSE CODE: BA (JMC) 106	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define Photography
- describe the parts of a digital camera and their functions
- describe various lights and lighting applications
- demonstrate proficiency of knowledge in Photo Journalism

Unit I: [Basics of Photography] **L: 12**

1. Photography: Definition, Meaning & Concept
2. Brief History of Photography
3. Types of Cameras: Digital vs Film
4. Types of Photography: Portrait, Wildlife, Nature, Advertising, Fashion, Night Photography

Unit II: [Camera Basics] **L: 12**

1. Basic Parts of Digital Single Lens Reflex (DSLR) Camera: Lens, Sensor, Shutter, View Finder
2. Camera Control and Adjustment:
   a. Exposure- Aperture, Shutter, ISO
   b. Depth of Focus and Depth of Field
   c. Measurement of light -Exposure Metering System
   d. Composition and Perspective
3. Type of Lenses and Special Purpose Lenses
4. Camera Accessories

Unit III: [Lighting] **L: 12**

1. Sources of Light: Natural and Artificial
2. Nature and Physical Properties of Light
3. Three Point Lighting: Key, Fill and Back
4. Lighting Aesthetics: Controlling Contrast through Lighting

Unit IV: [Photo Journalism] **L: 12**

1. Photo Journalism: Definition and Concept, Role and Importance
2. Photo Stories, Photo Features and Photo Essays
3. Photo Appreciation
4. Photo Editing Tools, Morphing
5. Legal and Ethical Issues

Suggested Readings & E-resources:

1. Ang, T. (2008). Fundamentals of Modern Photography. London: Mitchell Beazley.
2. Aiyer, B. (2005). Digital Photo Journalism. Delhi: Authors Press.
3. Langford, M. Starting Photography. Oxford: Focal Press.
4. Langford, M. Basic Photography. Oxford: Focal Press.
5. Langford, M. Advanced Photography. Oxford: Focal Press.
6. www.betterphotography.com/the international landscape photographer of the year
7. www.karltaylorphotography.com/photography-tips-training-structure

PRINT JOURNALISM LAB

COURSE CODE: BA (JMC) 152	L: 0	T/P: 2	CREDITS: 2
External Evaluation: 60 Marks	Internal Evaluation: 40 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- write leads and headlines
- identify and rewrite news stories
- edit news stories using editing symbols
- write photo captions and cutlines

Exercises/Assignments

1. Identify any five headlines and rewrite them
2. Write various types of leads
3. Report and file story for each of the beats: Political, Entertainment, Business, Education and Crime
4. Convert any news story into feature
5. Prepare a copy by using editing and proof - reading symbols
6. Translate a news story from English to Hindi and vice - versa
7. Write an Editorial
8. Rewrite any five photo captions and cutlines

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

STILL PHOTOGRAPHY LAB

COURSE CODE: BA (JMC) 154	L: 0	T/P: 2	CREDITS: 2
External Evaluation: 60 Marks	Internal Evaluation: 40 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- capture aesthetically rich photographs
- demonstrate proficiency of skills to prepare photo features/photo stories

Exercises/Assignments

A. OUTDOOR

1. Capture Photographs with different compositions
2. Capture photographs at different f-stops (aperture)
3. Capture photographs at different shutter speeds
4. Capture photographs with different focal lengths

B. INDOOR

5. Capture portraits using Single Point Lighting
6. Capture portraits using Three Point Lighting
7. Product Photography: photograph a product for commercial purpose

C. FINAL PRODUCT

8. Create a Photo feature on specific topic
9. Create a photo story for newspaper/ magazine
10. Create a Still Audio-Visual Production

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

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DESIGN AND GRAPHICS LAB - II

COURSE CODE: BA (JMC) 156	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- apply knowledge gained of designing softwares for design and layout
- demonstrate proficiency of skills in designing and creating layouts using page layout software for print media

Exercises/Assignments

A. CorelDraw

1. Design an Invitation Card
2. Design a Logo
3. Design a Calendar
4. Design Cover Page of a Book

B. Indesign

1. Design a Magazine (16 Pages)

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

HEALTH COMMUNICATION

COURSE CODE: BA (JMC) 108	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define Public Health
- describe need and importance of Health Communication
- utilize knowledge gained in reporting and writing on health & lifestyle issues

Unit I: [Introduction to Public Health] **L: 12**

1. Public Health: Definition & Concept
2. Health Awareness and Role and Importance of Yoga
3. Major Public Health and Lifestyle Issues in India
4. Public Health Care System in India: Issues & Problems in Rural and Urban India
5. India as a Medical Tourism Destination

Unit II: [Introduction to Health Journalism] **L: 12**

1. Health Journalism: Concept, Need and Importance
2. Roles &Responsibilities of a Health Journalist
3. Sources of Health Reporting: NFHS reports, UNICEF reports, WHO, Census
4. Role of Media in Public Health Care Campaigns: Polio, HIV/AIDS, Reproductive Child Health

Unit III: [Health Reporting and Writing] **L: 12**

1. Ethics in Health Reporting
2. Structure and Guidelines for Health Reporting
3. Health Reporting for Various Media: Traditional and Digital Media
4. Writing for Public Health Care: Think Globally and Write Locally

Unit IV: [Health Communication] **L: 12**

1. Define Information Education Communication (IEC): Concept and Functions
2. Define Behaviour Change Communication (BCC): Concept and Functions
3. Design Communication Campaign: Pre-test and Evaluation
4. Future of Health Communication and Career Prospects

Suggested Readings & E-resources:

1. Jethwaney, J. N. (2016). Social Sector Communication in India: Concepts, Practices, and Case Studies: New Delhi: Sage Publications.
2. Robert C. Hornik (2002) Public Health Communication: Evidence for Behavior Change. Contributors, Lawrence Erlbaum Associates
3. Schwitzer, G. (2009). The State of Health Journalism in the U.S. Menlo Park, CA: Henry J. Kaiser Family Foundation.
4. S. Renata (2013). Health Communication: From Theory to Practice, John Wiley & Sons
5. www. Nathealthindia.org: Healthcare Federation of India
6. www.healthjouralism.org, Association of Health Care Journalists
7. www.reportingonhealth.org, Reporting on the Health, The Health Journalism Fellowship
8. www.jomc.unc.edu, Science and Medical Journalism
9. www.nrhm.gov.in

10. www.unicef.org/publications
11. www.mohfw.nic.in

SPORTS JOURNALISM

COURSE CODE: BA (JMC) 110	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objective of the Course

On completion of this course, the student should be able to:

- define Sports Journalism
- explain types and techniques of sports reporting and writing
- describe the importance of sports management and regulatory organisations
- utilize knowledge gained to promote physical and mental wellbeing through sports

Unit I: [Sports Journalism] **L: 12**

1. Defining Sports Journalism
2. Role and functions of International Sports Organizations: FIFA, ICC, IOC, International Paralympic Committee, Commonwealth Games Federation, Asian Games Federation, National Games
3. Sports Authority of India (SAI), its importance in the promotion and management of sports
4. News Sources for Sports Journalism

Unit II: [Sports Reporting and Writing] **L: 12**

1. News Values and Ethics for Sports Reporting and Writing
2. Types and techniques of writing sports stories: Feature, Interviews, Advanced Story, Trend Story, Column, News Story and Game Story
3. Sports Photography: Equipment, Editing, Publishing and Uploading
4. Editing and Use of Info-graphics, Layout of Sports News

Unit III: [Sports Management and Organisations] **L: 12**

1. Understanding Sports Management: Planning, Organizing, Coordinating and Controlling Pre, During and Post Event Issues
2. Sports Marketing and Promotion: Sponsors, Sports Management Companies, Spectators,Sports Personalities and Media
3. Emerging Professional Sporting Leagues: Pro Kabaddi League, Indian Super League (ISL), Indian Premier League (IPL), Indian Hockey League (IHL)
4. The role, significance, functions and need of WADA (World Anti-Doping Agency) and NADA (National Anti-Doping Agencies)

Unit IV: [Emerging Trends and Opportunities in Sports] **L: 12**

1. Sports writing for Print, Broadcast and Online: Commentaries; Live Telecast, Sportscast, Web Commentaries and News Alerts for Mobiles
2. New Trends in Sports Journalism: E-magazines and Blogs
3. Role of Sports Journalist in promoting Physical and Mental Wellbeing through Sports
4. Future of Sports Journalism and Career Opportunities

Suggested Readings:

1. Armstrong, J. R., & Tucker, W. E. (1964). Injury in Sports. Springfield, IL: C.C. Thomas.
2. Craig, S. (2002). Sports Writing: A Beginner's Guide. Shoreham, VT: Discover Writing Press.
3. Parks, J. B., Zanger, B. K., & Quarterman, J. (1998). Contemporary Sport Management. Champaign, IL: Human Kinetics.
4. SHANK, M. D. (2009). Sports Marketing: A strategic Perspective. Upper Saddle River, NJ: Pearson Prentice Hall.

5. Sports Journalism: A Practical Introduction. (2013). London: Sage Publications.
6. Steen, R. (2014). Sports Journalism. London: Taylor & Francis.
7. Thakur, K. C. (2010). Sports Journalism. New Delhi, India: Cyber Tech Publications.

HEALTH COMMUNICATION LAB

COURSE CODE: BA (JMC) 158	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- apply knowledge gained in spreading awareness on public health & lifestyle issues
- demonstrate proficiency of skills in health journalism

Exercises/Assignments

1. Create a blog post on ill effects of smoking and drug addiction/malnutrition/any other health issue. (Based on anactual Case Study)
2. Write a feature for a health magazine in 300-400 words. Support your article with photographs.
3. Create a photo feature on lifestyle health issues.
4. Plan & design IEC message and media materials for behaviour change communication.

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

SPORTS JOURNALISM LAB

COURSE CODE: BA (JMC) 160	L: 0	T/P: 2	CREDITS: 2
External Evaluation: 60 Marks	Internal Evaluation: 40 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- demonstrate proficiency of skills to create a sports blog and online magazine

Exercises/Assignments

1. From a daily newspaper or sports magazine, collect 5 examples of good sports story leads. Rewrite the headlines.
2. Create and maintain a Sports Blog. Include the following:
   a. Watch one of the sports tournaments on Television/ YouTube. Report the event in 500 words includingphotographs and infographics etc. Publish the report on the blog.
   b. Record an interview of any sports person using mobile phone (3-5 minutes duration).
3. Create an online sports magazine. Include the following:
   a. Feature article
   b. Interview
   c. Photo feature
   d. Trend story

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checkedand signed by the concerned faculty. The marks assigned for internal evaluation are 40.

THIRD SEMESTER

DEVELOPMENT COMMUNICATION

COURSE CODE: BA (JMC) 201	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define and describe the process of Development Communication
- explain the models and paradigms of Development Communication
- utilize the knowledge gained in designing social media marketing campaign on a development issue

Unit I: [Introduction to Development Communication] **L: 18**

1. Development Communication: Definition, Meaning and Process
2. Economic and social indicators of development:
   a. GDP/GNP
   b. Human Development Index
   c. Happiness Index
   d. Communication as an indicator: Role of ICT
   e. Human Rights as an Indicator
3. Approaches to Development Communication: Diffusion of Innovation; Magic Multiplier; Empathy
4. Communication and Social Change:
   a. Gandhian Perspective; Panchayati Raj
   b. Case Studies: Kheda, SITE, Water Harvesting Management, MNREGA, NHRM
   c. Sustainable Development Goals

Unit II: [Models and Paradigms of Development Communication] **L: 10**

1. Linear Models: Rostow's Demographic (Stages of Growth), Transmission
2. Non-Linear: World System Theory, Neo-Marxist Theory
3. Changing Paradigms of Development
4. Alternative Paradigms: Participatory, Think local/Act global - Think global/Act local

Unit III: [Development Journalism] **L: 10**

1. Role and performance of Mass Media in Development
2. Development Support Communications: Social Audit, Grass-root Activism, Whistleblowers
3. Role of NGOs in Development
4. Cyber media and Development: e-governance, digital democracy & e-chaupal

Unit IV: [Social Marketing] **L: 10**

1. Social Marketing and Development: An Overview
2. Corporate Social Responsibility: case studies in India
3. Social change Campaign in India (Case studies)
4. Development of social media marketing campaign

Suggested Readings:

1. Gupta, V. S. (2004). Communication & Development. New Delhi, India: Concept Pub.
2. Jethwaney, J. N. (2016). Social Sector Communication in India: Concepts, Practices, and Case Studies: New Delhi: Sage Publications.
3. Joshi, U. (2001). Understanding Development Communication. New Delhi: Dominant and Distributors.
4. Melkote, S. R. (2001). Communication for Development in the Third World: Theory and practice. New Delhi: Sage Publications.
5. Narula, U. (2007). Development Communication: Theory and Practice. New Delhi: Har-Anand Publications.
6. Nair, K. S., & Smith, S. A. (1993). Perspectives on Development Communication. New Delhi: Sage Publication's.
7. Sood, R, (2014) Message Design for Development Communication. New Delhi: S. Kapoor & Sons.
8. Sharma, R. (2012). Breakout Nations: In Pursuit of the Next Economic Miracles. New York: W.W. Norton &.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

BASICS OF RADIO PROGRAMMING AND PRODUCTION

COURSE CODE: BA (JMC) 203	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- describe radio as a medium of mass communication
- describe various formats of radio programme
- describe the process of radio programme production & evaluation

Unit I: [Understanding the Medium] **L: 14**

1. Radio as Medium of Mass Communication
2. Radio Broadcasting in India (pre and post-independence)
3. Different Types of Radio Stations and Transmissions:
   a) On the Basis of Reach: National, Regional, Local and Community
   b) On the Basis of Transmission Technology: AM, SW, FM, Web
4. Organizational Structure and Functionaries of a Radio Station: Govt. and Private

Unit II: [Programme Formats] **L: 12**

1. Radio Announcement and Links
2. Radio Talk
3. Radio Interview and Discussion
4. Radio News
5. Radio Feature and Documentary
6. Radio Commentary
7. Radio Play/Drama
8. Radio Ads (Social and Commercial)
9. Phone-in and Radio Bridge

Unit III: [Radio Production and Transmission Process] **L: 12**

1. Elements of Radio Programme
2. Radio Production Process
3. Equipment used in Radio Production: Types of Microphones, Headphones and Talk Backs, Audio Mixers and Transmitters
4. Recording, Broadcasting and Troubleshooting
   a. Indoor: Studio, Acoustics and Perspective
   b. Outdoor: Ambience and Noise

Unit IV: [Post Production and Evaluation] **L: 10**

1. Editing and Mixing
2. Adding Sound Effects and Music
3. Audio Filters: Types, Need and Importance
4. Evaluation: Process and Measurement Techniques

Suggested Readings & E-resources:

1. Chantler, P., & Stewart, P. (2003). Basic Radio Journalism. Amsterdam: Focal Press.
2. Chatterji, P. C. (1987). Broadcasting in India. New Delhi: Sage Publications.

3. Luthra, H. R. (1986). Indian Broadcasting. New Delhi: Publications Division, Ministry of Information and Broadcasting, Govt. of India.
4. McLeish, R. (1999). Radio Production: A manual for broadcasters. Oxford: Focal Press.
5. Shrivastava, K. M. (1990). Radio & TV journalism. Sterling.
6. Sharma, R. (2012). Breakout nations: In pursuit of the next economic miracles. New York: W.W. Norton &.
7. Pavarala, V., & Malik, K. K. (2007). Other voices: The Struggle for Community Radio in India. Thousand Oaks, CA: Sage Publications.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

BASICS OF VIDEO CAMERA, LIGHTS AND SOUND

COURSE CODE: BA (JMC) 205	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- describe video camera operations and functions
- describe camera movements, mounts, shots, angles and compositions
- describe techniques of lighting for video production
- describe the methods of recording and in-cam editing

Unit I: [Introduction to Video Camera] **L: 12**

1. Introduction to Video Camera, Parts and their Functions
2. Types of Video Camera, Equipment and Accessories
3. Broadcast Standards
4. Lenses & Filters: Types and Functions
5. Camera Control and Adjustment:
   a. Aperture Control
   b. Depth of Field
   c. Depth of Focus
   d. Focal Length
   e. Aspect Ratio

Unit II: [Composition and Types of Shots] **L: 12**

1. Types of Shots
2. Camera Angles
3. Camera Movements
4. Rules of Composition

Unit III: [Lighting] **L: 12**

1. Light and its Properties
2. Different types of Lights
3. Other tools used in Lighting: Diffusers, Reflectors, Cutters and Gels
4. Basic Lighting Techniques

Unit IV: [Sound] **L: 12**

1. Audio Elements in Video Programmes: Lip Synchronized Sound, Voice Over, Music, Ambience And Sound Effects
2. Use of Microphones, Audio Mixers for Recording
3. Audio Control and Adjustment in Video Camera: Audio Level & Audio Channel
4. In-camera Editing and File Formats

Suggested Readings & E-resources:

1. Belavadi, V. (2013). Video Production. New Delhi: Oxford University Press.
2. Donald, R., & Spann, T. (2000). Fundamentals of Television Production. Wiley.
3. Millerson, G. (1999). The Technique of Television Production. London: Focal Press.
4. Zettl, H. (2005). Television Production Handbook,Cengage Learning.
5. http://www.videomaker.com
6. www.mediacollege.com/video/camera/tutorials

RADIO PRODUCTION LAB

COURSE CODE: BA (JMC) 251	L: 0	T/P: 2	CREDITS: 2
External Evaluation: 60 Marks	Internal Evaluation: 40 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- distinguish and differentiate between various radio programme formats
- demonstrate proficiency of skills in production of a radio programme

Exercises/Assignments

1. Listen, identify and discuss various radio programme formats
2. Hands-On: Work on studio recording and edit using digital audio equipment
3. Hands-On: Work on Outdoor recordings: Vox-Pop/Interview
4. Prepare a production book including:
   a. Audio brief
   b. Program objective (s)
   c. Synopsis
   d. Treatment
   e. Script
   f. Crew list
   g. Technical requirements
   h. Budget
5. Produce a 30 sec. public service announcement/radio commercial (individual activity)
6. Produce a five minute radio news/documentary/feature/drama/interview/discussion (small group activity)

Internal Assessment :The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

VIDEO PRODUCTION LAB

COURSE CODE: BA (JMC) 253	L: 0	T/P: 2	CREDITS: 2
External Evaluation: 60 Marks	Internal Evaluation: 40 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- use video camera, lights and sound for studio and location shooting
- demonstrate proficiency of skills to operate and handle video system

Exercises/Assignments

Camera

1. Operate and handle video camera:
   a. White Balancing
   b. Exposure
   c. Depth of Field
   d. Filters (External and Internal)
2. Camera mounts, composition, continuity of shots and camera movements

Lighting

1. Use different types of lights (Indoor and Outdoor) for videography
2. Use of filters, reflectors and gels

Sound

1. Audio Control and audio adjustment in video camera: audio levels and audio channels
2. Use of different types of microphones for indoor and location video recordings

Final Product: **Produce a Public Service Message (up to 1 minute) using in-cam editing technique**

Internal Assessment:The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

SUMMER TRAINING REPORT

COURSE CODE: BA (JMC) 255	L: 0	T/P: 0	CREDITS: 4
External Evaluation: 50 Marks	Internal Evaluation: 50 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- apply classroom-based education for practical work experience in the industry
- utilize current standards and recent advances in media and entertainment organisation
- network with the industry professionals

Soon after the Second Semester End-Term Examination, students will undergo Summer training/ internship in Media and Entertainment Organisation for a period of four weeks and will submit a Summer Training Report (STR) along with multi-media Presentation incorporating the work done during the training/ internship.

The hard and soft copy of the STR (in duplicate) is to be submitted along with a soft copy of multi-media Presentation at least 4 weeks before the commencement of End Term Examination of the Third semester.

Summer Training Reports will be evaluated by the Board of Examiners comprising of Internal Examiner and External Examiner separately out of 50 marks each. The External Examiner will be appointed by the Competent Authority.

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ELECTIVE

COURSETHIRD

SEMESTER

RADIO JOCKEYING AND NEWS READING

COURSE CODE: BA (JMC) 207	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- describe the structure and functioning of radio FM channel
- describe the presentation techniques used by Radio Jockey/ News Reader
- utilize knowledge gained in presentation of a radio programme for transmission

Unit I: [Radio News and Structure of Radio Station] **L: 12**

1. Basics of Radio News: Concept of News, News Values: Objectivity, Balance and Fairness
2. News Sources: News agencies, Reporters, Correspondents and Monitoring Services
3. Structure and Functioning of News Services Division and News Room
4. Structure and Functioning of FM Radio Stations (Govt. & Private)

Unit II: [Writing Skills for Radio] **L: 12**

1. Writing for Radio
2. News Bulletin: Types and Elements
3. News writing: Opening, Headlines, Body and Closing/Conclusion
4. Writing and Packaging for Radio Infotainment Programs

Unit III: [Voice Personality and Presentation Techniques] **L: 12**

1. Voice Qualifiers& Speech Personality
2. Radio Jockey: Techniques and Style
3. News Reader: Presentation Techniques
4. Guidelines, Code & Ethics for Presentation

Unit IV: [Production and On Air Programming] **L: 12**

1. Techniques of Radio Production: Studio and Location, Hardware and Software Requirements
2. Use of Music and Generating Sound Effects
3. Use of Pre-recorded Features
4. Emerging trends in Radio Industry

Suggested Readings & E-resources:

1. A. S. Utterback, Broadcast (2005)Voice Handbook: How to Polish Your On-Air Delivery, Taylor Trade Publishing.
2. Adams, M. H., & Massey, K. K. (1995). Introduction to Radio: Production and Programming. Madison, WI: Brown& Benchmark.
3. Boyd, A. (1997). Broadcast Journalism: Techniques of Radio and TV news. Boston: Focal Press.

4. Hakemulder, J. R., Jonge, F. A., & Singh, P. P. (2005). Broadcast Journalism. New Delhi, India: Anmol Publications.
5. www.learningsolutionsmag.com/learning technology, strategy and news
6. www.voiceartistes.com/articles

ELECTIVE

COURSETHIRD

SEMESTER VIDEO

EDITING

COURSE CODE: BA (JMC) 209	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- describe the concept &process of video editing
- describe various types of video editing
- describe the process of packaging and archiving

Unit I: [Introduction to Video Editing] **L: 12**

1. Video editing: Background, Concept, Objectives and Importance
2. Types of Editing
3. Rules of Video Editing
4. Role of Video Editor

Unit II: [Process of Video Editing] **L: 12**

1. Video Formats: Analogue and Digital
2. Linear and Non-linear Video Editing: Equipment and its functions
3. Steps for Linear and Non-linear Video Editing
4. Editing Techniques: Types of Cuts and Transitions

Unit III: [Mixing and Exporting] **L: 12**

1. Sound Design and Editing: Concept and Troubleshooting
2. Effects and Transitions
3. Styles of Packaging: News and Non-news
4. Archiving and File Formats

Unit IV: [Multi Camera Editing] **L: 12**

1. Control Room and Panel: Use of Switcher, Chroma, Super - Impositions
2. Multi-camera Online Editing: Concept and Process
3. Live Events: Recording, Editing and Telecasting
4. Emerging Trends in Multi-camera Video Editing

Suggested Readings & E-resources:

1. Belavadi, V. (2013). Video Production. New Delhi: Oxford University Press.
2. Dancyger, K. (1993). The Technique of Film and Video Editing. Boston: Focal Press.
3. Millerson, G., &Millerson, G. (1999). Television Production. Oxford: Focal Press,13 edition.
4. Zettl, H. (2005). Television Production Handbook,Cengage Learning.
5. www.mediacollege.com/video/editing/tutorials

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ELECTIVE

COURSETHIRD

SEMESTER

RADIO JOCKEYING AND NEWS READING LAB

COURSE CODE: BA (JMC) 257	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- write and present a script for radio news
- prepare news package
- demonstrate proficiency of skills in managing radio programmes transmission as a radio jockey

Exercises/Assignments

A. News Reading

a. Write, present and edit 5-10 minutes radio news bulletin package with Live Reporting & Phone-in sequences

B. Radio Jockeying

a. Write, present and edit 10-15 minutes radio entertainment show

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

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ELECTIVE

COURSETHIRD

SEMESTER

VIDEO EDITING LAB

COURSE CODE: BA (JMC) 259	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- demonstrate proficiency of skills in offline and online video editing

Exercises/Assignments

1. Prepare a log sheet
2. Capture/import video clips (Dumping of Media)
3. Create a rough cut
4. Undertake Filtering and keying, Colour Correction, Use of Effects and transitions
5. Fine Cut

Create a package with Montage for news/non-news story (2-5 minutes)

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

FOURTH SEMESTER

FOURTH SEMESTER

BASICSOF

ADVERTISING

COURSE CODE: BA (JMC) 202	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- Define advertising and brand
- Describe functions and types of advertising agency
- Describe various elements of an advertisement
- utilize knowledge gained to plan and design advertising campaign

Unit I: [Concept of Advertising] **L: 12**

1. Advertising: Definition, Types and Functions
2. Models of Advertising Communication
   a. AIDA model
   b. DAGMAR model
   c. Maslow's Hierarchy Model
3. Classification of Advertising on the basis of Target Audience, Geographical Area, Medium and Purpose
4. Ethical and Regulatory Aspects of Advertising: ASCI & AAAI Code

Unit II: [Creativity in Advertising] **L: 12**

1. Creativity in Advertising: Concept and Importance
2. Elements of Advertisement: Copy, Slogan and Audio-Visual Elements
3. Concept of Brand; Segmentation, Targeting and Positioning
4. Advertising Appeals

Unit III: [Ad Agency - Structure and Functions] **L: 12**

1. Advertising Agency: Concept, Types, Functions and various departments
2. Structure and Hierarchy of an Advertising Agency
3. Planning and Pitching in Advertising
4. Role and Functions of DAVP

Unit IV: [Advertising Campaign] **L: 12**

1. Media Planning and Scheduling
2. Uses and Importance of media measurement tools: IRS, RAM, BARC and WAM
3. Budgeting Process and factors affecting Advertising Budget
4. Advertising Campaign: Definition, Concept and stages of product Life Cycle

Suggested Readings & E-resources:

1. Aaker, D. A., & Myers, J. G. (1975). Advertising Management. Englewood Cliffs, New Jersey's: Prentice-Hall.
2. Butterick, K. (2011). Introducing Public Relations: Theory and Practice. London: Sage Publication.
3. Chunawalla, (2000). Advertising Theory and Practice. Mumbai: Himalaya Publishing House.

4. Jethwaney, J., & Jain, S. (2012). Advertising Management. New Delhi, New York: Oxford University Press.
5. Mankad, N. (2006). Reinventing Advertising: The New Reality. Hyderabad, India: ICFAI University Press.

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FOURTH SEMESTER

BASICS OF PUBLIC

RELATIONS

COURSE CODE: BA (JMC) 204	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define Public Relations
- describe role and importance of Public Relations
- describe the functions of PR agency
- utilize knowledge gained in planning and designing a public relations campaign

Unit I: [Concept and Evolution of Public Relations] **L: 14**

1. Defining Public Relations: Functions and Types of Publics
2. Evolution of Public Relations
3. Scope of PR: Issue Management, Lobbying, Corporate Social Responsibility, Public Opinion, Advertising, Propaganda, Publicity and PR as a marketing tool
4. Ethics in PR, PRSI Code, IPRA

Unit II: [PR Agency- Tools and Techniques] **L: 12**

1. PR agency: Concept, Structure and Functions
2. Media Relations: Multi-Media Release (press, audio, video and social media), Press Conference, Press Kit, Press Briefings and Familiarizing Tours
3. Tools &Techniques for Public Relations: House Journal, Bulletin Board, Visit by Management, Open House and Annual Reports, Exhibitions
4. Use of Digital Media and Emerging trends in PR

Unit III: [PR in Different Sectors] **L: 10**

1. Role and Responsibility of PRO
2. PR in Public and Private sector (CSR)
3. Role of PR in Education and Health sector
4. Role of PR in Political Parties and Election Campaigns

Unit IV: [Corporate Communications and PR] **L: 12**

1. Evolution of Corporate Communications
2. Corporate Communications and Public Relations
3. Defining PR Pitch and Campaign
4. PR campaign: Research, Setting Objectives, Programme Planning, Budgeting, Implementation, Feedback/Evaluation

Suggested Readings & E-resources:

1. Balan, K. R., & Rayudu, C. S. (1994). Public Relations in Action. New Delhi: Castle Book.
2. Cutlip, S. M., Center, A. H., & Broom, G. M. (1985). Effective Public Relations. Englewood Cliffs, New Jersey's: Prentice-Hall.
3. Cottle, S. (2003). News, Public Relations and Power. London: Sage Publication.

4. Black, S., & Sharpe, M. L. (1983). Practical Public Relations. Englewood Cliffs, New Jersey's: Prentice Hall.
5. Jethwaney, J. N., & Sarkar, N. N. (2015). Public Relations Management. New Delhi: Sterling Private.
6. Sachdeva, I. S. (2009). Public Relations: Principles and Practices. New Delhi: Oxford University Press.
7. Tripathy, M. (2011). Public Relations: Bridging Technologies and Monitoring Public and the Media. Delhi: Authors Press.
8. Fundamentals of Communication PR and Leadership by Georgios P. Piperopoulos, bookboon.com
9. www.tv-handbook.com/index.html
10. www.cengagebrain.co.nz/content/zettl

FOURTH SEMESTER

TELEVISION PROGRAMMING AND PRODUCTION

COURSE CODE: BA (JMC) 206	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define TV as a medium of mass communication
- distinguish and differentiate various TV programme formats
- describe the process of production of TV programme

Unit I: [Understanding the Medium] **L: 12**

1. Brief Historical Background of Television in India
2. Characteristics and Importance of Television
3. Various Formats of TV programmes
4. Stages of Programme Production

Unit-II [Pre-Production] **L: 12**

1. Ideation, Programme Brief, Objectives, Synopsis, Research - Recce and Treatment
2. Scripting a Programme: Story Boarding and Script Breakdown
3. Maintaining Continuity, Make-up, Set-designs, Costumes, Props, Floor Plan
4. Budgeting

Unit-III: [Production] **L: 12**

1. Steps involved in production and utilization of a TV programme
2. Production Personnel: Role and Responsibilities in Studio & Location Shoot
3. Single Camera Shoot
4. Multi Camera Shoot

Unit IV: [Post Production] **L: 12**

1. Video Editing: Concept and Process
2. Basics of Continuity Editing
3. Idea to Screen
4. Pretesting and Evaluation: Tools and Techniques

Suggested Readings & E-resources:

1. Boyd, A. (1997). Broadcast Journalism: Techniques of Radio and TV news. Boston: Focal Press.
2. Belavadi, V. (2013). Video production. New Delhi: Oxford University Press.
3. Hakemulder, J. R., Jonge, F. A., & Singh, P. P. (2005). Broadcast Journalism. New Delhi, India: Anmol Publications.
4. Millerson, G., &Millerson, G. (1999). Television Production. Oxford: Focal Press,13 edition.
5. Trewin, J. (2003). Presenting on TV and Radio: An Insider's Guide. Amsterdam: Elsevier.
6. Utz, P. (2006). Today's Video. Jefferson, NC: McFarland.
7. Zettl, H. (2005). Television Production Handbook,Cengage Learning.
8. www.tv-handbook.com/index.html

FOURTH SEMESTER

ADVERTISING LAB

COURSE CODE: BA (JMC) 252	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- design, plan and produce advertisements for different mediums
- utilize skills acquired to conceptualise, plan and implement an ad campaign

Exercises/Assignments

1. Analyse three different types of advertisements on the basis of idea/concept, copy, design and layout
2. Plan Ad Campaign for a product/service/an idea as per the following steps:

A. Setting objectives

a. Objective of the Advertising Campaign: Overall and Specific
b. Market Analysis: SWOT Analysis and Competitor Analysis

B. Strategy Ad Campaign

a. Creative Strategy
b. Advertising Budget Appropriation
c. Media Strategy and Plan

C. Implementation

a. Advertising message design and production: Display ads, hoarding, internet ads, TVC
b. Media scheduling

D. Evaluation Plan

a. Pre-Testing of the Media Material
b. Audience Feedback and Analysis

E. Production and presentation of Ad Campaign

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

FOURTH SEMESTER

PUBLIC RELATIONS LAB

COURSE CODE: BA (JMC) 254	L: 0	T/P: 2	CREDITS: 2
External Evaluation: 60 Marks	Internal Evaluation: 40 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- plan, design and implement different media release for the launch of a product/service /idea
- demonstrate proficiency of skills to design and manage a PR pitch and campaign

Exercises/Assignments

1. Plan, design and implement the following for the launch of a product/service /idea
   a. Press release
   b. Audio release
   c. Video release
   d. Social media news release
2. Write Minutes of the Meeting, Memo and Notice (one each)
3. Organise a Mock Press Conference
4. PR Pitch and Campaign: Plan, Design and Implement
   a. Plan: objectives, date, venue, time, invite, refreshments, equipment, infrastructure, checklist, guests, budget
   b. PR Personnel/staff
   c. Liaisoning, Licensing & permissions
   d. Designing a Press Kit: Press Release, backgrounder, fact-sheet, audio-visual material, stationery, gift
   e. Scheduling: Opening Speech, presentation, Q&A Session, vote of thanks
   f. Post-Conference PR: compilation of media coverage

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

FOURTH SEMESTER

TV PRODUCTION LAB

COURSE CODE: BA (JMC) 256	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objective of the Course

On completion of this course, the student should be able to:

- demonstrate proficiency of skills to plan, produce a video programme

Exercises/Assignments

Plan, design, produce a 5 minutes fiction/ non-fiction video programme of social relevance.

Production Booklet will include the following:

1. Prepare a video brief: idea, target audience, synopsis, treatment, duration and format
2. Write a video script (2-5 minutes)
3. Prepare shooting script
4. Prepare story board
5. Prepare a production schedule
6. Prepare a floor, light and audio plan
7. Finalise production crew
8. Budgeting

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

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ELECTIVE COURSE

FOURTH

SEMESTER

TELEVISION NEWS: REPORTING AND ANCHORING

COURSE CODE: BA (JMC) 208	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objective of the Course

On completion of this course, the student should be able to:

- describe the structure and functioning of TV news channel
- explain the role and responsibilities of TV News Reporter and Anchor
- utilize knowledge gained in writing and presenting TV news

Unit I: [Structure of TV News Channel] **L: 12**

1. Basics of Television News: Concept of News and News Value
2. Structure of TV News Channel
3. Qualities and Responsibilities of News Personnel
4. News Sources and Monitoring Services

Unit II: [TV News Writing] **L: 12**

1. Characteristics and Essentials of TV Language
2. News Writing: Concepts and Elements
3. Writing for Visuals: Simple News stories, Writing Intros / Opening, Headlines & Closing / Concluding
4. News Writing for TV versus other Media

Unit III: [TV News Reporting] **L: 12**

1. Television News Reporter: Techniques and Styles
2. Different Types of Reporting: Objective, Investigative, Interpretative, Reporting Beats
3. Essentials of Field Reporting: Live/recorded Phone-in, Piece to Camera, Walk through
4. Guidelines and Challenges for a TV Reporter

Unit IV: [TV News Anchoring] **L: 12**

1. News Anchor: Qualities, Responsibilities and Professional Ethics
2. Voice Personality & Presentation
3. Anchoring News & Non-News Programs
4. Anchoring with/without Tele-prompter, Studio and Outdoor

Suggested Readings:

1. Baker, J. (2005). Secrets of Voice-Over Success: Top Voice-Over Artists Reveal how they did it. Boulder, Sentient Publications.
2. Hakemulder, J. R., Jonge, F. A., & Singh, P. P. (2005). Broadcast Journalism. New Delhi, India: Anmol Publications.
3. Kalra, R. J. (2012). The ABC of News Anchoring: A guide for Aspiring Anchors, Pearson.
4. Zettl, H. (2005). Television Production Handbook,Cengage Learning.
5. www.icfj.org/sites/default/files/Broadcast_English
6. www.asaha.com/ebooks/news-writing-and-reporting

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ELECTIVE COURSE

FOURTH

SEMESTER

CORPORATE COMMUNICATION

COURSE CODE: BA (JMC) 210	**L: 4**	**T/P: 0**	**CREDITS: 4**
External Evaluation: 75 Marks	**Internal Evaluation: 25 Marks**		**Total Marks: 100**

Objective of the Course

On completion of this course, the student should be able to:

- define corporate and Corporate Communication
- describe shift from PR to Corporate Communication
- utilize knowledge gained for Corporate Branding

Unit I: [Understanding Corporate Environment] **L: 12**

1. Contemporary Corporate Environment: an overview
2. Forms of Corporate Constituencies
3. Brand Identity, Brand Image and Brand Reputation
4. Corporate Philanthropy and Social Responsibility

Unit II: [Introduction to Corporate Communication] **L: 12**

1. Corporate Communication: Definition, Concept And Scope
2. Shift from PR to Corporate Communication
3. Structure and forms of Corporate Communication: Management, Marketing, Organizational
4. Corporate Communication as Branding strategy: Monolithic, Endorsed, Branded

Unit III: [Corporate Communication in Practice] **L: 12**

1. Developing a Communication Strategy
2. Perspectives on Organizing Communication: Vertical, Horizontal and Lateral
3. Corporate Identity Audit: Concept And Steps
4. Corporate Advertising: Concept and Functions

Unit IV: [Application of Corporate Communication] **L: 12**

1. Media Relations: Tools and Techniques, Media Monitoring and Research (Gate keeping research and output analysis)
2. Internal & External Communication: Concept and Tools
3. Guidelines and Ethics for Corporate Communication
4. Crisis Management: Concept and Case Studies (Infosys Crisis and Nestle Maggie)

Suggested Readings:

1. Argenti, P. A. (2009). Strategic Corporate Communication: A Global Approach for doing Business in the New India. New York: McGraw-Hill.
2. Cornelissen, J. (2008). Corporate Communication: A guide to Theory and Practice. Los Angeles: SagePublications.

3. Jethwaney, J. (2010). Corporate Communication: Principles and Practice. Oxford: Oxford University Press.
4. Oliver, S. (2004). A Handbook of Corporate Communication and Public Relations: Pure and Applied. London: Routledge.

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ELECTIVE COURSE

FOURTH

SEMESTER

TELEVISION NEWS: REPORTING AND ANCHORING LAB

COURSE CODE: BA (JMC) 258	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objective of the Course

On completion of this course, the student should be able to:

- demonstrate proficiency of skills acquired in reporting, anchoring and packaging of TV news

Exercises/Assignments

1. Reading and Recording a news piece of 5 mins with or without a Teleprompter
2. Field Reporting
3. Host a Talk Show /Interview
4. Moderate a Debate/Discussion
5. Package a News Bulletin of 5-10 minutes

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

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ELECTIVE COURSE

FOURTH

SEMESTER

CORPORATE COMMUNICATION LAB

COURSE CODE: BA (JMC) 260	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objective of the Course

On completion of this course, the student should be able to:

- demonstrate proficiency of skills acquired to conduct an identity audit,manage communication of a media/entertainment organisation and prepare a plan for crisis communication

Exercises/Assignments

1. Select an existing organization:
   a. Analyze its vision, mission, values and objectives
   b. Conduct an identity audit
   c. Compile and present the analysis using a multi-media presentation

2. As a Corporate Communication Executive of a media organization:
   a. Create an e-mail invite for launch of any product/ service/ idea
   b. Create a Press Note to inform a recent development in the organization
   c. Create a social media strategy for internal and external communication

3. Simulation: Disaster Management and Crisis Communication
   Steps:
   a. Defining the problem/crisis
   b. Pre – crisis to Post – crisis
   c. Stakeholder definition
   d. Message action plan
   e. Media mapping
   f. Media planning and management

Internal Assessment :The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

FIFTH SEMESTER

BASICS OF NEW MEDIA

COURSE CODE: BA (JMC) 301	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- describe New Media technology for mass communication
- explain the use of online discussion forums keeping in mind cyber law and ethics
- understand the applications of New Media
- utilize knowledge gained to design and manage a website

Unit I: [Online Communication] **L: 12**

1. Online Communication: Meaning, Definition and Evolution from Web 1.0 to Web 3.0
2. Communication Technology and Society
3. Attributes of Online Communication
4. Video Conferencing, Webcasting and Podcasting

Unit II: [Online Journalism, Cyber Law and Ethics] **L: 12**

1. Traditional vs Pen-less/ Paperless Journalism, News and Content Presentation
2. Do's and Don'ts for reporting and editing for e-papers, websites and news portals
3. Cyber Crimes and Cyber Security: An Overview
4. IT Act (2000); Ethics and Limitations: Piracy, Copyright, Copyleft, Open Source, Digital Archives

Unit III: [New Media: Issues &Applications] **L: 12**

1. Digital Divide and Information Society
2. ICT and its applications and E-governance
3. Convergence and its Types: Synergy between Electronic and Mobile Commerce
4. Social Media Platforms: Importance and Usage

Unit IV: [Web Content Design& Evaluation] **L: 12**

1. Website Planning and Visual Design
2. Audience Analysis and Content Strategy
3. Blogs: Creating and Promoting a Blog (SEO)
4. Website Audience Measurement (WAM): Process and Techniques

Suggested Readings & E-resources:

1. Barker, M. S., Barker, D., Bormann, N. F., &Neher, K. (2013). Social Media Marketing: A Strategic Approach. Mason, OH: South-Western Cengage Learning.
2. D. Satish & Rajesh Prabhakar Kaila ((2006): Blogs: Emerging Communication Media, The ICFAI University Press
3. Mishra , R.C, (2008) Cyber Crime: Impacts in the New Millennium, Author Press
4. Martin, P., & Erickson, T. (2011). Social media marketing. New Delhi: Global Vision Publishing House.Prasad, Kiran, New Media & Pathways to Social Change(Ed), B.R. Publishing Corporation
5. Rajgopalan, S.,(2006) The Digital Divide, ICFAI Books
6. Sekhar, Pulugurta Chandra, (2014) New Media: The Virtual Media, Vol 1, B.R. Publishing Corporations
7. Schiller, J. (2005). Mobiele Communication. Amsterdam: Pearson Education
8. http://www.digit.in
9. http://pitchonnet.com
10. www.sagepub.in/Media Management in Theory and Practice
11. www.amarc.org/documents/manuals/Media_Management_Manual

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FIFTH SEMESTER

MEDIA

RESEARCH

COURSE CODE: BA (JMC) 303	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define Media Research
- explain the process of Media Research
- describe the Research methodology for Media
- describe the steps involved in report writing

Unit I: [Introduction to Research] **L: 12**

1. Research: Meaning, Definition and Objectives
2. Types of Research
3. Approaches to Research: Qualitative and Quantitative
4. Media Research: Meaning and Scope

Unit II: [Survey in Media Research] **L: 12**

1. Survey, Public Opinion Surveys, TRPs, TeleWeb Survey
2. Readership Survey & IRS
3. Election Related Survey: Opinion Poll and Exit Poll
4. Media Research Agencies: BARC, ABC, MAP, RAM

Unit III: [Research Design] **L: 12**

1. Research Design: Meaning and different Types, Hypotheses /Research Questions
2. Research Methods: Survey, Content Analysis and Case Study
3. Sampling &Selecting a sample, Types of sampling: Probability and Non- Probability
4. Data Collection Tools: Primary and Secondary, Observation, Interview, Questionnaire/ Schedule, FGD

Unit IV: [Data Analysis and Report Writing] **L: 12**

1. Processing of Data: Editing, Coding, Classification, Tabulation
2. Measures of Central Tendency: Mean, Median and Mode
3. Analysis and Interpretation of Data
4. Report Writing/ Abstract/ Proposal/ Synopsis

Suggested Readings & E-resources:

1. Bertrand, I., & Hughes, P. (2005). Media Research Methods: Audiences, Institutions, Texts. New York: Palgrave Macmillan.
2. Guthrie, G. (2012). Basic Research Methods: An entry to Social Science Research. Los Angeles: Sage Publications
3. Kothari, C. R. (2004). Research Methodology: Methods and Techniques. New Delhi: New Age International (P).
4. Wimmer, R. D., & Dominick, J. R. (2014). Mass Media Research an Introduction. Andover : Wadsworth, Cengage

Learning.
5. www.cles.org.uk/Research Methods Handbook
6. www.isites.harvard.edu/ Research Methods

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FIFTH SEMESTER

EVENT

MANAGEMENT

COURSE CODE: BA (JMC) 305	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- define event and Event Management
- describe organisational structure and functionaries of an event management company
- explain the process of organizing an event
- utilize knowledge gained to assess and evaluate an event

Unit I: [Event and Event Management] **L: 12**

1. Event: Definition and Types
2. Event as a Communication and Marketing tool
3. Event Management: Definition and Elements
4. 5C's of Event Management

Unit II: [Event Management Organisation] **L: 12**

1. Organisational Structure of an Event Management company
2. Event Management Personnel: Role and Responsibility
3. Account Planners and Liaisoning
4. Business Operations and Accounting

Unit III: [Event Management Process] **L: 12**

1. Event Proposal Planning: Licenses, Permissions and Legalities
2. Event Budget, Covering Cost and Methods of Revenue Generation
3. Event Promotion: Tools and Media Coordination
4. Risk Management and Insurance

Unit IV: [Evaluation, Assessment & Trends] **L: 12**

1. Evaluation and Impact Assessment: Concept, Techniques and Application
2. Monitoring and Controlling the Event
3. Emerging Trends in Event Management
4. Careers in Event Management

Suggested Readings & E-resources:

1. Goyal, S. K. (2010). Event Management. New Delhi: Adhyayan & Distributors.
2. Kotler, P. (2003). Marketing Management. Upper Saddle River, New Jersey's: Prentice Hall.
3. Kishore, D., & Singh, G. S. (2011). Event management: A Booming Industry and an Eventful Career. New Delhi: Har-Anand Publications.

4. K.Niraj. (2009). Integrated Marketing Communications: Himalaya Publishing House
5. K. Purnima. (2011). Event Management: Anmol Publications Pvt Ltd.
6. Sharma, D. (2005). Event Planning and Management. New Delhi: Deep & Deep Publications Pvt.
7. www.wodonga.vic.gov.au/lEvent_management_planning_guide
8. www.eventmanagement.com/planning

FIFTH SEMESTER

NEW MEDIA LAB

COURSE CODE: BA (JMC) 351	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- use search engines effectively
- demonstrate proficiency of skills to design and develop blog and website

Exercises/Assignments

1. To create and maintain blogs and vlogs
2. Distinguish between news, opinions and advertisements on the web
3. Analyze various elements and content of a news website
4. Create a simple web page with links to text, graphics and audio and video documents using HTML
5. Students in groups should create a dynamic website using Adobe Dreamweaver

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

FIFTH SEMESTER

MEDIA RESEARCH LAB

COURSE CODE: BA (JMC) 353	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- apply research techniques in pre-testing/evaluation of media material
- conduct media research and write a report

Exercises/Assignments

1. Pre-test/Evaluate a print, audio, video and online ad programme
2. Using any of the research technique the student will conduct media research culminating into hard and soft copies of thereport. A media research will have to be conducted by the student who will prepare the report based on the following steps:

a. Selection of a research topic
b. Write Research Proposal/ Abstract/ Synopsis
c. Introduction to the topic
d. Formulate the research problem
e. Significance of the study
f. Set the objectives and hypothesis of the research
g. Review of literature
h. Application of methods and tools for data collection
i. Data tabulation and analysis
j. Write a research report and draw a conclusion on the research conducted
k. Write bibliography and references according to APA style format

Internal Assessment: Student should be evaluated on the basis of media research report prepared by him/her after conducting the assigned project as mentioned above. An internal faculty will be assigned as research guide by the Director/ principal of the institute/college for each student. The marks prescribed for internal evaluation are 40.

FIFTH SEMESTER

EVENT MANAGEMENT LAB

COURSE CODE: BA (JMC) 355	L: 0	T/P: 2	CREDITS: 2
External Evaluation: 60 Marks	Internal Evaluation: 40 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- prepare a Gantt chart on organizing event
- demonstrate proficiency of skills to conceptualise, organize and evaluate an event

Exercises/Assignments

1. Conceptualize, Organize and Evaluate an event as per the following steps:
   a. Conduct and analyze pre-event survey
   b. Prepare event brief
   c. Prepare a Gantt chart to organizing event.
   d. Prepare checklist for the event
   e. Prepare a budget estimate for the event
   f. Write a proposal for potential sponsors for the event
   g. Design creative's and collaterals
   h. Prepare an event floor plan/ event design and layout
   i. Develop event crisis/ risk management plan
   j. Prepare a monitoring plan and questionnaire for final evaluation
   k. File final report about the event along with multi-media Presentation

Internal Assessment :The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40

FIFTH SEMESTER

FUNCTIONAL EXPOSURE

REPORT

COURSE CODE: BA (JMC) 357	**L: 0**	**T/P: 0**	**CREDITS: 4**
External Evaluation: 50 Marks	**Internal Evaluation: 50 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- apply classroom learning for practical work experience in the industry
- develop professional skills, explore career options and network with potential employers
- demonstrate proficiency of skills in their field of interest in Media and Entertainment industry

Soon after the Fourth Semester End Term Examination, each student will undergo a Functional Exposure Training for a period of four weeks in Radio/ Television/Advertising /Public Relations/New Media/NGO and submit a Functional Exposure Report [FER] along with the multi-media presentation on actual experiential learning. The hard and soft copy of the FER (in duplicate) along with a copy of the multi-media presentation is to be submitted at least four weeks before the commencement of End Term Examination of the Fifth Semester.

The Functional Exposure Report [FER] carries 100 marks. These reports will be evaluated out of 50 marks each by a Board of Examiners comprising Director/Principal or his/her nominee and one External Examiner to be appointed by the Competent Authority.

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ELECTIVE

COURSEFIFTH

SEMESTER

DIGITAL MEDIA MARKETING

COURSE CODE: BA (JMC) 307	**L: 4**	**T/P: 0**	**CREDITS: 4**
External Evaluation: 75 Marks	**Internal Evaluation: 25 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- describe the concept of social media marketing for online communication
- explain the concept of social business
- utilise knowledge gained to create and maintain social networking platforms for business

Unit I: [Social Media] **L: 12**

1. Social Media & Social Network: Brief history, Meaning and definition
2. Features of Social Media and Social Network
3. Types of Social Networking Sites
4. Social Media & Issues
5. Social Consumers and Social Influencers

Unit II: [Branding on Digital Media] **L: 12**

1. Audience Research and Engagement in Glocal environment
2. Building Brand on Digital Media
3. Storytelling and User Generated Content on Digital Media Network
4. SEO, SEM, Keywords, Viral Marketing, E-mail Marketing and ZMOT

Unit III: [Online Entrepreneurship] **L: 12**

1. E-Commerce & Start-ups: Ideation, Plan and Management
2. Lead Generation and Personal Branding
3. Building a Multi-platform Social Media Marketing Strategy
4. Mobile Apps: M-Commerce and App Monetization

Unit IV: [Social Media Measurement and Metrics] **L: 12**

1. Data Mining for Digital Media: Google Analytics, Website Audience Measurement (WAM)
2. Monetizing Social Media: ROI
3. Role of Social Media in Marketing Research
4. Case Studies on Digital Media Marketing: Digital India, Make in India, Skill India, Start up India, Stand up India

Suggested Readings & E-resources:

1. Barker, M. S., Barker, D., Bormann, N. F., & Neher, K. (2013). Social Media Marketing: A Strategic Approach. Mason, OH: South-Western Cengage Learning.
2. Charlesworth, A. (2014). An introduction to social media marketing. London: Routledge.
3. Parkin, G. (2009). Digital Marketing: Strategies for Online Success. London: New Holland.

4. Qualman, E. (2009). Socialnomics: How Social Media Transforms the way we Live and do Business. Hoboken, New Jersey's:: Wiley.
5. Singh, S., & Diamond, S. (2012). Social Media Marketing for Dummies. Hoboken, New Jersey's: Wiley.

ELECTIVE COURSE

FIFTH SEMESTER

FILM

APPRECIATION

COURSE CODE: BA (JMC) 309	**L: 4**	**T/P: 0**	**CREDITS: 4**
External Evaluation: 75 Marks	**Internal Evaluation: 25 Marks**		**Total Marks: 100**

Objective of the Course

On completion of this course, the student should be able to:

- describe film as a medium of communication
- describe the evolution of World Cinema
- explain the emerging trends in contemporary Indian cinema
- utilize knowledge gained to appreciate and review a film

Unit I: [Film as a Language] **L: 12**

1. Film as a Medium of Communication: Concept, Strengths & Limitations
2. Components of Film: Script, Light, Sound, Camera, Acting, Music, Editing
3. Visual Language: Shot, Scene, Sequence, Montage, Mise-En-Scene and Continuity

Unit II: [Landmarks in Cinema] **L: 12**

1. Various Movements in Cinema: Expressionism, Italian Neo Realism and French New Wave
2. Milestones and landmarks in World Cinema :Alfred Hitchcock, Dziga Vertov, Vittorio De Sica, Akira Kurosawa and Satyajit Ray
3. Landmarks of Indian Cinema: Silent Era (*Raja Harishchandra*), Socials (*Mother India*), Parallel Cinema (*Ankur*), Diaspora (*Namesake*)

Unit III: [Trends and Debates in Indian Cinema] **L: 12**

1. Emerging Trends in Contemporary Indian Cinema: Computer Generated Imagery (CGI), Crossover and Experimental Cinema
2. Censorship: Need and CBFC standards
3. An Overview of Contemporary Indian Film Industry: Multiplex culture, Piracy and Statistics

Unit IV: [Film Appreciation] **L: 12**

1. Film Appreciation: concept, need, elements and Cinematic Language
2. Film Review: Critical Appreciation of Cinema as a text, Discourse and Narrative
3. Job Profile and Responsibilities of a Film Reviewer

Suggested Readings:

1. J., Saldi, R., &Manjula, S. (New Delhi). Indian Cinema through the Century.
2. Gazetas, A. (2000). An Introduction to World Cinema. Jefferson, NC: McFarland

3. Garga, B.D. (2008). So Many Cinemas: The Motion Picture in India, Eminence Designs.
4. Nowell-Smith, G. (1995). The Oxford History of World Cinema. Oxford: Clarendon Press
5. Phillips, L. R., & Phillips, J. M. (1979). Film Appreciation. New York: Gordon Press.

ELECTIVE

COURSEFIFTH

SEMESTER

DIGITAL MEDIA MARKETING LAB

COURSE CODE: BA (JMC) 359	**L: 0**	**T/P: 4**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- design and develop blog
- demonstrate proficiency of skills in use of digital media effectively

Exercises/Assignments

1. Create and maintain promotional or corporate blog for an organisation/product
2. Create an account on at least 5 social media platforms and promote your blog/vlog on any social media platforms
3. Create a multi-media presentation on Social Media Marketing Strategy for promotion of corporate blog for anorganisation/product

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

ELECTIVE

COURSEFIFTH

SEMESTER

FILM APPRECIATION LAB

COURSE CODE: BA (JMC) 361	**L: 0**	**T/P: 2**	**CREDITS: 2**
External Evaluation: 60 Marks	**Internal Evaluation: 40 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- demonstrate proficiency of skills in reviewing films for different media

Exercises/Assignments

1. Film Screening and critical analysis of the following films:*

    a. *Pather Panchali*: Realism in Bengali Cinema
    b. Bicycle Thieves/ Rashomon: Italian Neo-Realism and Post War Japan
    c. Harishchandrachi Factory/ *Maqbool*: evolution of Indian Cinema and cinematic adaptation
    d. Vertigo/ Gone with the Wind: Understanding the Classical Narrative structure
    e. *Pyaasa/Kaagaz Ke Phool*: A study in Social/ progressive Realism
    f. *Jaane Bhi Do Yaaron/ Garam Hawa*: Parallel Cinema
    g. *Man with the Movie Camera*: DzigaVertov

    *The list is only indicative; the teacher can add to the list for the purpose of assignments.

2. Written assignments: film reviews, script writing, screenplay etc.
3. Write/ record/ shoot review any recently released film and upload it on an online platform

Internal Assessment: The student should maintain a file and soft copy of her/his assignments/jobs duly checked and signed by the concerned faculty. The marks assigned for internal evaluation are 40.

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SIXTH SEMESTER

MEDIA MANAGEMENT AND ENTERPRENEURSHIP

COURSE CODE: BA (JMC) 302	**L: 4**	**T/P: 0**	**CREDITS: 4**
External Evaluation: 75 Marks	**Internal Evaluation: 25 Marks**		**Total Marks: 100**

Objectives of the Course

On completion of this course, the student should be able to:

- describe the principles and functions of management
- describe leadership styles and behavioral patterns
- describe the structure and functions of media organizations
- explain the importance of revenue generation for media organization in print, radio, TV & online

Unit I: [Media Organisation - Structure and Functions] **L: 12**

1. Media Organisation: Meaning, Structure and Importance
2. Ownership Patterns of Media Organisations
3. Cross Media Ownership and Conglomerates: Case Studies of Times Group and Reliance Communication
4. FDI in Indian Media and Entertainment Industry

Unit II: [Management - Functions and Principles] **L: 12**

1. Management: Definition, Need and Principles
2. Management Functions: Planning, Organizing, Directing, Staffing, Controlling and Coordination
3. Management: Responsibility, Authority and Accountability
4. Leadership: Importance, Needs and Types

Unit III: [Managing Media Organisations and Start Ups] **L: 12**

1. Establishing a Media Organization or Start Up: Steps Involved
2. Human Resource Management: Roles and Responsibilities
3. Methods of Revenue Generation by Media Organizations and Start Ups
4. Managing Cost and Revenue Relationship

Unit IV: [Media Marketing and Entrepreneurship] **L: 12**

1. Marketing Media Products
2. Media Business: Innovation and Entrepreneurship
3. Media Entrepreneurship and its Challenges
4. Emerging Trends in Entertainment and Media Industry

Suggested Readings & E-resources:

1. Albarran, A. B., Chan-Olmsted, S. M., & Wirth, M. O. (2006). Handbook of Media Management and Economics. Mahwah, NJ: L. Erlbaum Associates.
2. Alexander, A. (2004). Media Economics: Theory and Practice. Mahwah, NJ: Lawrence Erlbaum.
3. Doyle, G. (2011). Understanding Media Economics. London: Sage Publication
4. Herrick, D. F. (2003). Media Management in the age of Giants: Business Dynamics of Journalism. Ames: Iowa State Press.

5. Kotler, P. (2003). Marketing Management. Upper Saddle River, New Jersey's: Prentice Hall.
6. Mass Media in India 1994-95. (1995). New Delhi: Publications Division, Ministry of Information and Broadcasting, Government of India
7. www.media-studies.ca/articles/resonance and the global village
8. www.studentpulse.com/articles/61/understanding-the-implications-of-a-global-village
9. www.un-documents.net/macbride-report
10. www.media-alliance.org/article/many voices, one world

SIXTH SEMESTER

GLOBAL MEDIA: AN OVERVIEW

COURSE CODE: BA (JMC) 304	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- describe the global communication system post World War II
- explain the changing trends in global information flow
- utilize knowledge gained to analyse major media concerns for India

Unit I: [Global Communication: Struggle for Balance of Information Flow] **L: 12**

1. Global Communication: North-South Divide
2. Domination of Transnational News Agencies: BBC, AP, AFP, Reuters, ITTAR-TASS & UPI
3. Barriers to the flow of News and Information
4. MacBride Commission: Recommendations for NWICO

Unit II: [Global Communication Giants] **L: 12**

1. Media Imperialism & Localisation of Global Media
2. International Multimedia Giants: NEWSCORP, DISNEY, AOL-TIMEWARNER, VIACOM, Star Network
3. Global Television and Cultural Imperialism: CNN and MTV
4. International Practices on Visual Coverage and Regulations in Media Exchange

Unit III: [Indian Media] **L: 12**

1. News Agencies: PTI, UNI, IANS, ANI, Hindustan Samachar
2. Government & Private Sector Media Conglomerates
3. Entertainment: Local, Global and Hybrid
4. Global Satellite System: Cable & Satellite TV (C&S), Direct-To- Home (DTH), Internet Protocol TV (IPTV) CAS

Unit IV: [Global Media & Market Forces] **L: 12**

1. Reporting International Issues and Conflicts
2. Media Conglomerates and Monopolies
3. Democratizing Communication; Vertical to Horizontal Communication through Internet Journalism
4. Global Challenges in the New Information Age

Suggested Readings:

1. Artz, L., &Kamalipour, Y. R. (2003). The Globalization of Corporate Media Hegemony. Albany: State University of New York Press.
2. Herman, E. S., &McChesney, R. W. (1997). The Global Media: The New Missionaries of Corporate Capitalism. London: Cassell.
3. Merrill, J. C., & S., D. B. (2003). Global Journalism: Topical issues and Media Systems. Stellenbosch: US Printers.
4. P. Ghosh (2013). International Relation, PHI Learning Pvt Limited

SIXTH SEMESTER

ENVIRONMENT

COMMUNICATION

COURSE CODE: BA (JMC) 306	L: 4	T/P: 0	CREDITS: 4
External Evaluation: 75 Marks	Internal Evaluation: 25 Marks		Total Marks: 100

Objectives of the Course

On completion of this course, the student should be able to:

- understand development as an issue of Man v/s Nature and man as part of nature
- describe the concept, scope and importance of environment and Environment Communication
- describe the concept, structure and functions of Ecosystem
- describe causes, effects and control measures for Environmental Disasters
- utilize knowledge gained to conserve natural resources for human welfare

Unit I: [Environment and Media] **L: 12**

1. Environment: Definition, Scope and Importance
2. Environment Communication: Definition, Concept and Need for Public Awareness
3. Natural Resources: Associated Problems and Law (Forest, Water, Mineral, Food, Energy and Land Resources)
4. Role of Individual and Media in Conservation of Natural Resources

Unit II: [Ecosystem and Media] **L: 12**

1. Ecosystem: Concept, Structure and Functions
2. Ecological Succession: Types and Stages
3. Biodiversity: Definition and Concept
   a. Threats to Biodiversity (Global, National & Local): Habitat Loss, Poaching of Wildlife, Man-wildlife conflicts
   b. Endangered and Endemic Species of India
4. Role of Multi- Media in Sensitising Masses towards Ecosystem

Unit III: [Environmental Disaster and Media] **L: 12**

1. Environmental pollution: Definition, Causes, Effects and Control Measures of Air, Water, Soil, Marine,Noise, Thermal Pollution and Nuclear hazards
2. Role of Govt. (NEMA, National Green Tribunal) and NGOs in Protecting Environment
3. Disaster Management: Concept, Need and Importance; Role of NDMA
4. Media Intervention in Disaster Management

Unit IV: [Environment and Human Welfare] **L: 12**

1. Industrialisation, Consumerism and Development
2. Global Warming and Climate Change: Shift to Alternate Sources of Energy
3. Environment and Social Movements: Chipko Movement, *Narmada Bachao Andolan*
4. Media, Environment and Human Welfare

Suggested Readings:

1. Joshi, P. C., Joshi, P. C., & Joshi, N. (2009). A Text Book of Environmental Science. New Delhi: APH Pub.
2. Kaushik, A., & Kaushik, C. P. (2008). Perspectives in Environmental Studies. New Delhi: New Age International (P).
3. Parker, L. J. (2005). Environment Communication: Message, Media &Methods: A handbook for Advocates andOrganizations. Dubuque, IA: Kendall/Hunt Publication.

4. Rajagopalan, R. (2011). Environmental Studies: from Crisis to Cure. Oxford: Oxford University Press.

SIXTH SEMESTER

FINAL PROJECT AND COMPREHENSIVE VIVA

COURSE CODE: BA (JMC) 352	**L: 0**	**T/P: 0**	**CREDITS: 16**
External Evaluation: 50 Marks	**Internal Evaluation: 50 Marks**		**Total Marks: 100**

Each student will be assigned the Final Project at the end of the Fifth Semester. The Final Project will be pursued by her/him under the supervision of internal supervisor(s) in the Sixth Semester. Each student will make his/her final project on any one of the disciplines, i.e., Print Media/ Electronic Media (Radio & TV)/ New Media/ Integrated Marketing (Ad, PR & Event)/ Research on the subject/theme approved by the Director/ Principal of the Institute/HoD in the Fifth Semester. The Project Report (in duplicate) both hard & soft copy along with the end product will be submitted by the student at least four weeks prior to the date of commencement of the End-Term Examination of the Sixth Semester. The student will present her/his final product along with a multi-media presentation. The Comprehensive Viva Voce based on the courses of the entire programme and future projections of Media and Entertainment industry. It will be conducted by a Board of Examiners comprising of the Director/Principal or his/her nominee and two External Experts, out of which one should preferably be from the Corporate World i.e. Media Organization operating in the country. The quorum shall be deemed to have met if 2 out of 3 members are present.

The Project Report, final product and comprehensive viva carries100 marks, which will be evaluated by External and Internal Examiners separately for50 marks each. The External Examiner will be appointed by the Competent Authority.

SCHEME FOR (B.A HISTORY)

B.A HISTORY			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BHIS-101	History of Ancient India 1000 AD	√	√		04
2	BHIS-102	History of Medieval India from 1000-1707 A. D	√	√		04
3	BHIS-103	Contemporary India	√	√		04
4	BHIS-104	Foundation Course in English	√	√		04
		Total				**16**

SCHEME FOR (B.A HISTORY)

B.A HISTORY			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BHIS-201	Indian History from 1700 up to 1857 A.D	√	√		04
2	BHIS-202	History of Europe from 1789 to 1848 A. D	√	√		04
3	BHIS-203	Indian Government and Politics	√	√		04
4	BHIS-204	Foundation Course in Hindi	√	√		04
		Total				**16**

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SCHEME FOR (B.A HISTORY)

B.A HISTORY			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BHIS-301	History of Indian Freedom Movement	√	√		04
2	BHIS-302	Modern World: Late 18th Century to the 20th Century	√	√		04
3	BHIS-303	Public Administration	√	√		04
4	BHIS-304	Environment Studies	√	√		04
		Total				16

SCHEME FOR (B.A HISTORY)

B.A HISTORY			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BHIS-401	Social and Economic History of Medieval India	√	√		04
2	BHIS-402	Society and Culture in Medieval India	√	√		04
3	BHIS-403	Human rights in comparative perspective	√	√		04
4	BHIS-404	Foundation Course in IT	√	√		04
		Total				16

SCHEME FOR (B.A HISTORY)

B.A HISTORY			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BHIS-501	Social, Economic and Cultural History of Colonial India	√	√		04
2	BHIS-502	Gender History in India	√	√		04
3	BHIS-503	Understanding Ambedkar	√	√		04
4	BHIS-504	Digital Literacy and Account Literacy	√	√		04
		Total				16

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SCHEME FOR (B.A HISTORY)

B.A HISTORY			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BHIS-601	Contemporary World	√	√		04
2	BHIS-602	Gandhi and the Contemporary World	√	√		04
3	BHIS-603	Sociological Thinkers I	√	√		04
4	BHIS-604	Project Based on History	√	√		04
		Total				**16**

HISTORY OF ANCIENT INDIA 1000 A.D.

UNIT -1 Evidences of Ancient Indian History:, Literature, Archaeology, Epigraphy, Numismatics, Foreign Travellers Account Physical Features: Physical Features of India and their Influence on the Indian History. The Pre-Historic Cultures: Palaeolithic, Mesolithic, Neolithic, Chalcolithic.

UNIT -2 Indus Valley Civilization: Extent, Chronology, Origin, Society, Religion and Causes of Decline, The Vedic Age: Original Homelands, The Aryans, Political, Social, Religious and Economic Life, Difference and Similarities between Indus Civilization and Vedic Culture., The Later-Vedic Age: Political, Social, Religious and Economic Life.

UNIT -3 The Maury's: Chandragupta, Bindusara, Ashoka (Ashoka Dhamm: its Nature and Propagation), Successors of Ashoka., The Golden Period: Gupta and theirSuccessors (to C.750 A.D.): Changes in Political. Organization of Empire, Economy and Society, Literature and Sciences, Arts. Samuragupta 'The IndianNapoleon': Extent of the Empire, Battles and Administration, Disintegration of the Gupta Empire.

UNIT -4 Religious Movements: Jainism and Buddhism Vardhamana Mahavira's and Gautama Buddha's Contribution. Causes of Decline of Jainism, Factors for thespread of Buddhism, Stupa Architecture, Buddhist Customs and Manners.

UNIT -5 Bhagvatism, Shaivism and Brahmanism: Main Characterstics, important Leaders, Extent in India.State Formation and Urbanization: Urbanization, Society, Political History, Mahajanapadas, Monarchies and Republics, Administration in Monarchies.

HISTORY OF MEDIEVAL INDIA 1000-1707 A.D.

UNIT -1 Rise of Islam: Sources, Rise of Islam, Arab Conquest of Sindh: Condition on the Eve of Arab Conquest, Arab Conquest, and Administration. India on the Eve of Muslim Conquest: Multan, Hindushahi Kingdom, Kashmir, Kanauj, Chandelas, Chauhans, Chalukyas.

UNIT -2 Rise and Fall of Ghaznavides: Alaptgin, Subuktgin, Mahud, Expeditions and Estimate, Muhammad Ghori, Early Carrer, Battles, Estimate, Causes of Muslim Success and Rajput Failure. The Salve Dynasty: Qutub-din-Aibak, Iltutmish, Balban, The Khalji Dynasty: Jalal-ud-din, Ala-ud-din, The TughlagsDynasty: Consolidation by Ghias-ud-din, Innovation of Muhammd Tughlag, Administrative Reforms of Firoz Tughlag and the Decline of Delhi Sultanate.

UNIT -3 The Lodi Dynasty: Sikander Lodhi, Bahlol Lodhi, Indrahim Lodhi and the First Battle of Panipat. The Mughal Empire: Establishment and Consolidation under Babur, Humayun. Akbar The Great: Early Life and Conquests of Akbar,Din-i-Illahi, Bairam Khan, Aurangzeb (1658-1707).

UNIT -4 Vijaynagar Empire: Martial Character of the State, Features of Nayak System, Role of Brahmins & Temples.

UNIT -5 The Marathas: Shivaji (1647-80) Maradha Administration Under the Peshawas, Chauth and Sardeshmukhi.

CONTEMPORARY INDIA

UNIT -1 INDIAN HISTORY & CULTURE, Socio-cultural Configuration of Contemporary India: Unity, Diversity, Multi-Culturalism Art, Culture& Politics: Contemporary Issues and Debates, Scientific Temper: Concept, Relevance and Practice, Indian Freedom Movement (1857-1947) Landmarks.

UNIT -2 INDIAN POLITY, Indian Constitution: Preamble; Fundamental Rights and Duties; Directive Principles., Federalism: Centre and State Relations, Presidential System and Parliamentary Democracy General Elections and Electoral Reforms, National and State Political Parties in India.

UNIT -3 INDIAN ECONOMY, The Nature and Ideological Contours of Indian Economy, Five Year Plans, Mixed Economy, Liberalization, Privatization and Globalization (FDI, BPOs and KPOs), Current Five Year Plan and New Economic Initiatives

UNIT -4 SOCIAL MOVEMENTS & ACTIVISM, Marginalization, Socio-Economic Equality and Reservation, Women Safety, Gender Equality and Activism,Public Health, Hygiene & Sanitation: Swachh Bharat Abhiyaan, Judicial Activism

FOUNDATION COURSE IN ENGLISH

UNIT -1 Comprehension and vocabulary, Question based on content from the prescribed text Question based on a passage from the prescribed text to test thecandidate's comprehension and vocabulary, Question based on an unseen passage to test the candidate's comprehension and vocabulary, (There will be atext of essays and short stories between 100 and 150 words length.)

UNIT -2 Composition, Letter/Application writing, Paragraph writing/précis writing, Report Writing

UNIT -3 Translation, This exercise will require candidates to render into English ten simple sentences in Hindi. At least 15 sentences will be set.

UNIT -4 Grammar and Usage, Elements of a sentence, Transformation of Sentences including Active and Passive Voice, Models, Tense Usage, Determiners, Common English Errors, Phrasal Verbs, Idioms.

UNIT -5 Phrasal Verbs, Break: Break away, break down, break off, and break up. Bring: Bring about, bring in, bring up, and bring down, Come: Come by, comeacross, come upon, Carry: Carry out, carry on, carry off, and carry over, Call: Call on, Call off, Call at, Get: Get along, Get away with, Get by, Get though, and Get over, Give: Give up, Give away with, Give in. up, hard of hearing, hard nut to crack, hard to please, Look: Look after, Look into, and Look forward to, And Look Up To. Put: Put out, Put off, Put up, and Put up with. Run: Run after, Run down, and Run over, And Run Out Of. Take: Takeafter, Take up, and Take to.

IDIOMS To be born with a silver spoon in one's mouth, to be at daggers drawn. To beat sea, To be in the dark, To be in hot water, To be on the run, To be out of thewoods, To be under someone's thumb, To break the ice, To break freshground, To make a mountain out of a molehill, To put a spoke in someone's well, To put two and two together, To turn a deaf ear, To turn a new leaf, To turn the tables (On someone), to blow one's own trumpet, To burn the candleat both ends, To curry favor, To cut one's coat according to one's cloth To fill in troubled waters, To hit the nail on the head, To kill two birds without stone, To know where the shoe pinches, To let the cat out of the bench. Something inthe bud. To smell a rat, to wash one's hands of something.

INDIAN HISTORY FROM 1700 UP TO 1857 A.D

UNIT -1 Consolidation of Mughal rule under Akbar: Campaigns and conquests: tactics and technology, Evolution of administrative institutions: zabt, mansab, jagir, madad-i-maash, Revolts and resistance, Expansion and Integration:Incorporation of Rajput's and other indigenous groups in Mughal, Nobility, North-West frontier, Gujarat and the Deccan, Conquest of Bengal

UNIT -2 Rural Society and Economy: Land rights and revenue system; Zamindars and peasants; rural Tensions, Extension of agriculture; agricultural production;crop patterns, Trade routes and patterns of internal commerce; overseas trade; rise of Surat, Political and religious ideals:

UNIT -3 Inclusive political ideas: theory and practice, Religious tolerance and sulh-i- kul; Sufi mystical and intellectual interventions, Pressure from the ulama

UNIT -4 India in the mid-18th Century; Society, Economy, Polity, Expansion and Consolidation of colonial Power: Mercantilism, foreign trade and early forms of exactions from Bengal. Dynamics of expansion, with special reference to Bengal, Mysore, Western India, Awadh, Punjab, and Sindh.

UNIT -5 Colonial State and Ideology: Arms of the colonial state: army, police, law. Ideologies of the Raj and racial attitudes. Popular Resistance: [a] Santhal uprising (185-7); Indigo rebellion (1860); Pabna agrarian Leagues (1873); Deccan riots (1875). [b] Uprising of 1857.

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HISTORY OF EUROPE FROM 1789 TO 1848 A.D.

UNIT -1 **Europe before 1789; an introduction; -Role of Philosophers in Frenchrevolution:** Social, Political & economic conditions before revolution. Contribution of Philosophers in French revolution (a) Charles de second at Montesquieu (b) Francois Marie Aroused Voltaire (c) Jean Jacques Rousseau- Causes of French revolution, of the Declaration of Rights of men and of citizens by the National Legislative Assembly of 1791. War between Austria & France in 1792-its causes & events (or course) of he wars, 1792- chief events happened in France during his dictatorship, **National Convention (Sept, 1792 to Oct 1795)**: Its achievements-the reign of terror established in France & its consequences.

UNIT -2 **Political groups:** Girondists , Jacobins – their achievements & causes of downfall, Foreign policy of Napoleon from the time of his becoming the Emperor to the time when the Treaty of Tilsit was made-Circumstances which led to the Treaty of Tilsit and its provisions-continental system of Napoleon & reasons of its failure, The Spanish ulcer & the Russian adventure ruinedNapoleon**,** Role of Pitt-the-younger in tackling the situation arising out of the Revolution, **Settlement of Vienna:** Territorial adjustment effected by the congress: The various decisions taken at the Vienna congress in 1815. The congress of Vienna made mistakes both of commission and omission, importance of Vienna congress.

UNIT -3 **The concert of Europe:** its aims and plans- Holy alliance and its significance, quadruple Alliance-its objects, provisions & significance, **Ruling period of Metternich (1815 to 1848):** Metternich, the high priest of conservation and apostle of the forces of darkness, Home and Foreign policyof Metternich, Downfall of Metternich & its causes, **Again, revolution in France and Europe:** Revolution of 1830- Causes and results, **Effect of the revolution of 1830 of France on the different countries of Europe-** Its importance in the history of Europe. (a) Belgium and revolution (b) Polland and Revolution (c) Italy and Revolution (d) Switzerland and Revolution, etc.

UNIT -4 **Policy of "Golden mean" adopted by Louis Phillipe- reasons of failure tosatisfy the French,** Home and Foreign Policies of Louis Phillipe – his Problems, French Revolution of 1848: causes and results, The effects of the French Revolution of 1848 on Europe: Revolution in Austria (b) Revolution inHungry (c) Revolution in bohemia (d) Revolution in Italy (e) Revolution in Rome (f) Revolution in Prasha (g) Revolution in Germany with other states (h)Revolution in Switzerland Holland & Denmark (i) Revolution in England and Ireland.

INDIAN GOVERNMENT AND POLITICS

UNIT -1 Nature of Indian State: - Nature of the Colonial State, India —A Liberal- Democratic State, India —A Liberal-Socialist State, India—A Welfare State, Nature of Indian State — the Marxist View.

UNIT -2 Philosophy of Indian Constitution: - The Roots of the constituent Assembly of India, Parties in the constituent Assembly, work and Status, Essential Features, Federalism, Significance of a written constitution, Preamble to a constitution, Citizenship and Rights in the Indian Constitution.

UNIT -3 Institutional Framework: - Parliamentary System in India, Union Legislature, The Presiding Officers, Parliamentary Devices to Control theExecutive, President of India, The Prime Minister of India, Judiciary, The supreme Court, Jurisdiction of the supreme Court, The High Court.

UNIT -4 Party System in India: - Development of Party System in India, National and Regional Party System in India.

UNIT -5 Election and Participation: - Election in India, Election Commission in India, Election Programme Conduct in India.

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इकाई–1 भाषा की परिभाषा, आधार, विशेषताएँ एवं प्रकृति, सामान्य विशेषताएँ, ब्राह्मी लिपि की विशेषताएँ, देवनागरी लिपि की विशेषताएँ, लिपि के दोष, लिपि में सुधार के प्रयत्न, निष्कर्ष, मातृभाषा शिक्षा के उद्देश्य, विभिन्न स्तरों पर मातृभाषा शिक्षा के उद्देश्य, मातृभाषा शिक्षा के सामान्य सिद्धान्त, पाठ्यक्रम में स्थान

इकाई–2 कविता से अभिप्राय, रसात्मकता, काव्य विभाजन, उद्देश्य, काव्य पाठन की प्रणालियाँ, कहानी की परिभाषा, चुनाव, उद्देश्य, द्वन्द्व एवं संघर्ष, महत्त्व, शुद्ध उच्चारण से आशय, महत्त्व, सामान्य अशुद्धियाँ, अशुद्ध उच्चारण के कारण, सुधार हेतु सुझाव, सम्बन्धी कुछ नियम, वर्तनी सम्बन्धी अशुद्धियाँ, अर्थ, शुद्ध वर्तनी की आवश्यकता एवं महत्त्व, वर्तनी शिक्षा के उद्देश्य, वर्तनी अशुद्ध के प्रकार, व्याकरण का अर्थ एवं परिभाषा, विशेषताएँ, आवश्यकता , उद्देश्य, प्रकार, विधियाँ या प्रणालियाँ, स्वर परिचय, वयन्जन, हिन्दी व्यंजनों का वर्गीकरण, अक्षर, अक्षर विीाजन का स्वरूप, वलाघात, बलाघात और संगम, कुछ सामान्य अशुद्धियाँ

इकाई–3 गद्य, गद्य शिक्षण के सामान्य उद्देश्य, मुख्य उद्देश्य, पाठ, स्थूल एवं सूक्ष्म अध्ययन, गद्य के विषय तथा गद्य संकलन की विशेषतायें, महत्त्व, राजभाषा का इतिहास, सांविधानिक स्थिति, राजभाषा के प्रयोग की प्रगति, हिन्दी का भविष्यँ,, उत्त्पति का आधार, गठन का आधार, प्रयोग–क्षेत्र का आधार, रूप या प्रयोग का आधार, द्विवेदी युग का विशेष योगदान, स्वतंत्रता प्राप्ति से तुरन्त पूर्ण का युग, स्वतंत्रतोपरांत, वर्तनी का मानकीकरण, शब्दावली का मानकीकरण, व्याकरण

इकाई–4 सामान्य परिचय, मुहावरा, काक्यांश, लोकोक्तियाँ, अनेक शब्दों के स्थान पर एक शब्द का प्रयोग, विलोम शब्द,

इकाई–5 वर्तनी–विचार, सामान्य विचार, तत्सम और तद्भव शब्द, रचना एवं रचनाकार, कवियों की उक्तियाँ, अलंकार

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

HISTORY OF INDIAN FREEDOM MOVEMENT

UNIT -1 Changes in the British colonial policy under the Crown, Movements of reforms and revival among Hindus, Muslims and Sikhs, Concepts of Nation and Nationalism: an historical survey.

UNIT -2 Early political bodies and their programmes, Birth of the Indian National Congress: current debates, Early Nationalist Politics: moderates, extremists and revolutionaries

UNIT -3 Genesis and growth of communal sentiments, Swadeshi Movement in Bengal, The advent of mass politics: Gandhian movements, 1917-1942.

UNIT -4 Peasant's Movements, Worker's movements, Tribal Movements

UNIT -5 Left and socialist parties, Events leading to Independence and Partition

MODERN WORLD: LATE 18TH CENTURY TO THE 20TH CENTURY

UNIT -1 Emergence of philosophy of Enlightenment and its differing impact onEuropean society, Emergence of bourgeoisie and the French Revolution of 1789, the rise of Napoleon and the making of Napoleonic Empire;

UNIT -2 Unification of Italy and Germany, Paris Peace Treaty, First World War, League of Nations, Rise of Nazism in Germany, Growth of Fascism in Italy, Second World War, UNO

UNIT -3 Nationalism and nationalist movements in non-European societies and its impact on the changing social order; Russian Revolution and the Making ofthe Socialist state in USSR under Lenin and Stalin;

UNIT -4 Republican Revolution, May Fourth movement, Communist Revolution in China, Economic liberalisation and the Communist regime in the post-Mao era;

UNIT -5 The Cold War and the international political Climate; The emergence of dictatorship, democracy and apartheid in Asia and Latin America and Africa; The Non-aligned movement; Collapse of the Soviet Union and emergence of the Uni-polar world.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

PUBLIC ADMINISTRATION

UNIT -1 Public Administration: Meaning, Nature, Scope and Significance, Evolution of Public Administration: Different phases including New Public Administration, New Public Management, New Public Service, Good Governance. Relationship of Public Administration with Political Science,Law, Economics, Sociology and Psychology

UNIT -2 Basic concepts and principles of Public Administration: Introduction, Organization, hierarchy, Unity of command, Span of control

UNIT -3 Authority and Responsibility, Coordination, Centralization and Decentralization, Delegation, Supervision, Line and Staff

UNIT -4 Public Policy: Policy Formulation and Policy Implementation, Feminist Approach: Understanding Gender in Administration, State of Administrative Theory in 21st Century

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

ENVIRONMENT STUDIES

UNIT -1 Introduction to Environment Basic Concept and Nature of Environment, Meaning, scope and nature of environment. Natural and Man-made Environment. Ecosystem-Structure, function and its components. Energy flow in Ecosystem-Food chains, Food webs and Ecological pyramids.

UNIT -2 Natural Resources: Renewable and Non-renewable Resources Natural Recourses and Associated Problems Forest Recourses – use and overexploitation. Deforestation-cause effects and remedy Water Recourses, Mineral Resources, Food Resources Energy Resources

UNIT -3 Biodiversity and Conservation Meaning and values of Biodiversity, India asa Mega diversity Nation. Threats to Biodiversity-habitat loss, poaching of wildlife, man-wildlife conflicts. Conservation of genetic diversity, an important environment priority learning to live in harmony with nature.

UNIT -4 Environment Issues and Its Preventive Measures Causes and effects of environmental hazard, global and local Environmental pollution. Air, Water, Soil, Marine, Noise, Thermal and Nuclear Pollution. Climate Change- Global Warming, Acid Rain, Ozone layer depletion, Pillar Melting. Natural Disasters-Flood, Earthquake, Cyclone and Landslides.

UNIT -5 Humans Communities & Environment Programmes of Environment education /awareness, Agencies, Environmental Movements : Chipko, Silent Valley , Bishops of Rajasthan Environment Management, Sustainabledevelopment ,Acts /Laws related to Environment Environment Ethics.

SOCIAL AND ECONOMIC HISTORY OF MEDIEVAL INDIA

UNIT -1 Socio-economic consequences of the establishment of the Delhi Sultanate; centralization of power and the Iqta system, currency system; trade: internal and external, system of agrarian taxation and rural classes under the Sultans.

UNIT -2 Structure of rural society; peasants and zamindars, Stratification; ownership in land during the Mughal period.

UNIT -3 Methods of assessment and collection of land revenue under the Mughals, Village community.

UNIT -4 Urbanization and growth of urban towns- Sultanate and the Mughal period, Non-agricultural production and organization of urban production, Impact of European Technology on Indian Technique of production.

UNIT -5 Internal and external trade during the Mughal period, Merchants and brokers; currency system, Potentialities of economic growth in the medieval Indian economy.

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SOCIETY AND CULTURE IN MEDIEVAL INDIA

UNIT -1 Courtly ceremonies and etiquettes under the Sultans, and the Mughals, Architecture and paintings

UNIT -2 Court histories (Kalhana, Barani, Abul Fazl), and bardic literature, Women in Medieval courts and politics

UNIT -3 Medieval Islamic views of India and Hindus, Representations of Muslims in Sanskrit and vernacular literature, Islamic culture in Indian environment, The growth of 'composite culture' religious syncretism, Akbar's world view and Dara Shikoh's synthesis, Sulh-i-Kul and Wahdatul Wujud

UNIT -4 Growth of sufi silsilahs, Sufis and the state, sufi shrines and their socio-political role, Nathpanthi movement; growth of Nirguni monotheistic and Saguni bhakti, bhaktas and the Medieval state, Women bhaktas and the nature of their devotion, Nature of bhakti-sufi Interaction

UNIT -5 Bhakti based regional literary cultures, Malfuz literature and Sufi biographies, Hindavi-sufi romance narratives, Rise and growth of Urdu language

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

HUMAN RIGHTS IN COMPARATIVE PERSPECTIVE

UNIT -1 Human Rights: Theory and Institutionalization, Understanding Human Rights: Three Generations of Rights, Institutionalization: Universal Declaration of Human Rights, Rights in National Constitutions: South Africa and India

UNIT -2 Issues, Torture: USA and India, Surveillance and Censorship: China and India,Terrorism and Insecurity of Minorities: USA and India

UNIT -3 **Structural Violence II :** Caste and Race: South Africa and India,

UNIT-4 **Structural Violence II:** Gender and Violence: India and Pakistan,Adivasis/Aboriginals and, the Land Question: Australia and India.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

FOUNDATION COURSE in IT

UNIT – I Classification, Definitions, Primary Memory, Output Devices, Audio Output Devices (Soft Copy), Hardcopy Devices (print and film), Data Storage, Optical Disks, Removable Hard Drives, Smart Cards, Optical Cards.

UNIT - II Hardware, Motherboard, Machine Language, Assembly Language, High LevelLanguage, Natural Languages, BIOS, Operating System (OS), Transmission Technology, OSI Reference Model, TCP/IP Protocol, Network Topologies, Types of Networks.

UNIT - III Architecture of Computer system, The Control Unit (CU), The Immediate Access Store (IAS), Operations on the file, File Organisation, Relative File, Indexed Files, Data Capture Forms, Data Capture Forms, Verification, Editingand Checking.

UNIT - IV Operating System, Operating System as User Interface, Components of MS- DOS, External Commands, UNIX, EDIT etc., Time Sharing Systems, Multiprogramming, Spooling, Time Sharing, Interactive, Real time system, Distributed.

UNIT - V IP Address, Domain Name Service, Packet Switching, Understanding Potential Threats, Functioning of the WWW, Web page, URL, Using theWWW, Web Browser, Search Techniques, Advance Application: Emergence of Web 2.0.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

CONTEMPORARY WORLD

UNIT -1 Middle East and Arab-Israel Conflict., The collapse of the Soviet Union and socialist regimes in Eastern Europe, Technological and Scientific Advances; Cultures, Literature and Arts.

UNIT -2 Globalization and its discontents; Environment and climate change, Problems of capitalism and new international economic order.

UNIT -3 International organization and international security, Debate on world population.

UNIT -4 Human rights, feminist and other social movements, Communication mediaand their social and cultural contexts.

UNIT -5 Terrorism as global phenomena, Scenario after 9/11, Environmental concernin 21 century, Role of media, human rights.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

GANDHI AND THE CONTEMPORARY WORLD

UNIT -1 Gandhi on Modern Civilization and Ethics of Development, Conception of Modern Civilisation and Alternative Modernity, Critique of Development:Narmada Bachao Andolan

UNIT -2 Gandhian Thought: Theory and Action, Theory of Satyagraha, Satyagraha in Action, Peasant Satyagraha: Kheda and the Idea of Trusteeship Temple Entry and Critique of Caste, Social Harmony: 1947and Communal Unity

UNIT -3 Gandhi's Legacy, Tolerance: Anti - Racism Movements (Anti - Apartheid and Martin Luther King), The Pacifist Movement, Women's Movements *Gandhigiri*: Perceptions in Popular Culture

UNIT -4 Gandhi and the Idea of Political Swaraj Swadeshi

SOCIOLOGICAL THINKERS I

UNIT -1 Karl Marx, Philosophical Foundations of Karl Marx's Work, Use Value and Exchange Value, Social Formation and Capitalist Mode of Production, Class and Class Struggle,

UNIT -2 Emile Durkheim, Philosophical Foundations of Emile Durkheim's Work Social Fact, Individual and the Collective, Normal and Pathological

UNIT -3 Max Weber, Philosophical Foundations of Max Weber's Work, Social Action and Ideal Types, Power and Authority, Religion and Economy

SCHEME FOR (B.A POL.SCIENCE)

(B.A POL.SCIENCE)			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPS-101	Political Theory	√	√		04
2	BPS-102	Political Thought	√	√		04
3	BPS-103	Contemporary India	√	√		04
4	BPS-104	Foundation Course in English	√	√		04
		Total				16

SCHEME FOR B.A. (Hons.) Political Science

B.A. (Hons.) Political Science			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPS-201	Indian Political Thought	√	√		04
2	BPS-202	Indian Government and Politics	√	√		04
3	BPS-203	Sociology of India	√	√		04
4	BPS-204	Foundation Course in Hindi	√	√		04
		Total				16

SCHEME FOR B.A. (Hons.) Political Science

B.A. (Hons.) Political Science			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPS-301	Comparative Government and Politics	√	√		04
2	BPS-302	Public Administration	√	√		04
3	BPS-303	History of Indian Freedom Movement	√	√		04
4	BPS-304	Environment Studies	√	√		04
		Total				**16**

CHEME FOR B.A. (Hons.) Political Science

B.A. (Hons.) Political Science			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPS-401	Indian Foreign Policy	√	√		04
2	BPS-402	Human Rights in Comparative Perspective	√	√		04
3	BPS-403	Social Institution	√	√		04
4	BPS-404	Foundation Course in IT	√	√		04
		Total				**16**

SCHEME FOR B.A. (Hons.) Political Science)

B.A. (Hons.) Political Science			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPS-501	Women Power & Politics	√	√		04
2	BPS-502	Public Opinion and Survey Research	√	√		04
3	BPS-503	Understanding Ambedkar	√	√		04
4	BPS-504	Digital Literacy and Account Literacy	√	√		04
		Total				16

SCHEME FOR B.A. (Hons.) Political Science)

B.A. (Hons.) Political Science			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BPS-601	Peace and Conflict Resolution	√	√		04
2	BPS-602	Gandhi and the Contemporary world	√	√		04
3	BPS-603	Sociological Thinkers I	√	√		04
4	BPS-604	Project Based on Political Science	√	√		04
		Total				16

BPS-101
POLITICAL THEORY

UNIT -1 What is Political Theory, What are its types? Why do you need to study it?

UNIT -2 State and Civil Society, Power, Authority and Legitimacy

UNIT -3 Democracy, Socialism, Nationalism, Globalization **UNIT -4**

Classical Liberalism, Modem Liberalism, Neo Liberalism**UNIT -5**

Marxism, Gandhism

UNIT -6 Justice, Human Rights, Feminist Political Theory

BPS-102
POLITICAL THOUGHT

UNIT -1 Background and Development, Introduction: Approaches and methods, Ancient and Medieval India, Modern India: Renaissance, Raja Ram Mohan Roy and Vankim Chandra Chattarji, Dayanad Saraswati

UNIT -2 Nationalist School of Thought, Gopal Krishan Gokhale, Aurobindo Ghosh, Bhagat Singh, Bal Gangadhar Tilak, M.K. Gandhi, Rabindranath Tagore, Subhash Chandra Bose

UNIT -3 National Builders of Independent India, Jawahar Lal Nehru, M.N. Roy, Jai Prakash Narayan, Ram Manohar Lohiya

UNIT -4 Champions of Social Emancipation, Jyotiba Phule, B.R. Ambedkar, Periyar Ramaswamy Naicker

UNIT -5 Muslim Political Thinkers, Sir Syed Ahmad Khan, Mohammad Iqbal, Maulana Abul Kalam Azad

V

CONTEMPORARY INDIA

UNIT -1 INDIAN HISTORY & CULTURE, Socio-cultural Configuration of Contemporary India: Unity, Diversity, Multi-Culturalism Art, Culture& Politics: Contemporary Issues and Debates, Scientific Temper: Concept, Relevance and Practice, Indian Freedom Movement (1857-1947) Landmarks

UNIT -2 INDIAN POLITY, Indian Constitution: Preamble; Fundamental Rights and Duties; Directive Principles, Federalism: Centre and State Relations, Presidential System and Parliamentary Democracy General Elections and Electoral Reforms, National and State Political Parties in India.

UNIT -3 INDIAN ECONOMY, The Nature and Ideological Contours of Indian Economy, Five Year Plans, Mixed Economy, Liberalisation, Privatisation and Globalisation (FDI, BPOs and KPOs), Current Five Year Plan and New Economic Initiatives

UNIT -4 SOCIAL MOVEMENTS & ACTIVISM, Marginalisation, Socio-Economic Equality and Reservation, Women Safety, Gender Equality and Activism, Public Health, Hygiene & Sanitation: Swachh Bharat Abhiyaan, Judicial Activism

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

FOUNDATION COURSE IN ENGLISH

UNIT -1 Comprehension and vocabulary, Question based on content from the prescribed text , Question based on a passage from the prescribed text to test the candidate's comprehension and vocabulary , Question based on an unseen passage to test the candidate's comprehension and vocabulary,(There will be a text of essays and short stories between 100 and 150 words length.)

UNIT -2 Composition, Letter/Application writing, Paragraph writing/précis writing , Report Writing, **Translation,** This exercise will require candidates to render into English ten simple sentences in Hindi. At least 15 sentences will be set.

UNIT -3 Grammar and Usage, Elements of a sentence, Transformation of Sentences including Active and Passive Voice, Models, Tense Usage, Determiners, Common English Errors, Phrasal Verbs, idioms

UNIT -4 Phrasal Verbs, Break: Break away, break down, break off, break up. **Bring:** Bring about, bring in, bring up, bring down, **Come:** Come by, come across, come upon, **Carry:** Carry out, carry on, carry off, carry over, **Call: C**all on, Call off, Call at, **Get: G**et along, Get away with, Get by, Get though, Get over,**Give :** Give up, Give away with, Give in. up, hard of hearing, hard nut to crack, hard to **please, Look:** Look after, Look into, Look forward to, AndLook Up To. **Put: P**ut out, Put off, put up, Put up with. **Run: R**un after, run down, Run over, Run out of. **Take:** Take after, take up, Take to.

IDIOMS To be born with a silver spoon in one's mouth, to be at daggers drawn. To beat sea, To be in the dark, To be in hot water, To be on the run, To be out of the woods, To be under someone's thumb, To break the ice, To break freshground, To make a mountain out of a molehill, To put a spoke in someone's whell, To put two and two together, To turn a deaf ear, To turn a new leaf, To turn the tables (On someone), to blow one's own trumpet, To burn the candleat both ends, To curry favor, To cut one's coat according to one's cloth To fill in troubled waters, To hit the nail on the head, To kill two birds without stone, To know where the shoe pinches, To let the cat out of the bench. Something in the bud. To smell a rat, To wash one's hands of something.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

INDIAN POLITICAL THOUGHT

UNIT -1 BACKGROUND AND DEVELOPMENT, Introduction: Approaches and methods, Ancient and Medieval India, Modern India: Renaissance, Raja Ram Mohan Roy and Vankim ChandraChattarji, Dayanad Saraswati

UNIT -2 NATIONALIST SCHOOL OF THOUGHT, Gopal Krishan Gokhale, Aurobindo Ghoshii-Bhagat Singh , Bal Gangadhar Tilak, M.K. Gandhi, Rabindranath Tagore, Subhash Chandra Bose

UN IT -3 NATIONAL BUILDERS OF INDEPENDENT INDIA, Jawahar Lal Nehru, M.N. Roy, Jai Prakash Narayan, Ram Manohar Lohiya

UNIT -4 CHAMPIONS OF SOCIAL EMANCIPATION, Jyotiba Phule, B.R. Ambedkarii- Periyar Ramaswamy Naicker

UNIT -5 MUSLIM POLITICAL THINKERS, Sir Syed Ahmad Khan, Mohammad Iqbal, Maulana Abul Kalam Azad

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

INDIAN GOVERNMENT AND POLITICS

UNIT -1 Nature of Indian State: - Nature of the Colonial State, India —A Liberal- Democratic State, India — A Liberal-Socialist State, India—A Welfare State, Nature of Indian State — the Marxist View.

UNIT -2 Philosophy of Indian constitution: - The Roots of the constituent Assembly of India, Parties in the constituent Assembly, work and Status, Essential Features, Federalism, Significance of a written constitution, Preamble to a constitution, Citizenship and Rights in the Indian Constitution.

UNIT -3 Institutional Framework: - Parliamentary System in India, Union Legislature, The Presiding Officers, Parliamentary Devices to Control the Executive, President of India, The Prime Minister of India, Judiciary, The supreme Court, Jurisdiction of the supreme Court, The High Court.

UNIT -4 Party System in India: - Development of Party System in India, National and Regional Party System in India.

UNIT -5 Election and Participation: - Election in India, Election Commission in India, Election Programme Conduct in India.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

SOCIOLOGY OF INDIA

UNIT -1 Indian Society: Approaches to study Indian Society, Features of Indian Society.

UNIT -2 Caste and Class System: Indian Caste System, Social Classes in Rural India, Social Classes in Urban India, Features of Caste System, Tribe Class, Tribe in India.

UNIT -3 Social Identity and Change: Dalit Movements, Gender Based Movements, Tribal and Ethnic Movements.

UNIT -4 State Society and Religion: Communalism, Secularism.

UNIT -5 Social Institution and Change: Family, Marriage and Kinship, Religion in India.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

FOUNDATION COURSE IN HINDI

इकाई–1 भाषा की परिभाषा, आधार, विशेषताएँ एवं प्रकृति, सामान्य विशेषताएँ, ब्राह्मी लिपि की विशेषताएँ, देवनागरी लिपि की विशेषताएँ, लिपि के दोष, लिपि में सुधार के प्रयत्न, निष्कर्ष, मातृभाषा शिक्षा के उद्देश्य, विभिन्न स्तरों पर मातृभाषा शिक्षा के उद्देश्य, मातृभाषा शिक्षा के सामान्य सिद्धान्त, पाठ्यक्रम में स्थान

इकाई–2 कविता से अभिप्राय, रसात्मकता, काव्य विभाजन, उद्देश्य, काव्य पाठन की प्रणालियाँ, कहानी की परिभाषा, चुनाव, उद्देश्य, द्वन्द्व एवं संघर्ष, महत्त्व, शुद्ध उच्चारण से आशय, महत्त्व, सामान्य अशुद्धियाँ, अशुद्ध उच्चारण के कारण, सुधार हेतु सुझाव, सम्बन्धी कुछ नियम, वर्तनी सम्बन्धी अशुद्धियाँ, अर्थ, शुद्ध वर्तनी की आवश्यकता एवं महत्त्व, वर्तनी शिक्षा के उद्देश्य, वर्तनी अशुद्ध के प्रकार, व्याकरण का अर्थ एवं परिभाषा, विशेषताएँ, आवश्यकता , उद्देश्य, प्रकार, विधियाँ या प्रणालियाँ, स्वर परिचय, वयन्जन, हिन्दी व्यंजनों का वर्गीकरण, अक्षर, अक्षर विीाजन का स्वरूप, वलाघात, बलाघात और संगम, कुछ सामान्य अशुद्धियाँ

इकाई–3 गद्य, गद्य शिक्षण के सामान्य उद्देश्य, मुख्य उद्देश्य, पाठ, स्थूल एवं सूक्ष्म अध्ययन, गद्य के विषय तथा गद्य संकलन की विशेषतायें, महत्त्व, राजभाषा का इतिहास, सांविधानिक स्थिति, राजभाषा के प्रयोग की प्रगति, हिन्दी का भविष्यँ,, उत्पति का आधार, गठन का आधार, प्रयोग–क्षेत्र का आधार, रूप या प्रयोग का आधार, द्विवेदी युग का विशेष योगदान, स्वतंत्रता प्राप्ति से तुरन्त पूर्ण का युग, स्वतंत्रतोपरांत, वर्तनी का मानकीकरण, शब्दावली का मानकीकरण, व्याकरण

इकाई–4 सामान्य परिचय, मुहावरा, काक्यांश, लोकोक्तियाँ, अनेक शब्दों के स्थान पर एक शब्द का प्रयोग, विलोम शब्द,

इकाई–5 वर्तनी–विचार, सामान्य विचार, तत्सम और तद्भव शब्द, रचना एवं रचनाकार, कवियों की उक्तियाँ, अलंकार

COMPARATIVE GOVERNMENT AND POLITICS

UNIT -1 Comparative Politics – Meaning, nature, scope and significance. Problems in theory building, The Comparative method in the study of political system, Approaches – Traditional and modern, structural and functional, Marxist and Behavioral, Problems in comparative analysis, Classification of Political systems: Democratic and Authoritarianism. Federal and Unitary, Parliamentary and presidential, Capitalist and Socialist, Political Economy – Classical and Marxist – Neo – Classical and Neo – Marxist

UNIT -2 Constitutionalism – Nature and elements – Techniques Problems of freedom and Authority, Theories of state – Liberal, Neo – Liberal, Marxist, Neo – Marxist State – Class Instrument and relative autonomy – state in Post – Colonial societies. Class and class theory – Class formation – Plural societies and politics – Consociationalism Political Elites – Theories – Political Elites and Hegemonic classes – structuralism

UNIT -3 Political Culture – Nature and Components – Elite and Mass Political Culture – Civic Culture, Political socialization – Nature and Elements Political socialization and Political system Political participation and communication Political conflict – theories – violent and non-violent – Relevance for comparative Analysis.

UNIT -4 Party system and mobilization in developed and developing countries – patterns of opposition, Political parties, classification of political parties, and party system formal and informal role, Pressure Groups – determinates of pressure group – methods – operational technique. Politics in developingcountries: Nature, issues and trends.

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PUBLIC ADMINISTRATION

UNIT -1 Public Administration: Meaning, Nature, Scope and Significance, Evolution of Public Administration: Different phases including New Public Administration, New Public Management, New Public Service, Good Governance, Relationship of Public Administration with, Economics, Sociology and History.

UNIT -2 Basic concepts and principles of Public Administration: Introduction, Organization, hierarchy, Unity of command, Span of control.

UNIT -3 Authority and Responsibility, Coordination, Centralization and Decentralization, Delegation, Supervision, Line and Staff.

UNIT -4 Public Policy: Policy Formulation and Policy Implementation, Feminist Approach: Understanding Gender in Administration, State of Administrative Theory in 21st Century.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

HISTORY OF INDIAN FREEDOM MOVEMENT

UNIT -1 Changes in the British colonial policy under the Crown, Movements of reforms and revival among Hindus, Muslims and Sikhs, Concepts of Nation and Nationalism: an historical survey.

UNIT -2 Early political bodies and their programmes, Birth of the Indian National Congress: current debates, Early Nationalist Politics: moderates, extremists and revolutionaries

UNIT -3 Genesis and growth of communal sentiments, Swadeshi Movement in BengalThe advent of mass politics: Gandhian movements, 1917-1942.

UNIT -4 Peasant's Movements, Worker's movements, Tribal Movements

UNIT -5 Left and socialist parties, Events leading to Independence and Partition

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

ENVIRONMENT STUDIES

UNIT -1 Introduction to Environment Basic Concept and Nature of Environment, Meaning, scope and nature of environment. Natural and Man-made Environment. Ecosystem-Structure, function and its components. Energy flow in Ecosystem-Food chains, Food webs and Ecological pyramids.

UNIT -2 Natural Resources: Renewable and Non-renewable Resources Natural Recourses and Associated Problems Forest Recourses – use and overexploitation. Deforestation-cause effects and remedy Water Recourses, Mineral Resources, Food Resources Energy Resources

UNIT -3 **Biodiversity and Conservation** Meaning and values of Biodiversity, India as a Mega diversity Nation. Threats to Biodiversity-habitat loss, poaching of wild life, man-wildlife conflicts. Conservation of genetic diversity, an important environment priority learning to live in harmony with nature.

UNIT -4 Environment Issues and Its Preventive Measures Causes and effects of environmental hazard, global and local Environmental pollution. Air, Water, Soil, Marine, Noise, Thermal and Nuclear Pollution. Climate Change- Global Warming, Acid Rain, Ozone layer depletion, Pillar Melting. Natural Disasters-Flood, Earthquake, Cyclone and Landslides.

UNIT -5 Humans Communities & Environment Programmes of Environment education /awareness, Agencies, Environmental Movements : Chipko, Silent Valley , Bishops of Rajasthan Environment Management, Sustainable development ,Acts /Laws related to Environment Environment Ethics.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

INDIAN FOREIGN POLICY

UNIT -1 Historical origins. Determinants, Decision Making Institutions: MEA, National Security Council, PMO, Parliament.

UNIT -2 **Nehruvian tradition in Indian Foreign Policy.** Non-Alignment: evolution and socio- political basis. Contemporary relevance-emerging debate

UNIT -3 **India and outside World,** India and South Asia, SAARC, India and South East Asia, ASEAN India and West Asia, Latin America

UNIT -4 India and Major Powers, India and USA, European Union India and Russia, China, Japan

UNIT -5 **India and Major Issues in International relations.** Debating nuclear issues, India and UN system, Peacekeeping, Disarmament, reforms. India and emerging economic order, economic Diplomacy, Socio-cultural Issues: Ethnic and Religious movements, Environment, Global terrorism, Globalisations.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

HUMAN RIGHTS IN COMPARATIVE PERSPECTIVE

UNIT -1 Human Rights: Theory and Institutionalization, Understanding Human Rights: Three Generations of Rights, Institutionalization: Universal Declaration of Human Rights, Rights in National Constitutions: South Africa and India

UNIT -2 Issues, Torture: USA and India, Surveillance and Censorship: China and India, Terrorism and Insecurity of Minorities: USA and India

UNIT -3 Structural Violence, Caste and Race: South Africa and India, Gender and Violence: India and Pakistan, Adivasis/Aboriginals and ,the Land Question: Australia and India

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

SOCIAL INSTITUION

UNIT -1 Economy and Society, Man, Nature and Social Production, Economic System of Simple and Complex Societies-Barter and Ceremonial Exchange, Market Economy and Control Economy, Jajmani System

UNIT -2 Family, Marriage and Kinship, Different Forms of Family and Marriage, Changes in Family Pattern Worldwide, Alternatives to Family: Divorce and Separation, Importance of Kinship

UNIT -3 Politics and Society, Sociological Theories of Power, Bureaucracy, Political Parties and Pressure Groups, Nation-State, Citizenship and Democracy

UNIT -4 Religion, Types of Religious Practices: Animatism, Manaism, Pluralism, Sects, Cults, Religion in Modern Society: Religion and Science, Secularization, Religious Revivalism and Fundamentalism

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OUNDATION COURSE in IT

UNIT -1 BASICS OF INFORMATION TECHNOLOGY Familiarity with the Basics of Computer: Design of computers, and overview of communication technologies. **Computer system:** Characteristics of computer, components of a computer system – CPU, memory, storage devices and I/O devices. **Memory:** Primary (RAM and ROM) and secondary memory. **Storage Devices:** Hard disk, CD ROM, DVD, pen/flash drive memory stick. **I/O Devices:** Keyboard mouse. Monitor, printer, scanner, web camera. **Types of Software:** System software) operating system), application software mobile applications. **Operating System:** Kernel, device drivers, and file system *very basic idea). **Computer Networking:** Wired/wireless communication, common protocols: Wi-Fi, Bluetooth, cloud computer (private/public). **Multimedia:** Images, audio, video, animation Chat sites, and social network.

UNIT -2 CYBER SAFETY Safely Browsing the Web and Using Social Networks: Identity protection, proper usage of passwords, privacy, confidentiality ofinformation, cyber stalking, reporting cybercrimes. **Safely Accessing Websites:** Viruses and malware

UNIT -3 OFFICE TOOLS Introduction to a Word Processor: Create and save a document. Edit and format text: Text style (B, I, U), font type, font size, text colour, alignment of text Format. paragraphs with line and/or paragraph 'spacing. Add headers, and footers, numbering pages, grammar and spell check utilities, subscript and superscript, insert symbols, use print preview,and print a document. Insert pictures, change the page setting, add bullets and numbering, borders and shading, and insert tables-insert/delete rows and columns, merge and split cells. Use AutoFormat, track changes, review comments, use of drawing tools, shapes and mathematical symbols. **Presentation Tools:** Understand the concept of slide shows, basic elements of a slide, different types of slide layouts, create and save a presentation, and learn about the different views of a slide set-normal view, slide sorter view and handouts. Edit and format a slide: add titles, subtitles, text, background, and watermark, headers and footers, and slide numbers. Insert pictures from files, create animations, add sound effects, and rehearse timings. **Spreadsheets:** Concept of a worksheet and a workbook, create and save a worksheet. Working with a spreadsheet: enter numbers, text, date/time, series using AutoFiIl; edit and format a worksheet including changing the colour, size, font, alignment of text; insert and. delete cells, rows and columns. Enter aformula using the operators (+,-,*, /), refer to cells, and print a worksheetUse simple statistical functions: SUM (), AVERAGE (), MAX (), MIN (), IF () (without compound statements); embed charts of various types: line, pie, scatter, bar and area in a worksheet.

UNIT -I

Women's Issues in 19th Century , Women's Political Participation in Early 20th Century, Women and Partition

UNIT-II

WOMEN'S AGENCY IN POST-INDEPENDENCE INDIA: Women's Political Rights and Political Institution, Women's Movements in Contemporary India

UNIT-III

WOMEN AND ELECTORAL PROCESS: Electoral Systems and Political PartiesWomen

and Elections

UNIT-IV

WOMEN AND POLITICAL CONFLICT: Caste, Community and Violence Against Women

UNIT - I Introduction, Ways to Measure Public Opinion, Advantages and Disadvantages of Survey, Other Survey Methods, Conductors of Public Opinion research: Academic Research Organization, Media, Politicians, Commercial Company

UNIT- II Sample Design: Steps in Sample Design, Criteria of Selecting a Sampling Procedure, Characteristics of Sample Design, Random Sample, Sampling Methods: Census Versus Sampling, Sampling Methods: Cluster Sampling, Multi Sampling, Judgment Sampling, Quota Sampling, Snowball Sampling.

UNIT - III Research Design: Selection of Research Approach Designing of Sampling Plan, Types of Research: Exploratory Research, Literature Survey, Experience Survey, Conclusive Research, Descriptive Research, Experimental Research, Modeling Research,Algorithmic Research. Research Process: Problem Definition, Objectives of Research, Fundamentals of Data Collection Methods.

UNIT - IV The Functions of Opinion Polls: Reporting, Analytical, Predictive. Mechanics of Polling: Polling Modality, Face to Face Polls, Postal Polls, Online Polls. Polls and Politics: Use of Polls by Politicians, Role of Public in Indian Politics, Politics of Interpreting Polling, Role of Public Opinion Polls in Indian Politics.

BPS-503 UNDERSTANDING AMBEDAKAR

UNIT -1 **Introducing Ambedkar,** Approach to Study Polity, History, Economy,Religion and Society

UNIT -2 **Caste and Religion,** Caste, Untouchability and Critique of Hindu SocialOrder Religion and Conversion

UNIT -3 **Women's Question,** Rise and Fall of Hindu Women Hindu Code Bill

UNIT -4 **Political Vision,** Nation and Nationalism Democracy and Citizenship

UNIT -5 **Constitutionalism,** Rights and Representations Constitution as an Instrumentof SocialTransformation, Planning and Development, Land and Labor.

BPS-504 DIGITAL LITERACY & ACCOUNT LITERACY

UNIT-1 Review of MS office Advance options in MS excel, Power point Introduction to internet learning platform Using internet-based learning platform .Using Google and you tubefor learning, using smart phone to become smart

UNIT-2 Benefits of digital learning, Using internet for personal requirement Online payments method, Use of social media for advisement Digital security and privacy. Various cybercrime and their safety guideline Best practice for securing online and network transaction, Managing privacy and security and social media accounts

UNIT-3 Introduction and basic of financial planning, Concept of time and value of money Risk and return, Myths about easy money, Financial planning with examples Introduction to financial market and institution investment option in post office Sources of finance, Capital market basics, Basic of money market, Mutual funds

UNIT-4 Life insurance, General insurance, Types of banks KYC, Function of commercial banks and RBI and its function Deposit accounts-understanding of operation, Retail finance, Personal loan Corporate banking, Cheque collecting services, Payments modes in banking system

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

EACE AND CONFLICT RESOLUTION

UNIT -1 International Peace and Conflict Resolution: Sources of War: International and Domestic Issues and Trends, What is Conflict: Introduction to International Conflict Resolution

UNIT -2 International Conflict Resolution Theory: Models developed by Johan Galtung, Joseph Montville, Morton Deutsch, William Zartman, Levy Jack

UNIT -3 Conflict resolution: Back ground of Various Peace Movements and Concepts, Principles used to resolve conflict

UNIT -4 Cross-border relationships between the world's peaceful and war-torn zones (migration and information flows, economic transactions, international rules and regulations, normative concepts and political decisions)

UNIT -5 Conflict Transformation: is Peace Possible? Resolve problems throughconflict analyses and instrumentation of peace concepts, Current perspective of peace and conflict resolution: Grass-roots level perspective onwar and Peace

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ANDHI AND THE CONTEMPORARY WORLD

UNIT -1 Gandhi on Modern Civilization and Ethics of Development, Conception of Modern Civilisation and Alternative Modernity, Critique of Development:Narmada Bachao Andolan

UNIT -2 Gandhian Thought: Theory and Action, Theory of Satyagraha, Satyagraha in Action, Peasant Satyagraha: Kheda and the Idea of Trusteeship Temple Entry and Critique of Caste, Social Harmony: 1947and Communal Unity

UNIT -3 Gandhi's Legacy, Tolerance: Anti - Racism Movements (Anti - Apartheid and Martin Luther King), The Pacifist Movement, Women's Movements *Gandhigiri*: Perceptions in Popular Culture

UNIT -4 Gandhi and the Idea of Political Swaraj Swadeshi

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

SOCIOLOGICAL THINKERS I

UNIT -1 Karl Marx, Philosophical Foundations of Karl Marx's Work, Use Value and Exchange Value, Social Formation and Capitalist Mode of Production, Class and Class Struggle

UNIT -2 Emile Durkheim, Philosophical Foundations of Emile Durkheim's Work Social Fact, Individual and the Collective, Normal and Pathological

UNIT -3 Max Weber, Philosophical Foundations of Max Weber's Work, Social Action and Ideal Types, Power and Authority, Religion and Economy

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

SCHEME FOR B.A. (Hons.) Sociology

B.A. (Hons.) Sociology			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BS-101	Fundamentals of sociology	√	√		04
2	BS-102	Social Institution	√	√		04
3	BS-103	Contemporary India	√	√		04
4	BS-104	Foundation Course in English	√	√		04
		Total				16

SCHEME FOR B.A. (Hons.) Sociology

B.A. (Hons.) Sociology			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BS-201	Sociology of India	√	√		04
2	BS-202	Sociological Thought	√	√		04
3	BS-203	Indian Government and Politics	√	√		04
4	BS-204	Foundation Course in Hindi	√	√		04
		Total				16

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SCHEME FOR B.A. (Hons.) Sociology

B.A. (Hons.) Sociology			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BS-301	Social Policy and Administration	√	√		04
2	BS-302	Social Disorganization and Legislation	√	√		04
3	BS-303	Public Administration	√	√		04
4	BS-304	Environment Studies	√	√		04
		Total				**16**

SCHEME FOR B.A. (Hons.) Sociology

B.A. (Hons.) Sociology			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BS-401	Sociology of Gender	√	√		04
2	BS-402	Sociology of Religion	√	√		04
3	BS-403	Comparative Government and Politics	√	√		04
4	BS-404	Foundation Course in IT	√	√		04
		Total				**16**

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SCHEME FOR B.A. (Hons.) Sociology

B.A. (Hons.) Sociology			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BS-501	Health, Medicine and Society	√	√		04
2	BS-502	Sociological Thinkers I	√	√		04
3	BS-503	Human Rights in Comparative Perspective	√	√		04
4	BS-504	Digital Literacy and Account Literacy	√	√		04
		Total				**16**

SCHEME FOR B.A. (Hons.) Sociology

B.A. (Hons.) Sociology			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BS-601	Sociological Problems in India	√	√		04
2	BS-602	Gandhi and the Contemporary World	√	√		04
3	BS-603	Sociological Thinkers II	√	√		04
4	BS-604	Project Based on Sociology	√	√		04
		Total				**16**

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FUNDAMENTAL OF SOCIOLOGY

UNIT -1	Sociology: Sociology-the Study of Groups, Definition, Nature & Scope,Development of Sociology as a Discipline.
UNIT -2	Basic Concepts: Society, Community, Institution, Association, Group, SocialStructure, Status and Role etc.
UNIT -3	Institutions: Marriage, Family and Kinship, Religion, Education, Politics etc.

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SOCIAL INSTITUION

UNIT -1 Economy and Society, Man, Nature and Social Production, Economic System of Simple and Complex Societies-Barter and Ceremonial Exchange, Market Economy and Control Economy, Jajmani System

UNIT -2 Family, Marriage and Kinship, Different Forms of Family and Marriage, Changes in Family Pattern Worldwide, Alternatives to Family: Divorce and Separation, Importance of Kinship

UNIT -3 Politics and Society, Sociological Theories of Power, Bureaucracy, Political Parties and Pressure Groups, Nation-State, Citizenship and Democracy

UNIT -4 Religion, Types of Religious Practices: Animatism, Manaism, Pluralism, Sects, Cults, Religion in Modern Society: Religion and Science, Secularization, Religious Revivalism and Fundamentalism

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

CONTEMPORARY INDIA

UNIT -1 INDIAN HISTORY & CULTURE, Socio-cultural Configuration of Contemporary India: Unity, Diversity, Multi-Culturalism Art, Culture& Politics: Contemporary Issues and Debates, Scientific Temper: Concept, Relevance and Practice, Indian Freedom Movement (1857-1947) Landmarks.

UNIT -2 INDIAN POLITY, Indian Constitution: Preamble; Fundamental Rights and Duties; Directive Principles., Federalism: Centre and State Relations, Presidential System and Parliamentary Democracy General Elections and Electoral Reforms, National and State Political Parties in India.

UNIT -3 INDIAN ECONOMY, The Nature and Ideological Contours of Indian Economy, Five Year Plans, Mixed Economy, Liberalization, Privatization and Globalization (FDI, BPOs and KPOs), Current Five Year Plan and New Economic Initiatives

UNIT -4 SOCIAL MOVEMENTS & ACTIVISM, Marginalization, Socio-Economic Equality and Reservation, Women Safety, Gender Equality and Activism, Public Health, Hygiene & Sanitation: Swachh Bharat Abhiyaan, Judicial Activism

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

ENVIRONMENT STUDIES

UNIT -1 Introduction to Environment Basic Concept and Nature of Environment, Meaning, scope and nature of environment. Natural and Man-made Environment. Ecosystem-Structure, function and its components. Energy flow in Ecosystem-Food chains, Food webs and Ecological pyramids.

UNIT -2 Natural Resources : Renewable and Non-renewable Resources Natural Resources and Associated Problems Forest Resources – use and overexploitation. Deforestation-cause, effects and remedy Water Recourses, Mineral Resources,Food Resources

UNIT -3 **Biodiversity and Conservation** Meaning and values of Biodiversity, India as a Mega diversity Nation. Threats to Biodiversity-habitat loss, poaching of wild life, man-wildlife conflicts. Conservation of genetic diversity, an important environment priority learning to live in harmony with nature.

UNIT -4 Environment Issues and Its Preventive Measures Causes and effects of environmental hazard, global and local Environmental pollution. Air, Water, Soil, Marine, Noise, Thermal and Nuclear Pollution. Climate Change- Global Warming, Acid Rain, Ozone layer depletion, Piller Melting. Natural Disasters-Flood, Earthquake, Cyclone and Land slides.

UNIT -5 Humans Communities & Environment Programmes of Environment education /awareness, Agencies ,Environmental Movements : Chipko, Silent Valley , Bishnois of Rajasthan Environment Management , Sustainable development ,Acts /Laws related to Environment Environment Ethics.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

SOCIOLOGY OF INDIA

UNIT -1 Indian Society: Approaches to study Indian Society, Features of Indian Society.

UNIT -2 Caste and Class System: Indian Caste System, Social Classes in Rural India, Social Classes in Urban India, Features of Caste System, Tribe Class, Tribe in India.

UNIT -3 Social Identity and Change: Dalit Movements, Gender Based Movements, Tribal and Ethnic Movements.

UNIT -4 State Society and Religion: Communalism, Secularism.

UNIT -5 Social Institution and Change: Family, Marriage and Kinship, Religion in India.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

SOCIOLOGICAL THOUGHT

UNIT -1 Interlocution to Social Thoughts:-Definition of Social thought, Characteristics, Development, Importance, Historical background, Some emergence. **Auguste Comte (1798-1857):-**Early life and education, Brief biographic sketch, Nature and impact of positivism on social thinking, Law of three stages, Stages in social organisation and progress, Classification of sciences, Social statics and social dynamics, Religion of humanity, Features of Comtean religion.

UNIT -2 Emile Durkheim (1858-1917) :-Social background/family, Career, Main Works, Theory of social facts, Theory of division of labour, Typology of suicide, Form of sociological realism, Forms of religious life, works.

UNIT -3 Karl, Marx (1818—1883):-Introduction of Karl Marx, Marx's Faith in Democracy, History, Infrastructure and superstructure, historical materialism, theory of social change, evolution of society and development of social classes , theory of class struggle or class conflict, concept of classless society establishment of the classless communist society , political principles of the classless society.

UNIT -4 Herbert Spence(1820-1903):-Introduction, **Social Environment,** Evolutionary Doctrine, Significance, theory of Social Evolution, Differences between Organism and Society, **Charles Horton Colley:-**Concept of Primary Group, Characteristics, contribution to Modern Sociological Theory, Contribution, Views about Social Process, Faith in Human Nature.

UNIT -5 Max Weber (1864—1920):-background, early life and family relationships, freiburg address, later works, weber's theory of ideal type, definition of ideal type, characteristics, critical comments about ideal types, purpose and use, theory of religion or sociology of religion, definition of bureaucracy , characteristics, functional and dysfunctional aspects, evaluation of contributions .

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

INDIAN GOVERNMENT AND POLITICS

UNIT -1 Nature of Indian State: - Nature of the Colonial State, India —A Liberal- Democratic State, India — A Liberal-Socialist State, India—A Welfare State, Nature of Indian State — the Marxist View.

UNIT -2 Philosophy of Indian constitution: - The Roots of the constituent Assembly of India, Parties in the constituent Assembly, work and Status, Essential Features, Federalism, Significance of a written constitution, Preamble to a constitution, Citizenship and Rights in the Indian Constitution.

UNIT -3 Institutional Framework: - Parliamentary System in India, Union Legislature, The Presiding Officers, Parliamentary Devices to Control the Executive, President of India, The Prime Minister of India, Judiciary, The supreme Court, Jurisdiction of the supreme Court, The High Court.

UNIT -4 Party System in India: - Development of Party System in India, National and Regional Party System in India.

UNIT -5 Election and Participation: - Election in India, Election Commission in India, Election Programme Conduct in India.

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FOUNDATION COURSE IN HINDI

इकाई–1 भाषा की परिभाषा, आधार, विशेषताएँ एवं प्रकृति, सामान्य विशेषताएँ, ब्राह्मी लिपि की विशेषताएँ, देवनागरी लिपि की विशेषताएँ, लिपि के दोष, लिपि में सुधार के प्रयत्न, निष्कर्ष, मातृभाषा शिक्षा के उद्देश्य, विभिन्न स्तरों पर मातृभाषा शिक्षा के उद्देश्य, मातृभाषा शिक्षा के सामान्य सिद्धान्त, पाठ्यक्रम में स्थान

इकाई–2 कविता से अभिप्राय, रसात्मकता, काव्य विभाजन, उद्देश्य, काव्य पाठन की प्रणालियाँ, कहानी की परिभाषा, चुनाव, उद्देश्य, द्वन्द्व एवं संघर्ष, महत्त्व, शुद्ध उच्चारण से आशय, महत्त्व, सामान्य अशुद्धियाँ, अशुद्ध उच्चारण के कारण, सुधार हेतु सुझाव, सम्बन्धी कुछ नियम, वर्तनी सम्बन्धी अशुद्धियाँ, अर्थ, शुद्ध वर्तनी की आवश्यकता एवं महत्त्व, वर्तनी शिक्षा के उद्देश्य, वर्तनी अशुद्ध के प्रकार, व्याकरण का अर्थ एवं परिभाषा, विशेषताएँ, आवश्यकता , उद्देश्य, प्रकार, विधियाँ या प्रणालियाँ, स्वर परिचय, वयन्जन, हिन्दी व्यंजनों का वर्गीकरण, अक्षर, अक्षर विीाजन का स्वरूप, वलाघात, बलाघात और संगम, कुछ सामान्य अशुद्धियाँ

इकाई–3 गद्य, गद्य शिक्षण के सामान्य उद्देश्य, मुख्य उद्देश्य, पाठ, स्थूल एवं सूक्ष्म अध्ययन, गद्य के विषय तथा गद्य संकलन की विशेषतायें, महत्त्व, राजभाषा का इतिहास, सांविधानिक स्थिति, राजभाषा के प्रयोग की प्रगति, हिन्दी का भविष्यँ,, उत्पति का आधार, गठन का आधार, प्रयोग–क्षेत्र का आधार, रूप या प्रयोग का आधार, द्विवेदी युग का विशेष योगदान, स्वतंत्रता प्राप्ति से तुरन्त पूर्ण का युग, स्वतंत्रतोपरांत, वर्तनी का मानकीकरण, शब्दावली का मानकीकरण, व्याकरण

इकाई–4 सामान्य परिचय, मुहावरा, काक्यांश, लोकोक्तियाँ, अनेक शब्दों के स्थान पर एक शब्द का प्रयोग, विलोम शब्द,

इकाई–5 वर्तनी–विचार, सामान्य विचार, तत्सम और तद्भव शब्द, रचना एवं रचनाकार, कवियों की उक्तियाँ, अलंकार

SOCIAL POLICY AND ADMINISTRATION

UNIT -1 S**ocial Policy Basic Concepts**: concept of Social Policy, Nature of Social Policy, Scope of Social Policy, Principles of Social Policy, Principles of Social Policy, Sources of Socials Policy, Social Policy and Welfare PolicySimilarities, and differences.

UNIT -2 Process and Social Policy: Social Policy Formulation Structure and Processes, Major Determinants in social Policy Formulation, social Policy Implementation, Major Problems of Implementation.

UNIT -3 Social Work Administration: Basic concepts, Meaning, Scope and Significance of Social Work Administration, social Administration and Social Work Administration, Social Work Administrator.

UNIT -4 Social Planning: Definition, Nature, Scope, Principles, Process and Models of Social Planning, People's Participation in Social Planning, social Planning machinery in India and its functions, social planning in Five Year Plans.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

SOCIAL DISORGANISATION AND LEGISLATION

UNIT -1 Social Disorganization: Concept of social organisation and social disorganisation, social disorganisation and social change, approaches to the study of social organisation, Personal disorganization.

UNIT -2 **Family Disorganisation:** Family disorganization, Community disorganisation, Concept of crime and Juvenile delinquency.

UNIT -3 **Social problems**: Concept of social problems, Major social problems in India, Beggary, Alcoholism, Drug Addiction, Problem of the Aged, Problem of Commercialized sex, Poverty, unemployment, Juvenile delinquency, Child Labour.

UNIT -4 **Social Defence –** Concept and Scope**,** Correctional work in India, Social Legislation, Juvenile Justice Act, 1986, Immoral Traffic (Prevention Act, 1956), Probation of Offenders Act 1958, Family Courts Act, 1984, The Child Labour (Prohibition and Regulation Act 1986) Social Research.

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UBLIC ADMINISTRATION

UNIT -1 Public Administration: Meaning, Nature, Scope and Significance, Evolution of Public Administration: Different phases including New Public Administration, New Public Management, New Public Service, Good Governance, Relationship of Public Administration with, Economics, Sociology and History.

UNIT -2 Basic concepts and principles of Public Administration: IntroductionOrganization,

hierarchy, Unity of command, Span of control.

UNIT -3 Authority and Responsibility, Coordination, Centralization and Decentralization, Delegation, Supervision, Line and Staff.

UNIT -4 Public Policy: Policy Formulation and Policy Implementation, Feminist Approach: Understanding Gender in Administration, State of Administrative Theory in 21st Century.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

ENVIRONMENT STUDIES

UNIT -1 Introduction to Environment Basic Concept and Nature of Environment, Meaning, scope and nature of environment. Natural and Man-made Environment. Ecosystem-Structure, function and its components. Energy flow in Ecosystem-Food chains, Food webs and Ecological pyramids.

UNIT -2 Natural Resources: Renewable and Non-renewable Resources Natural Recourses and Associated Problems Forest Recourses – use and overexploitation. Deforestation-cause effects and remedy Water Recourses, Mineral Resources, Food Resources Energy Resources

UNIT -3 Biodiversity and Conservation Meaning and values of Biodiversity, India as a Mega diversity Nation. Threats to Biodiversity-habitat loss, poaching of wild life, man-wildlife conflicts. Conservation of genetic diversity, an important environment priority learning to live in harmony with nature.

UNIT -4 Environment Issues and Its Preventive Measures Causes and effects of environmental hazard, global and local Environmental pollution. Air, Water, Soil, Marine, Noise, Thermal and Nuclear Pollution. Climate Change- Global Warming, Acid Rain, Ozone layer depletion, Pillar Melting. Natural Disasters-Flood, Earthquake, Cyclone and Landslides.

UNIT -5 Humans Communities & Environment Programmes of Environment education /awareness, Agencies, Environmental Movements : Chipko, Silent Valley , Bishops of Rajasthan Environment Management, Sustainable development ,Acts /Laws related to Environment Environment Ethics.

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SOCIOLOGY OF GENDER

UNIT -1	Gender, Sex, Sexuality, Production of Masculinity and Feminity
UNIT -2	Gender and embodiment, Inter-sectionality: Race, Caste and Ethnicity
UNIT -3	Family, Sexual Division of Labour and Property, Gender and Work, Genderand development
UNIT -4	Power, Subordination and Resistance, Sexual Violence, Women's Movements, Women's Queer Movements

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SOCIOLOGY OF RELIGION

UNIT -1 Formulating Religious: Elementary forms of Religion, Asceticism andAccumulation: Religion, Economy and Society

UNIT -2 Rationality: Religion, Politics/State, Theodicy and Eschatology: Magic,Science and Religion

UNIT -3 Elements of Religion, Sacred, Myth, Ritual: Social Significance of Religion,Body: Life Cycle Rituals, Prayer: Pilgrimages and Festivals

UNIT -4 Religion, Sect and Cults, Craft: Religious specialists, Religion and Solitude:Bhakti and Sufi, Religious Reform Movements, New Age Movements

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

COMPARATIVE GOVERNMENT AND POLITICS

UNIT -1 Comparative Politics: Meaning, nature, scope and significance. The Comparative method in the study of political system and Approaches. Federal and Unitary, Parliamentary and presidential.

UNIT -2 Historical context of modern government a. Capitalism: meaning and development: globalization b. Socialism: meaning, growth and development c. Colonialism and decolonization: meaning, context, forms of colonialism; anti- colonialism struggles and process of decolonization.

UNIT -3 Constitutionalism – Nature and elements – Techniques Problems of freedom and Authority, Theories of state – Liberal, Neo – Liberal, Marxist, Neo – Marxist State – Class Instrument and relative autonomy – state in Post – Colonial societies.

UNIT -4 Themes for comparative analysis A comparative study of constitutional developments and political economy in the following countries: Britain, India and USA.

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

FOUNDATION COURSE in IT

UNIT – I Classification, Definitions, Primary Memory, Output Devices, Audio Output Devices (Soft Copy), Hardcopy Devices (print and film), Data Storage, Optical Disks, Removable Hard Drives, Smart Cards, Optical Cards.

UNIT - II Hardware, Motherboard, Machine Language, Assembly Language, High Level Language, Natural Languages, BIOS, Operating System (OS), Transmission Technology, OSI Reference Model, TCP/IP Protocol, Network Topologies, Types of Networks.

UNIT - III Architecture of Computer system, The Control Unit (CU), The Immediate Access Store (IAS), Operations on the file, File Organisation, Relative File, Indexed Files, Data Capture Forms, Data Capture Forms, Verification, Editingand Checking.

UNIT - IV Operating System, Operating System as User Interface, Components of MS- DOS, External Commands, UNIX, EDIT etc., Time Sharing Systems, Multiprogramming, Spooling, Time Sharing, Interactive, Real time system, Distributed.

UNIT - V IP Address, Domain Name Service, Packet Switching, Understanding Potential Threats, Functioning of the WWW, Web page, URL, Using the WWW, Web Browser, Search Techniques, Advance Application: Emergence of Web 2.0.

UNIT -1

Introduction: Concepts and perspectives on health, medicine, illness, sickness, disease and society

UNIT -2

Theoretical perspectives on health and medicine within sociology

UNIT –3

Health, health care and social institutions: state, market, community and family in health and medicine, Philosophical and historical debates on provision of health care and medicine: Health and Development:Current Challenges

UNIT -4

Sociology and Health –Areas of Concerns, Social behavior sciences, Factors involved in Social class differences health, Family in Health & Diseases, Hospital Sociology, Social Cultural factors in Health and diseases, Etiology & Health care, Environmental Sanitation, Mother and Child health and Social aspects, Hygiene in Society, Sex age and marriage

UNIT -5

Health, health care and social institutions: state, market, community and family in health and medicine, Philosophical and historical debates on provision of health care and medicine: The sociology of health in India: Disparities in health indices: Historical Development of health services system in India; the sociology of medical knowledge and medical systems in India Health and Development: Current Challenges: The sociology of health in India: Disparities in health indices: Historical Development of health services system in India; the sociology o medical knowledge and medical systems in India.

UNIT -1

Karl Marx: Philosophical Foundations of Karl Marx's Work, Use Value and Exchange Value, Social Formation and Capitalist Mode of Production, Class and Class Struggle

UNIT -2

Emile Durkheim: Philosophical Foundations of Emile Durkheim's Work Social Fact, Individual and the Collective, Normal and Pathological

UNIT -3

Max Weber: Philosophical Foundations of Max Weber's Work, Social Action and Ideal Types, Power and Authority, Religion and Economy

UNIT- 4

Talcott Parsons: Social Action, Social System, Patterns variables, Equilibrium and change.

UNIT -1

Human Rights: Theory and Institutionalization, Understanding Human Rights: Three Generations of Rights, Institutionalization: Universal Declaration of Human Rights, Rights in National Constitutions: South Africa and India

UNIT -2

Issues, Torture: USA and India, Surveillance and Censorship: China and India, Terrorism and Insecurityof Minorities: USA and India

UNIT -3

Structural Violence I: Caste and Race: South Africa and India,

UNIT-4

Structural Violence II: Gender and Violence: India and Pakistan, Adivasis/Aboriginals and, the Land Question: Australia and India

UNIT-1	Review of MS office Advance options in MS excel, Power point Introduction to internetlearning platform Using internet-based learning platform .Using Google and you tube for learning, using smart phone to become smart
UNIT-2	Benefits of digital learning, Using internet for personal requirement Online payments method, Use of social media for advisement Digital security and privacy. Various cybercrime and their safety guideline Best practice for securing online and network transaction, Managing privacy and security and social media accounts
UNIT-3	Introduction and basic of financial planning, Concept of time and value of money Risk and return, Myths about easy money, Financial planning with examples Introduction to financial market and institution investment option in post office Sources of finance, Capital market basics, Basic of money market, Mutual funds
UNIT-4	Life insurance, General insurance, Types of banks KYC, Function of commercial banks and RBI and its function Deposit accounts-understanding of operation, Retail finance, Personal loan Corporate banking, Cheque collecting services, Payments modes in banking system

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

SOCIOLOGICAL PROBLEMS IN INDIA

UNIT -1 Introduciton of Social Problem, Types of Social Problems.

UNIT -2 The problems of poverty, Nature of poverty, Extent of poverty in India

UNIT -3 Casteism, Communalism, Regionalism, Untouchability

UNIT -4 Minorities, Minorities in India and welfare programmes, The Problem ofpopulation, Social Deviance

UNIT -5 Prostitution, Aloholism, Beggary 21. Old age problem

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SCHOOL OF HUMANITIES & SOCIAL SCIENCES

ANDHI AND THE CONTEMPORARY WORLD

UNIT -1 Gandhi on Modern Civilization and Ethics of Development, Conception of Modern Civilization and Alternative Modernity, Critique of Development:Narmada Bachao Andolan

UNIT -2 Gandhian Thought: Theory and Action, Theory of Satyagraha, Satyagraha in Action, Peasant Satyagraha: Kheda and the Idea of Trusteeship Temple Entry and Critique of Caste, Social Harmony: 1947and Communal Unity,

UNIT -3 Gandhi's Legacy, Tolerance: Anti - Racism Movements (Anti - Apartheid and Martin Luther King), The Pacifist Movement, Women's Movements *Gandhigiri*: Perceptions in Popular Culture

UNIT -4 Gandhi and the Idea of Political Swaraj, Swadeshi

SOCIOLOGICAL THINKERS-II

UNIT -1 Radcliffe Brown: Structural Functionalism, Talcott Parson: Social Action,Levi-Strauss: Structure as a Model

UNIT -2 Mead: Interactional Self, Erving Goffman: Presentation of Self, Luckmannand Berger: Social Construction of Reality

UNIT -3 Mass culture and its critiques, Theodore W.Adorno: Culture Industry, HerbertMarcuse: One Dimensional One

UNIT -4 Power, Discourse and Reproduction, Pierre Bourdieu: Habitus andEmbodiment , Michael Foucault: Power and Knowledge

SCHEME FOR M.A POL.SCI.

M.A POL.SCI.			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MPS-101	Political Theory	√	√		04
2	MPS-102	Ancient and Medieval Indian Political Thought	√	√		04
3	MPS-103	Indian Government and Politics	√	√		04
4	MPS-104	Contemporary Political Thought	√	√		04
		Total				16

SCHEME FOR M.A POL.SCI.

M.A POL.SCI.			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MPS-201	Issues in Indian Administration	√	√		04
2	MPS-202	Western Political Thought	√	√		04
3	MPS-203	Comparative Politics	√	√		04
4	MPS-204	International Relation	√	√		04
		Total				16

SCHEME FOR M.A POL.SCI.

M.A POL.SCI.			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MPS-301	Modern Indian Political Thought	√	√		04
2	MPS-302	Public Administration and Local Self Governance	√	√		04
3	MPS-303	Research Methodology	√	√		04
4	MPS-304	Social Movements and Politics in India	√	√		04
		Total				16

SCHEME FOR M.A POL.SCI.

M.A POL.SCI.			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MPS-401	Public Policy and Analysis	√	√		04
2	MPS-402	Management of Human Resource	√	√		04
3	MPS-403	Understanding Ambedkar	√	√		04
4	MPS-404	Dissertation	√	√		04
		Total				16

MPS-101

POLITICAL THEORY

UNIT -1 Power and Authority: Distinction of Power with Force, Influence and Authority —Power and Influence —Types of Power, Authority, Legitimacy and Influence —The Nature of Authority —Basis of Authority, Legitimacy —Influence

UNIT -2 State: State —Important Elements of State **Rights:** Rights: Meaning and Nature —Basis of Rights, Human Rights Economic Rights, Social Rights

UNIT -3 Liberty: Meaning of Liberty —Two Views of Liberty: Negative and Positive

— Limits of Negative and Positive Liberty Paradigm and Need to go Beyond, John Stuart Mill and the Value of Liberty, Liberty as Emancipation : Marxist Notion of Freedom, Important Issue : Liberty of Expression and Belief

UNIT -4 Equality : Meaning of Equality —Various Dimensions of Equality, Equality of Opportunity, **Justice:** Meaning of Justice and Concepts —Dawn of Liberalism and Changes in the Concepts of Justice —Procedural Justice — Rawl's Theory of Justice, Global Justice, **Contemporary Debates in Modernity and Gender :** Modernity Definition and Meaning —Salient Features of Modernity, Modernism, Modernity and Post Modernism, The Concept Of Gender Justice: Various Theories, Feminism Its Origin And Development

MPS-102

ANCIENT AND MEDIEVAL INDIAN POLITICAL THOUGHT

UNIT -1 **Ancient Indian Political Thought:** Nature, Source and Scope of Ancient Indian Political thought. Some Basic features and concepts: Religion and Politics, Concept of Man, End of life, Divinity of Society and its supremacy. Theory and Practice: Study of Institution, Sabha, Samiti, Janapad, Gana. Political Ideas in Smritis: Manu.

UNIT -2 Study of Politics in Epics: Ramayana and Mahabharta (Shanti Parva) Study of olitics in Nitishastra: Kautilya, Sukra. Study of Jain and Buddhist Literature. Political ideas in Sanskrit literature – Kalidas

UNIT -3 Medieval Indian Political Thought: Republics: Tribal and digarchical republics ature of republican administration. Kingship: forms and types: Divine Theory, Training of the Prince, Functions of King, Limitations on Monarchy, Council of Minister.

UNIT -4 Medieval Indian Political Thought: Socio – Economic and Political Background of Medieval India. Structure of Medieval Indian Polity: Genesis of Indo– Islamic Polity, Its features: Sovereignty, Universal Brotherhood and Law of Succession and their Practice in India. Political Ideals of Indo–Islamic Polity. Nation Building Process. State! New Adjustment in the spheres of the Islamic faith, Islamic theocracy: State and Religion – Different state, Regional states and the empire of Delhi, Moral obligations.

MPS-103

INDIAN GOVERNMENT AND POLITICS

UNIT -1 Forces shaping the Indian Political System, Evolving nature of the Indian Political system, Background of the constituent assembly, composition and working. Ideals of the Indian Political system. Fundamental rights, fundamental duties, Directive principles of state policy. Constitution as an instrument of social change

UNIT -2 Parliamentary democracy in India. Federalism and its working with reference to center state relation and demand for state autonomy. Union Government, President, Prime-Minister, Cabinet and Parliament. State Government: Governor, Chief Minister and state legislative assemblies. Judiciary: Supreme Court, Judicial review, Public Interest Litigation, Judicial Activism and Issue of Reforms, Lok Adalat.

UNIT -3 Party system – Feature and trends – Major National Political parties in India: Ideologies and programmers. Regional Political parties in India. A brief outline.

Coalition Politics in India: An overview. Election and Participation: Voting behavior determinates and trends. Role of the election commission. Religion and Politics in India, Caste in Indian Politics, Regionalism in India – Politics.

UNIT -4 Social Movements: Peasants and workers, Schedules castes and scheduled tribes movements. New Social movements in the field of environment, gender and Human rights. Bureaucracy and its role, Nation building in India! Problems and Prospects. Problems of the Indian Political system Linguish, Regionalism, Communalism, Terrorism – Casteism, Corruption and Criminalization, Nasalism.

MPS-104

CONTEMPORARY POLITICAL THEORY

UNIT -1 Nature and significance of political theory. Recent trends in political theory. Shift from traditional to modern. Behaviouralism and post behaviouralism: David Easton. Concept of modern state. End of Ideology and its impact on political theory.

UNIT -2 Libral Political theory and its critique, Concept of modern state. Theory of justice evisited ! John Rawls. Importance of the politics ! Hannah Arndt. Limits of politics : Oalceshot. Concept of citizenship. Concept of Sovereignty.Orientalism : Edward aid. Existentialism : J.P. Sartre

UNIT -3 Feminism Multiculturalism Communitarianism Environmentalism

MPS-201

ISSUES IN INDIAN ADMINISTRATION

UNIT -1 Evolution of Indian Administration, Vedic tradition, Buddhism and evolution of Sangha rules, Mughal Administration:, District and Local Administration Under Mughal Rule: 1757-1858, The Regulating Act of 1773, Effects of the Regulating Act, The Amending Act of 1781, The Union State Relations in India, Financial Relations during Emergency.

UNIT -2 Federalism, Council of Ministers, The Central Secretariat, Origin of the Central Secretariat, Role and functions of Central Secretariat, . Structure of Central Secretariat, Secretariat, Cabinet Secretary, Cabinet Committees, Indian Administrative Services, Recruitment of All Indian Services, Training of All India Services, . Present Pattern of Civil Services Examination.

UNIT -3 State List, Concurrent List, Distribution of Executive Power, Role of Governor, Exercise of Discretion by the Governor, Appointment of ChiefMinisters: Powers and Functions of the Council of Ministers, Division of Work into Departments at the State Level, Powers of the Chief Minister in Relation to the Council of Ministers, Pattern of Departmentalization in State Secretariat.

UNIT -4 District Administration, Evolution of the office of the District Collector, Functions of the Collector, Law and Order, Head of District Administration, Three Types of Municipalities: Composition, Ward Committees Reservationof Seats, Disqualification, State Election Commission, Finance, Audit of Accounts, Areas Kept Out, Observations on the 73rd Amendment.

UNIT -5 Delegated Legislation, Meaning of Delegated Legislation, History of Federal Court, Supreme Court, Position under Constitution of India, Legislative Control on delegated legislation, Limitations to legislative control: Executive Control over Administration, Judicial Control over Administration, Right to information Act 2005,

MPS- 202

WESTERN POLITICAL THOUGHT

UNIT -1 Greek & Roman Political Thought: Plato: Republic, Ideal State, Justice, Education, Communism. **Aristotle:** Politics, Aristotle's Method, Teleology, Notion of State, Justice, Slavery and Revolution. Cicero: Nature Law, State. Introduction to Medieval Thought, Church State Relationship, Theory of Two Swords. **Thomas Aquinas:** Theory of Knowledge and Law.

UNIT -2 European Political Thought–I, Machiavelli–Prince, Discourses, Human Nature, Religion, Ethics and Politics, Child of Renaissance. **Hobbes:** Scientific Materialism, Theory of Social Contract, Sovereignty and Individualism. **Locke:** Natural Law, Natural Right, Social Contract, Liberalism. **Rousseau:** Social Contract, General Will.

UNIT -3 European Political Thought–II, Bentham: Utilitarianism, Liberty. **J.S.Mill:** Liberty , Representative government. **Green:** Theory of Rights, State. **Marx:** Dialectical Materialism, Historical Materialism, Class Struggle, State and Revolution.

UNIT -4 Concept & Issues: Behaviouralism: Its Meaning, Nature, Characteristics and Limitations. Post–Bahaviouralism. Decline and Resurgence of Political Theory, Political Development, Legitimacy. Post–Modernism.

MPS203

COMPARATIVE POLITICS

UNIT -1 Comparative Politics - Meaning, nature, scope and significance. Problems in building, The Comparative method in the study of political system. Approaches - Traditional modem, structural and functional, Marxist and Behavioural, Problems in com analysis, Classification of Political systems: Democratic and Authoritarianism, Federal and Unitary, Parliamentary andpresidential, Capitalist and Socialist, Political Economy - Classical and Marxist - Neo-Classical and Neo -Marxist.

UNIT -2 Constitutionalism - Nature and elements – Techniques, Problems of freedomand Authority. Theories of state - Liberal, Neo - Liberal, Marxist, Neo - Marxist. State - Class Instrument and relative autonomy - state in Post – Colonial societies. Class and class theory – Class formation – Plural societies and politics Consociationalism, Political Elites - Theories - Political Elites andHegemonic classes - structuralism.

UNIT -3 Political Culture - Nature and Components - Elite and Mass Political Culture

- Civic Culture, Political socialization - Nature and Elements. Political socialization and Political system, Political participation and communication, Political conflict-theories -violent and non-violent - Relevance for comparative Analysis.

UNIT -4 Party system and mobilization in developed and developing countries - patterns of opposition, Political parties, classification of political parties, and party system formal and informal role, Pressure Groups - determinates of pressure group - methods -operational technique, Politics in developing countries: Nature, issues and trends.

MPS-204

INTERNATIONAL RELATIONS

UNIT -1 International relations as a discipline: Emergence and Evolution, theories of International relations! Realist, Idealist, Scientific Marxist and Liberal, Major concept ! Geo politics, national – interest, collective security, national power and ideology, Contemporary dimension – liberalization and Globalization,Non – Alignment.

UNIT -2 Foreign Policy: Basic concept – techniques of implementation of foreign policy, Diplomacy, Propaganda, foreign – aid, Genesis and foundation ofIndian foreign policy! Principles and objectives, India and Major powers ! USA, UK, Russian Republic, France and China, Indian's perspectives, disarmament and arms control : NPT, CTBT etc. , Globalization and WTO, Kyoto protocol and environment protection.

UNIT -3 International Organization: The United Nations : Its peace keeping functions – Reform of the UN., International financial institutions : World Bank, IMF, Regional Organization, SAARC, ASEAN, EU, OAS, Cold warand its phases : A board outline, End of cold war and the emerging world order, India and South Asian countries.

UNIT -4 Conflicts: Anatomy & Sources of conflicts, structural & cultural violence, Conflict handling mechanism : Conflict suppressions, Conflict management, conflict resolution, Reconciliation, Confidence Building Measures : India – Pakistan, Major issues in contemporary international relations, Human Rights, Terrorism, Regionalism.

MPS-301

MODERN INDIAN POLITICAL THOUGHT

UNIT -1 Background and development: Introduction: Approaches and Methods, Modern India: Renaissance, Raja Ram Mohan Roy and Vankim Chandra Chattarji, Dayanad Saraswati.

UNIT -2 Nationalist school of thought: Gopal Krishan Gokhale, Aurobindo Ghosh ii- Bhagat Singh, Bal Gangadhar Tilak., M.K. Gandhi, Rabindranath Tagore, Subhash Chandra Bose.

UNIT -3 **National builders of independent india:** Jawahar Lal Nehru, M.N. Roy, Jai Prakash Narayan, Ram Manohar Lohiya

UNIT -4 **Champions of social emancipation:** Jyotiba Phule, B.R. Ambedkar ii,Periyar Ramaswamy Naicker

UNIT -5 **Muslim political thinkers:** Sir Syed Ahmad Khan, Mohammad Iqbal, Maulana Abul Kalam Azad

MPS-302

PUBLIC ADMINISTRATION AND LOCAL SELF GOVERNANCE

UNIT -1 Public Administration; meaning, nature, scope and importance. Evolution of Public Administration as a discipline.

UNIT -2 Principle of organization-line and staff, Hierarchy, Unity of command, span of control, centralization, decentralization, Chief executive-types, functions and role

UNIT -3 Types of organization-formal and informal forms of organization, department, board and public corporation.

UNIT -4 Personal Administration: recruitment, training, promotion, discipline, morale, employer-employee relation.

UNIT -5 Bureaucracy – theories, types and role – MAX WEBER civil servant – minister relationship, leadership: its role in decision making and communication.

MPS-303 RESEARCH METHODOLOGY

UNIT -1 Overview of Research Methodology, Types of Research , Research Process.

UNIT -2 Data Collection and presentation, Basic Statistical measures, Design andAnalysis of Experiments, attitude measurement and scales.

UNIT -3 Sampling Methods and Distribution, Statistical Inference: Tests of Hypotheses, Correlation and Regression.

UNIT -4 Qualitative Research Methods and Techniques, Field Research.

UNIT -5 Qualitative Data Formatting and Processing, Writing Up Qualitative Data, Data Analysis and Presentation of Research Findings, Using Internet Word Processor, Using SPSS for Data Analysis, Using SPSS in Report, Writing, Tabulation and Graphic Presentation, Report writing.

MPS-304

SOCIAL MOVEMENTS AND POLITICS IN INDIA

UNIT -1 Social Movements: Meaning, Significance and Components., Approaches to Study Movements: Liberal, Gandhian and Marxian. Classification of Social Movements including New Social Movements.

UNIT -2 Democratic and Changing Nature of Indian Society. Globalization and social Movements. Social Movements and Democracy: An Assessment.

UNIT -3 Dalit Movements Backward Movements Ethnic Movements with special reference to Tribals

UNIT -4 Women's Movements Agrarian Movement, Working class Movements

MPS- 401

PUBLIC POLICY AND ANALYSIS

UNIT -1 Understanding Public Policy, The Policy Cycle, Models of Public Policy, Importance of Public Policy

UNIT -2 Policy Sciences, Role of Inter-Governmental Relations in policy-making, Role of planning commission and national development council in policy formulation

UNIT -3 Role of Cabinet Secretariat and Prime Minister's office in Policy-making, Role of civil society organisations in policy-making

UNIT -4 Policy Implementation Problems, Monitoring of Public Policy – I, Monitoring of Public Policy – II, Policy Analysis: Methods and Techniques –Policy analysis: Methods and Techniques -

MPS-402

MANAGEMENT OF HUMAN RESOURCES

UNIT – I Responsibilities of Human Resource Management, Human ResourceManagement Goal, Training and Development of Employee, comparison between Personnel Management and Human Resource Management, Comparison on the basis of Strategic Aspects, role of the Human Resource Management, Human Relation theory, Revolution of the Human Resource management, Human Relation concept, To Understand Human Behaviour,

UNIT – II Human Resource Planning, Definition, Benefits of HRP, Activities Involve ,Need for HRP, Process, Benefits, human Resource Planning System, Responsibility of Human Resource Planning Department, concept of Recruitment and Selection, Recruitment Practice In India, Selection Technique, Evaluation and Selection Criteria, The Selection Process, approval by manager, Medical Examination, induction

UNIT – III Training -Concept of Training, Objective of Training, difference between Training and Development , Objective of Training, Importance of Training , Benefits of Training, Training Need Identification, Total Organisational Analysis, Organisation Analysis Requirements, Organisational diagnosis, Task Analysis, Performance Analysis, Training Needs Identification, Different Kinds of Training Needs, Methodology of Training and Development, Training and Development Process Simulation Exercises and role Paying,

UNIT – IV Performance Appraisal - Concept and Need of Employee Review, Concept of Performance Appraisal, Concept of Performance Appraisal, Types of AppraisalMethods, Paired comparison analysis, Advantages of the 360 DegreeAppraisal, Problem with the 360 Degree Appraisal Process, Management by objectives (MBO), Unique Features and Advantages of MBO, Benefit of the Performance Appraisal,

UNIT – V Compensation Management - Components, Types, Direct & Indirect compensation, Need, Management, Managing Compensation, Standard ofLiving Theory, Demand and Supply "Theory, Marginal Productivity Theory, Purchasing Power Theory, classification of Wages, Designing and Administering Benefits, Job Evaluation – Definition, Procedure, Method, Advantages & limitations, Moral – Meaning, Importance, Measurement.

MPS- 403
UNDERSTANDING AMBEDAKAR

UNIT -1 Introducing Ambedkar, Approach to Study Polity, History, Economy,Religion and Society

UNIT -2 Caste and Religion, Caste, Untouchability and Critique of Hindu SocialOrder Religion and Conversion

UNIT -3 Women's Question, Rise and Fall of Hindu Women Hindu Code Bill

UNIT -4 Political Vision, Nation and Nationalism Democracy and Citizenship

UNIT -5 Constitutionalism, Rights and Representations Constitution as an Instrument of Social Transformation, Planning and Development, Land and Labor

SCHEME FOR M.A SOCIOLOGY

M.A SOCIOLOGY			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MS-101	Sociology of Change & Development	√	√		04
2	MS-102	Sociological Thought	√	√		04
3	MS-103	Human Growth and development	√	√		04
4	MS-104	The Rural Sociology	√	√		04
		Total				16

SCHEME FOR M.A SOCIOLOGY

M.A SOCIOLOGY			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MS-201	Sociology of India	√	√		04
2	MS-202	Law and Sociology	√	√		04
3	MS-203	Social policy and administration	√	√		04
4	MS-204	Sociology of Religion	√	√		04
		Total				16

SCHEME FOR M.A SOCIOLOGY

M.A SOCIOLOGY			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MS-301	Sociology of Education	√	√		04
2	MS-302	Sociology of Kinship	√	√		04
3	MS-303	Research Methodology	√	√		04
4	MS-304	Urban Sociology	√	√		04
						04
		Total				**16**

SCHEME FOR M.A SOCIOLOGY

M.A SOCIOLOGY			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MS-401	Economics of Social Sector and Environment	√	√		04
2	MS-402	Management of Human Resource	√	√		04
3	MS-403	Social Processes and Behavioural Issues	√	√		04
4	MS-404	Dissertation	√	√		04
		Total				**16**

SOCIALOGY OF CHANGE & DEVELOPMENT

UNIT -1 Meaning and Forms of Social Change, Evolution, Progress, Transformation, change in Structure and Change of Structure, Theories of Social change:Linear, Cyclical and Curvilinear.

UNIT-2 Factors of Social Change: Demographic, Economic, Religious, Factors ofSocial Change: Bio-tech, Info-tech and Media, Social Change in contemporary India: Trends of Change, Processes of Change: Sanskritization and Westernization, Processes of Change: Modernization and Secularization

UNIT -3 Changing Conceptions of Development: Economic Growth, Human Development Social Development, Sustainable Development, the Question of Socio-cultural Sustainability, Multiple Sustain abilities, Critical Perspectives on Development: Ecological, Liberal, Critical Perspectives on Development: Marxian.

UNIT -4 Theories of Development and Underdevelopment: Modernization Theories, Theories of Development and Underdevelopment: Centre-peripheri, World- systems, Unequal Exchange.

UNIT -5 Paths of Development: Capitalist, Socialist, Mixed Economy, Gandhian, Agencies of Development: State, Market, Non-governmental Organizations, Social Structure and Development: Structure as a Facilitator/Inhibitor, Development and Socio-economic Disparities, Gender and Development.

S-102
SOCIOLOGICAL THOUGHT

UNIT -1 AUGUSTE COMTE: The Development of Sociology in the 19th Century, Auguste Comte: Intellectual Background, Theory of Evolution and Progress, The Law of Three Stages, Hierarchy of the Sciences, Social Statics and Social Dynamics.

UNIT -2 KARL MARX: Karl Marx: Intellectual Background, Materialistic Interpretation of History, Emergence of Capitalism, Theory of Capitalist Development—Commodities, Surplus Value and Processes of Capitalism, Emergence of Classes and Class Conflict, Alienation in the Capitalist Society, Marx's Theory of Social Change.

UNIT -3 EMILE DURKHEIM: Emile Durkheim: Intellectual Background, Contribution to the Methodology of Sociology–Sociology as a Science Concept of Social Facts, Division of Labour in Society–Mechanical Solidarity and Organic Solidarity, Theory of Suicide, Theories of Religion.

UNIT -4 MAX WEBER: Max Weber: Intellectual Background, Sociology as an Interpretative Science, Concepts of Verstehen and Ideal Types, Theory of Social Action–Types of Social Actions, Analysis of Modern Capitalism: Protestant Ethic and Emergence of Capitalism, Concepts of Status, Class and Power, Authority and Power–Types of Authority, Bureaucracy.

UNIT -5 VILFREDO PARETO: Vilfredo Pareto: Intellectual Background, Contribution to the Methodology–Logico–Experimental Method Classificationof Logical and Non-Logical Actions, Theory of Residues and Derivatives, Theory of Social Change-Types of Elites, Their Classification, Circulation of Elite

-103HUMAN GROWTH AND DEVELOPMENT

UNIT -1 Life span Heredity and Environment: Stages of the life span. Life span perspective; Principles of growth and development; Methods of studying behavior; Role of heredity and environment; Social custom, traditions, values in parenting and child rearing practices, deprivation and development, during stages of the life span.

UNIT -2 Theories of Human Development: A critical look at the theories of human development like those of Freud's psychosexual theory, Erikson's psychosocial theory, learning theories and Piaget's theory of cognitive development, and those of a Jung, roger, Maslow and Murry.

UNIT -3 Indian Concept Understanding the Indian concept of life span stages.

UNIT -4 Human Development and Health Prenatal to pubertal Parental to Pubertal Growth: Stages of the life span from conception to old age; Parental stage and genetic factors, infancy and adjustment to immediate world; Early childhood growth play; relationship with family; early and later adolescence-pubertal growth, hazards, lifestyle effects. Youth in Indian society.

UNIT -5 Adulthood: Adulthood-growth personal and social adjustment, health, sexuality, vocational and marital adjustments; is aging: Characteristics, hobbies, adjustments; health; mental health; death; dying and bereavement. Special focus is on psychosocial development, moral development, and personality development vis-à-vis the influence of the contexts of development. The contexts here refer to gender family, significant others, neighborhood, peers, school, community, work place and other larger contexts like the society and culture. Emphasis is placed on the Indian context of development, variations from the normal patterns of development and viewson the stages takes, health, problems and services.

MS-104

THE RURAL SOCIOLOGY

UNIT -1 Concept and Scope: The Concept and Characteristics of rural and urban community development; Nature and Scope of community development; Historical review of rural and urban community development. **Rural Economy:** Nature of the Rural Economy, Society and Policy; Indian Rural Problem-Nature, Assumption and philosophy. Approaches to development: Modernization, capitalist, Socialist and Gandhi an approaches to development.

UNIT -2 Development Policies, Programmes and status in Rural India, Method and programmes of Government and Non-government interventions; The related structure of decision making and intervention; Land use pattern, water, Sustainable agriculture, Health, Education and Panchayati raj.

UNIT -3 Area Project Planning: Area Project Planning for Integrated rural development; Communication in Rural India. Theories of Economic development, Globalization and its impact on developing countries: Stages of growth theory; Structural internationalist theory; Privatization, programmes; Role of international financial institutions. Poverty in India—A structural problem: Causes, effects and implications; Entitlement approach to understanding poverty. Planning for development in India: World Hungermyths, magnitude, causes and remedies; Development aid to developing countries a critique. **Introduction to Political Economy:** Meaning of political economy; Significance of the study of political economy; Meaning and characteristics of development and under development; Universal values and objectives of development.

UNIT -4 Development: A Human Right Perspective: Social ideals of Indian Constitutions; Fundamental Rights; Human Rights. Socio-economic Order and Comparative Economic System: Capitalism, Socialism and Mixed economy, their features, merits and demerits; Marxian political economy.

UNIT -5 Social Analysis: Significant method of social analysis: A brief analysis of socioeconomic political and cultural systems; Their inter-linkages in the Indian context. Under-development and its Causes and Contemporary Development Dynamics: A historical overview with reference to developing countries of Asia, Africa and Latin America; North-South relations, world trades, Multinational corporations and their influences on Third World economies; Trends and counter trends in global, political, economic, military, ecological and socio cultural spheres.

MS-201
SOCIOLOGY OF INDIA

UNIT -1 Indian Society: Approaches to study Indian Society, Features of Indian Society.

UNIT -2 Caste and Class System: Indian Caste System, Social Classes in Rural India, Social Classes in Urban India, Features of Caste System, Tribe Class, Tribe inIndia.

UNIT -3 Social Identity and Change: Dalit Movements, Gender Based Movements, Tribal and Ethnic Movements.

UNIT -4 State Society and Religion: Communalism, Secularism.

UNIT -5 Social Institution and Change: Family, Marriage and Kinship, Religion in India.

MS-202

LAW AND SOCIOLOGY

UNIT -1 Rights: Concept of rights: legal rights, civil rights and under criminal procedure code, equality before law, rights of children, women and Scheduled Castes and Scheduled Tribes

UNIT -2 Law in India: Division of Law: Substantive Law: the creates, discovers and defines the rights and duties of each individual, for example, criminal code (Penal codes): Procedure Law: when a crime is committed, the procedure law is activated (Cr. PC. Evidence Act, etc.); Civil Law: (Private Wrongs) like those for inheritance, divorce, Juvenile Justice Laws; Lecture and small group work.

UNIT -3 Criminal Justice System: criminal Justice System in the country: Police, prosecution, judiciary and correction, district courts, session courts, high courts and the Supreme Court.

UNIT -4 The Components : Police: Structure, reporting, registration, investigation, arrest; How and what can be done, powers of the police bail and critique; Prosecution; Structure, screening, decision to prosecute, deciding the charges, public prosecutor and critique; Courts-district court, high court, supreme court; Structure (Civil, Criminal and Juveniles), Functions, trial participation, sentencing-institutional and non-institutional juvenile proceedings and critique; correction-Structure, function, treatment, rehabilitation and critique.

UNIT -5 Legal Aid: History of Legal Aid; concept of Legal Aid; Need for legal aid, who needs legal aid, legal aid schemes, problems, Public Interest Litigation History of Public Interest Litigating with special references to India, Public interest litigation: concept, processes and problems.

MS-203

SOCIAL POLICY AND ADMINISTRATION

UNIT -1 **Social Policy: Basic: Concepts**: concept of Social Policy, Nature of Social Policy, Scope of Social Policy, Principles of Social Policy, Principles of Social Policy, Sources of Socials Policy, Sources of Socials Policy, Ideology of Social Policy, Ideology of social Policy, Public Opinion, constitution, Social Policy and Welfare Policy Similarities, and differences.

UNIT -2 Process and Social Policy: Social Policy Formulation Structure and Processes, Major Determinants in social Policy Formulation, social Policy Implementation, role of different Agencies and Major Problems of Implementation, Implementation, Monitoring, and Evaluation.

UNIT -3 Social Work Administration: Basic concepts, Meaning, Scope and Significance of Social Work Administration, social Administration and Social Work Administration, Social Work Administrator, Functions and Skills, Bureaucracy: Nature, Characteristics and Issues.

UNIT -4 Social Planning: Definition, Nature, Scope, Principles, Process and Models of Social Planning, Indian Federal Structure and Social Planning, Social Policy and Welfare Planning centralization, Decentralization, People's Participation in Social Planning, social Planning machinery in India and its functions, Social planning in Five Year Plans.

MS-204
SOCIOLOGY OF RELIGION

UNIT -1 Definitions and Approaches: The Scope of Religion, Process of Knowledge, Study of Totems, Economy and Religion, the Rise of Capitalism, Goods and Goddesses, Origin theories, Durkheim and the Sacred, FunctionalInterpretation of Religion, The Marxist Anthropological Viewpoint.

UNIT -2 Classical Theories: Marxian Social Thought, Notion of Religion, Religion – An Instrument of Oppression, Religion as Super Structure, criticisms to Marxian approach to the Study of religion, **Ethnographic Studies of Religion:** Legacy of the Coorgs, Land Tenure System, Tribes and Caste in coorg, Aspects of Hinduism, Domestic, Life Cycle Rituals, concepts of Auspiciousness and Purity, the story of Samskara.

UNIT -3 Contemporary Theories: The theoretical Framework, world Construction, Religion and World construction, Existing Perspectives on Religion, The concept of Religion, Secularization, The Future of Religion.

UNIT -4 Religion and Social Change: Definitions of Secularism, What is secularization, Theories of Secularism, The European Experience, the Indian Experience.

UNIT 5 Communalism and fundamentalism: Definition of Fundamentalism,Politics, Religion and Education, Fundamentalism and Equality of Religions, Definition of communalism, Fundamentalism and communalism.

MS-301
SOCIOLOGY OF EDUCATION

UNIT -1 Introduction, Conceptual clarity, Relationship between society and education, Education and Development

UNIT -2 Socialization and Education: Relations between socialization and Education. Agencies of socialization and Education: Family, Peer Groups, School and Media.

UNIT -3 Education, Inequalities and Social Justice, Concept of Equality of Educational Opportunity. Education and Disparities, Caste. Class, tribe, gender, rural urban, Education and social mobility.

UNIT -4 Emerging Trends in Education in India. School education: Existing scenario. Higher Education in India, Governance of Higher Education: Institutionalprogrammes, NEP 2020

MS-302
SOCIOLOGY OF KINSHIP

UNIT -1 **APPROACHES TO THE STUDY OF KINSHIP** : Descent Theory: Types of Descent, Rules of Residence, Alliance Theory: Incest and Exogamy;Restricted Exchange and Generalised Exchange.

UNIT -2 **CULTURAL ACCOUNT OF KINSHIP :** Euro-American Kinship, Kinshipas Practice: Marriage Strategies, Patterns of Marriage in India.

UNIT -3 **CONTEMPORARY ISSUES IN KINSHIP:** Bride-Wealth and Dowry. Gay - Lesbian perspectives.

UNIT -4 **KINSHIP IN INDIA:** Dravidian Kinship, Family- household

MS-303 RESEARCH METHODOLOGY

UNIT -1 Overview of Research Methodology, Types of Research , Research Process.

UNIT -2 Data Collection and presentation, Basic Statistical measures, Design and Analysis of Experiments, attitude measurement and scales.

UNIT -3 Sampling Methods and Distribution, Statistical Inference: Tests of Hypotheses, Correlation and Regression.

UNIT -4 Qualitative Research Methods and Techniques, Field Research.

UNIT -5 Qualitative Data Formatting and Processing, Writing Up Qualitative Data,Data Analysis and Presentation of Research Findings, Using Internet Word Processor, Using SPSS for Data Analysis, Using SPSS in Report, Writing, Tabulation and Graphic Presentation, Report writing.

MS-304
URBAN SOCIOLOGY

UNIT -1 **CONCEPT:** What is Urban Sociology?, Urban centre, Urbanization andUrban Growth, City and Metropolis, Rural-Urban Continuum

UNIT -2 **EVOLUTION OF INDIAN URBAN STRUCTURE:** Ancient, medieval and colonial cities: case studies, Typologies of cities, Functional classifications of cities: commercial, administrative and pilgrimage towns, Trends and patterns of urbanization

UNIT -3 **URBAN SOCIOLOGY IN INDIA:** Urban sociology in India, Marriage,family and kinship, Traditional neighbourhoods and modern cities

UNIT -4 **URBAN ISSUES IN INDIA:** Poverty, Slums, Urban governance

MS- 401

ECONOMICS OF SOCIAL SECTOR AND ENVIRONMENT

UNIT 1

Society, state and market, economy and environment, society and environment, Poverty And Inequality, Multidimensional Concept of Poverty , Measurement of inequality, Economic andEnvironment, Market failure in the context of environmental goods.

UNIT 2

Economics of education, demand for educational services, supply of educational services, Determinants of educational services, Economics of education, Importance of Economics ofEducation, Privatization of education , Demand for educational services, Private and Social Demand for Education, Social demand for education.

UNIT 3

Society and education linkages, Schools as an organ of society, The influence of society to education process, understanding community, community and school interface, education andeconomic development in India, trends in the education sector in India, the ecosystem of education cities will mature in India.

UNIT 4

Demand for natural and environmental resources in India, Environment and economicdevelopment, Protection of environment and sustainable development, Environment, ecosystem supply and services

UNIT 5

Sustainable development, The birth and evolution of sustainable development, Sustainabledevelopment and the environment, the social dimension of sustainable development, basiceconomic principles of sustainable development, environmental policy and governance, sustainable development in India, functions of SDG in India.

MS-402

MANAGEMENT OF HUMAN RESOURCE

UNIT – I Responsibilities of Human Resource Management, Human ResourceManagement Goal, Training and Development of Employee, comparison between Personnel Management and Human Resource Management, Comparison on the basis of Strategic Aspects, role of the Human Resource Management, Human Relation theory, Revolution of the Human Resource management, Human Relation concept, To Understand Human Behaviour,

UNIT – II Human Resource Planning, Definition, Benefits of HRP, Activities Involve , Need for HRP, Process, Benefits, human Resource Planning System, Responsibility of Human Resource Planning Department, concept of Recruitment and Selection, Recruitment Practice In India, Selection Technique, Evaluation and Selection Criteria, The Selection Process, approval by manager, Medical Examination, induction

UNIT – III Training -Concept of Training, Objective of Training, difference between Training and Development , Objective of Training, Importance of Training , Benefits of Training, Training Need Identification, Total Organisational Analysis, Organisation Analysis Requirements, Organisational diagnosis, Task Analysis, Performance Analysis, Training Needs Identification, Different Kinds of Training Needs, Methodology of Training and Development, Training and Development Process Simulation Exercises and role Paying,

UNIT – IV Performance Appraisal - Concept and Need of Employee Review, Concept of Performance Appraisal, Concept of Performance Appraisal, Types of Appraisal Methods, Paired comparison analysis, Advantages of the 360 Degree Appraisal, Problem with the 360 Degree Appraisal Process, Management by objectives (MBO), Unique Features and Advantages of MBO, Benefit of the Performance Appraisal,

UNIT – V Compensation Management - Components, Types, Direct & Indirect compensation, Need, Management, Managing Compensation, Standard of Living Theory, Demand and Supply "Theory, Marginal Productivity Theory, Purchasing Power Theory, classification of Wages, Designing and Administering Benefits, Job Evaluation – Definition, Procedure, Method, Advantages & limitations, Moral – Meaning, Importance, Measurement.

MS-403

Social Processes and Behavioural Issues

Unit-I

Social Process: - types of social process, environment and organization, forms of social process as sources of human behaviour and social process level from individualto organization (from micro to macro). Organization in dynamic environment: - Introduction and recent changes in Indian society and organization. Organizational process and behaviour: - Meaning, definition of organizational behaviour, elements oforganizational behaviour, approaches to organizational behavioural and organizational behavioural models. Individual Behaviour and Process: - Introduction and the components of individual process

Unit -II

Organizational Communicational Process: - definition of communication, process of communication, elements of communication process, goals of organizational communication process, Leadership: - importance of leadership, functions of leadership, theories of leadership, effective qualities for leadership. Decision making:
- Importance of decision making, models of decision-making process, leadership anddecision making in organization. Organizational power: - Introduction, concept of power, definitions of power, importance of power in an organization. Organizationalpolitics: - types of political behaviour, factors influencing organizational politics andthe basis of organizational politics.

Unit -III

Diversity Management: - Introduction, meaning of diversity management, importanceof diversity in organization, effective diversity management and strategies to developeffective diversity management in organization. Organizational Culture: - Introduction, concept of Organizational culture, primary characteristics of an organization's culture, basic elements of organizational culture, role of culture in organization.

Unit-IV

Counselling: - Introduction of counselling, nature of counselling, functions of counselling, types of counselling, the purpose of counselling, Behaviour modification:
- Introduction, meaning of behaviour modification, characteristics of behaviourmodification, techniques for behaviour modification. Conflict Management: - Introduction, concept of conflict, causes of conflict in organization. Stress management: - Introduction, management of stress.

Unit V

Negotiating strategies for work behaviour: - Introducing negotiation, the process ofnegotiation,

Positive /Optimism approach to work behaviour in organization: - Introduction, dimensions of optimism, importance of optimism in workplace, ways to maintain apositive attitude at work. Workplace Spirituality: - Benefits of spirituality at workplace, principles of spirituality in the workplace and ways to encourage spirituality in the workplace.

Scheme - B.A (Hons) English

B.A (Hons) English			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BEN-101	English Communication Skills-1	4	0	0	4
2	BEN-151	English Communication Lab-1	0	0	2	1
3	BEN-102	History of English Literature: An Overview	4	1	0	5
4	BEN-103	British Poetry and Drama: 14th to 17th Century	4	1	0	5
	BEN-104	Modern Indian Writings in English Translations	4	1	0	5
	BEN-120	Business Communication	3	0	0	3
	PDP-101	Induction & Nurturing Hobby	0	0	2	1
		Total				**24**

Scheme - B.A (Hons) English

B.A (Hons) English			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BEN-111	Indian Writing in English- An Overview	4	1	0	5
2	BEN-112	Popular Literature	4	1	0	5
3	BEN-113	Media & Communication Skills	4	0	0	4
4	BEN-114	English Communication	2	0	0	2
5	BEN-111B	Seminar on Indian Writing	2	0	0	2
6	BEN-112B	Seminar on Popular Literature	2	0	0	2
7	BEN-113A	Media & Communication Skills Lab	0	0	2	1
8	CEA-101A	Environmental. Science & Ecology	2	0	0	2
9	PDP-102	People Connect	0	0	2	1
		Total				**24**

Scheme - B.A (Hons) English

B.A (Hons) English			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BEN-201	Soft Skills	4	0	0	4
2	BEN- 202	American Literature	4	1	0	5
3	BEN- 205	Academic Writing and Composition	4	1	0	5
4	BEN- 206	British Poetry & Drama: 17th to 18thCentury	4	1	0	5
5	BEN-202B	Seminar on American Literature	2	0	0	2
6	BEN-251	Soft Skills Lab	0	0	2	1
7	PDP-201	PDP- Personality Development & Grooming	0	0	2	1
		Total				16

Scheme - B.A (Hons) English

B.A (Hons) English			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BEN-211	Presentation Skills	4	1	0	5
2	BEN-252	Presentation Skills Lab	0	0	2	1
3	BEN-212	European Classical Literature – An Overview	4	1	0	5
4	BEN-213	British Literature 19th Century & Early 20th Century	4	1	0	5
5	BEN-214	Literary Criticism – An Introduction	4	1	0	5
6	BEN-215	Science Fiction and Detective Literature	4	1	0	5
7	PDP-202	Life Skills	0	0	2	1
		Total				27

Scheme - B.A (Hons) English

B.A (Hons) English			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BEN-301	Applied Language Skills	4	0	0	4
2	BEN-351	Applied Language Skills Lab	0	0	2	1
3	BEN-302	Postcolonial Literature	4	1	0	5
4	BEN-303	Language, Literature & Culture	4	1	0	5
5	BEN-304	Literary Theory	4	1	0	5
6	BEN-305	Indian Classical Literature	4	1	0	5
7	PDP-301	Leadership & Entrepreneurship Development	0	0	2	1
		Total				**26**

Scheme - B.A (Hons) English

B.A (Hons) English			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BEN-307	Literature of the Indian Diaspora	4	1	0	5
2	BEN-308	Modern European Drama	4	1	0	5
3	BEN-309	British Literature Post World War II	4	1	0	5
4	BEN-310	Women Writings: 19th to 20th Century	4	1	0	5
5	BEN-311	Research Methodology	4	1	0	5
6	BEN-312	Functional English	4	1	0	5
		Total				**30**

SEMESTER- I

Course No.	Course Name	L-T-P	Cr.
BEN-101	**English Communication Skills-1**	**4-0-0**	**4**

Course Outcomes - Students will be able to:

- CO1: Apply the rules of tenses and verbs appropriately.
- CO2: Identify literary devices and differentiate between poetry and prose
- CO3: Compose original pieces of writing using different genres.

Unit-1: Remedial English- Parts of Speech; Tenses and their application; Verbs and their various forms.

Unit-2: Oral Communication- Developing meaningful conversation; extempore speech; welcome speech etc.

Unit-3: Writing Skills- Introduction to various types of writings including general writing, technical writing, creative writing, picture composition etc.

Unit-4: Introduction to various literary devises; different forms of prose writing; different poetic forms, figures of speech, how to appreciate a poem? etc.

Unit-5: Professional Skills- Basic ethics in communication, body language in communication, News Paper reading etc.

COURSE CODE	COURSE NAME	L-T-P	Cr.
BEN-151	English Communication Lab-1	0-0-2	1

Course Outcomes: Student should be able to:

- CO1: Analyse skills & approaches of a successful listener by taking notes forcomprehension.
- CO2: Identify articulatory & presentation skills needed to participate in oralpresentations in various professional settings
- CO3: Apply reading skills using reading comprehension techniques.
- CO4**:** Demonstrate critical thinking ability through writing.

Details:

1. Self-introduction
2. Exercises on speaking: JAM
3. Exercises on speaking: Extempore
4. Newspaper reading and preparing writeup
5. Debate
6. Reading Comprehension
7. Speech on current affairs
8. Group Discussion
9. Listening Comprehension
10. Slogan Making

Course No.	Course Name	L-T-P	Cr.
BEN-102	**History of English Literature: An overview**	**4-1-0**	**5**

Course Outcome - Students will be able to:

1. Classify literary texts of different periods
2. Evaluate representative literary works written in different ages.
3. Analyse the complex relationship between literature and society.

Unit-1: Old English to Middle English Period

Unit-2: Elizabethan & Jacobean Period

Unit-3: Restoration & Augustan Period

Unit-4: Pre-Romantics & Romantics

Unit-5: Victorian Period

Course No.	Course Name	L-T-P	Cr.
BEN-103	**British Poetry & Drama: 14th to 17th Century**	**4-1-0**	**5**

Course Outcome - Students will be able to:

- CO1. Examine the major genres and forms of English literature
- CO2: Analyse the poems and plays in the larger socio-political andreligious contexts of the time
- CO 3: Develop fundamental skills required for close reading and critical thinking of the texts and concepts

Unit-I: Introduction- Students are required to study the social, political, religious and economic conditions of the respective ages in England, significant movements, influences and literary schools.

Unit-II: Chaucer- Nun's Priest's Tale, Edmund Spenser-The Faerie Queen, Book-1, Milton- How Soon Hath Time, Donne- A Hymn to God the Father, Andrew Marvell - To His Coy Mistress

Unit-III: Shakespeare- Macbeth

Unit-IV: John Bunyan- The Holy War

Unit-V: An Essay of Dramatic Poesy- John Dryden

Course No.	Course Name	L-T-P	Cr.
BEN-104	**Modern Indian Writings in English Translations**	**4-1-0**	**5**

Course Outcome - Students will be able to:

1. **Analyze translated texts in English**
2. **Develop awareness of the universal human concerns that are the basis for literary works.**
3. **Distinguish literature as an expression of human values within a historical and social context.**

Unit-1: Introduction to Indian literature and its various phases; importance of translated works in contemporary literary world etc.

Unit-2: Short Stories-Premchand: *'The Shroud'*, IsmatChugtai: '*The Quilt'*, Gurdial Singh : *'A Season of No Return*.

Unit-3: Poetry-Rabindra Nath Tagore-'*Light, Oh Where is the Light*?' and *'Where the Head is Held High*', from *Gitanjali*.

G.M. Muktibodh- *'The Void'* and '*So Very Far'*, (tr. Tr. Vishnu Khare and Adil Jussawala), in The Oxford Anthology of Modern Indian Poetry, ed. Vinay Dharwadker and A.K. Ramanujam (New Delhi: OUP, 2000).

Amrita Pritam- '*I Say unto Waris Shah'*, (tr. N.S. Tasneem) in Modern Indian Literature: An Anthology, Plays and Prose, Surveys and Poems, ed. K.M. George, vol. 3 (Delhi: Sahitya Akademi, 1992).

Unit-4: Novel- DharamveerBharati-*AndhaYug*, tr. AlokBhalla (New Delhi: OUP, 2009).

Unit-5: Drama- G. KalyanRao Untouchable Spring, tr. Alladi Uma and M. Sridhar (Delhi: Orient BlackSwan, 2010

COURSE CODE	COURSE NAME	L-T-P	Cr.
BEN-120	**Business Communication**	**3-0-0**	**3**

Course Outcomes: Students will be able to:

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1. Demonstrate his/her ability to write error free while making an optimum use of correct Business Vocabulary & Grammar.
2. Distinguish among various levels of organizational communication and communication barriers while developing an understanding of Communication as a process in an organization.

UNIT-1: Communication: Importance of communication, Forms of Communication, Communication Network of the Organisation, Process of communication-different stages, Difference between Oral and Written Communication

UNIT-2: Oral Communication: Fundamentals of Oral Communication, Introduction Barriers and Gateways in Communication, Listening, Feedback, Public Speaking and Presentation-Oral and Power point presentation

UNIT-3: Routine Correspondence: Circulars, Drafting Notices, Handling Complaints, Minutes of Meeting-Agenda and Resolution

UNIT-4: Technical Writing: Business Letters, Format of Business Letters and Business Letter Writing, Email writing

UNIT-5: Business Report: Reports, Types of Reports, Format of Formal Reports and Report Writing, Press Report Writing

Course No.	Course Name	L-T-P	Cr.
PDP - 101	Hobby Club: Induction & Nurturing Hobby	0-0-2	1

Learning Outcomes: Student should be able to:

- Build vocabulary to comprehend reading and listening activities
- Apply correct form of the words in their oral and written language production.
- Develop teamwork and leadership skills

ACTIVITY SCHEDULE:

- Self-introduction, Spin a Yarn, Spoonering, Anagrams, Tongue twisters, Slogan Writing/Poster Making, Word Building exercises, Treasure Hunt, Symposium, The Buck stops here (Debate), Titanic Ship Wreck- Rewind to 15th April 1912. (Titanic is sinking. Life Boats are limited and the time is short. Make your point, be persuasive and you might make it alive), Gender Bender- Write the turns of events if the gender of the protagonist is switched, Idioms and Praises, Conducting Interviews, Medley 'o' Mania- Convert medieval writing into modern writing, Poets Galore- Recitation and analysis of poems written by a favourite poet/poetess.

SEMESTER- II

Course No.	Course Name	L-T-P	Cr.
BEN-111	Indian Writing in English – An Overview	4-1-0	5

Course Outcomes - Students will be able to:

- CO1: Discuss the characteristics of major periods of Indian Writing in English
- CO2: Analyze the elements of poetry, novel and drama with respect to their socio-political background.
- CO1: Evaluate the universal themes and human conditions with reference to texts prescribed

UNIT 1: An Introduction to Indian Writing in English; Indian English Literature & its readership; Themes & Contexts of Indian English Novels; The Aesthetics of Indian English Poetry; Modernism in Indian English Literature

UNIT 2: R.K.Narayan :*Swami & Friends*

UNIT 3: Anita Desai: *In Custody*

UNIT 4: H.L.V.Derozio : *Freedom to the Slave, The Orphan Girl;* Kamala Das: *Introduction, My Grandmother's House;* Nissim Ezekiel: *Enterprise, The Night of the Scorpion;* Robin S.Ngangom: *The Strange Affair of Robin S.Ngangom', A Poem for Mother*

UNIT 5: Mulk Raj Anand: Two *Lady Rams;* Salman Rushdie: *The Free Radio;* Rohinton Mistry: *Swimming Lesson;* Shashi Deshpande: *The Intrusion*

Course No.	Course Name	L-T-P	Cr.
BEN-112	C4 Popular Literature	4-1-0	5

Course Outcomes - Students will be able to:

- CO1: Explain the early history of print culture in England and the emergenceof genre fiction
- CO 2: Distinguish between high and low culture, canonical and non-canonical- literature.
- CO 3: Analyse the characteristics of various genres of non-literary fiction
- CO 4: Critically evaluate the prescribed texts

UNIT 1: Coming of Age; Canonical & popular; Caste, gender & identity; Ethics & Education in Children's Literature; Sense & Nonsense; The Graphic Novel

UNIT 2: Lewis Carroll: *Through the Looking Glass*

UNIT 3: Agatha Christie: The *Murder of Roger Akroyd*

UNIT 4: Shyam Sevadurai: Funny *Boy*

UNIT 5: Durgabhai Vyam &SubhashVyam:*Bhimyana: Experiences of Untouchability*

Course No.	Course Name	L-T-P	Cr.
BEN-113	**Media & Communication Skills**	**4-0-0**	**4**

Course Outcomes - Students will be able to:

1. Relate the importance of good writing in the field of Mass Media - from print to Digital Media
2. Interpret theoretical perspectives behind mass media and the jargon associated with the field.
3. Develop writing skills required for various media - from journalism in print and broadcast media to advertising and creative commercial media

UNIT-1 Introduction to Mass Communication – Mass Communication & Globalization, Forms of Mass Communication (Topics for Student Presentation: Case studies of Current issues in Indian Journalism,

Performing street plays, writing pamphlets & posters)

UNIT 2: Advertisements – Types of Advertisements, Advertising Ethics, how to create Advertisement / story boards (Topics for student presentation – Creating advertisement / visualization, enacting an advertisement in a group, Creating jingles & taglines)

UNIT 3: Media Writing: Script writing for TV / Radio, writing News reports & editorials, editing for print & online media (Topics for student presentation –Script writing for a TV / Panel Discussion / radio programme/ hosting Radio Programme, editing articles, writing an Editorial for a topical subject)

UNIT 4: Introduction to Cyber and social media: Types of social media, impact of social media. Introduction to cyber media

UNIT 5: Digital Media- An Overview: Types of digital media: E-Book, E-Journal, E-Magazine, Internet, World wide web; Copyright, Plagiarism.

Course No.	Course Name	L-T-P	Cr.
BEN-114	**English Communication**	**2-0-0**	**2**

Course Outcomes - Students will be able to:

1. Demonstrate their familiarity with theories of communication and their types.
2. Develop effective communication

UNIT 1: Introduction: Theory of Communication, Types and Modes of communication

UNIT 2: Language of Communication: Verbal & Nonverbal; Personal, Social & Business; Barriers & Strategies; Intra-personal, Interpersonal & Group Communication

UNIT 3: Speaking Skills: Monologue, Discussion, Group Communication, Effective communication, Mis communication; Interview, Public speech

UNIT 4: Reading & Understanding: Close reading, comprehension, summary, paraphrasing, analysis, &Interpretation, translation (from Indian Language to English & Vice versa) Literary / knowledge texts

UNIT 5: Writing Skill: Documenting, Report writing, Making Notes & Letter writing

Course No.	Course Name	L-T-P	Cr.
BEN-111 B	**C3 Seminar on Indian Writing**	**2-0-0**	**2**

Course Outcomes - Students will be able to:

1. Demonstrate thorough knowledge of Indian Writing based on prescribed text(s)
2. Make effective presentation based on analysis & research

Details:

- Students should be assigned with topics regularly related to the syllabus and of current importance
- They must be encouraged to do sincere library reading of related books with the help of the teacher.
- Every week, the students should be given chance to prepare & present a topic. The presentation should be evaluated and the record of the content and evaluation should be kept with the faculty member's signature.
- Each student should have a Seminar file which keeps the records of all their presentations with the evaluation
- One student should complete 8 EFFECTIVE & SUCCESSFUL presentations in a semester to secure the 2 credits
- In case of PPt. presentation, the faculty should collect the PPt. Presentation and the full paper prepared on that.

- Topics should be different for each student in each presentation. The faculty should prepare meaningful topics well in advance.
- Faculty members should have a clear idea about the reference books available on the Courses they are dealing with.
- Along with oral presentation, assess the handwriting of the students also.

Course No.	Course Name	L-T-P	Cr.
BEN-112B	**C4- Seminar on Popular Literature**	**2-0-0**	**2**

Course Outcomes - Students will be able to:

1. Demonstrate thorough knowledge of Indian Writing based on prescribed text(s)
2. Make effective presentation based on analysis & research.

Details:

- Students should be assigned with topics regularly related to the syllabus and of current importance
- They must be encouraged to do sincere library reading of related books with the help of the teacher.
- Every week, the students should be given chance to prepare & present a topic. The presentation should be evaluated and the record of the content and evaluation should be kept with the faculty member's signature.
- Each student should have a Seminar file which keeps the records of all their presentations with the evaluation
- One student should complete 8 EFFECTIVE & SUCCESSFUL presentations in a semester to secure the 2 credits
- In case of PPt. presentation, the faculty should collect the PPt. Presentation and the full paper prepared on that.

- Topics should be different for each student in each presentation. The faculty should prepare meaningful topics well in advance.
- Faculty members should have a clear idea about the reference books available on the Courses they are dealing with.
- Along with oral presentation, assess the handwriting of the students also.

Course No.	Course Name	L-T-P	Cr.
BEN-113A	**Media & Communication Skills Lab**	**0-0-2**	**1**

Course Outcome - Students will be able to:

1. Demonstrate ability to make presentations orally with the help of Power Point.
2. Develop familiarity with activities like collage making, preparing advertisements, dialogue writing and hosting talk shows.

Activity 1- Formal Self Introduction; write the content, get assessed by the faculty member & then present confidently

Activity 2: Preparing Pamphlets & Posters on various programmes and current issues

Activity 3: Panel Discussion - Choose topics of real-life relevance and conduct a discussion

Activity 4: Case Studies - on topics & issues of current importance, topics of importance in the Newspaper& Journals

Activity 5: Advertisement – Prepare the ad with suitable jungles / tagline, enact the ad

Activity 6: Dialogue writing: Preparing script for a programme; Hosting a programme

Activity 7: PPt. Presentation & Oral presentation: Prepare PPt. Presentation on the assigned topic and get it evaluated by the teacher and then give a presentation of it.

Activity 8: Interpretation of visual images: Display some visual images and encourage the students to make some creative interpretation of that in written form. Then present it .

Activity 9: Collage making: Assign the students to prepare a collage on some social or educational issues.

Activity 10: Talk show: Invite some experts, conducted a talk show on topics related to the syllabus like Cyber-crime prevention, Plagiarism & copyright;

Course No.	Course Name	L-T-P	Cr.
CEA-101A	**Environmental Science & Ecology**	**2-0-0**	**2**

Course Outcome - Students will be able to:

1. Understand fundamental terms related to environment and aware of environmental Problems
2. Analyze the complexities of environmental problems and should know remedies available to them and implement them at their own level;
3. Move forward in their professional life with a environment conscious mind and preserve our environment as much as they can.

UNIT-1.THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:

Basic definitions related to environment; Scope, vis-à-vis environmental science and environmental engineering; uses of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principals involved in environmental education, environmental awareness, Environmental ethics, environmental organization and their involvement.

UNIT-2 NATURAL RESOURCES:

Renewable and non-renewable resources; forest resources, over-exploitation, and deforestation / afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; Food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non-renewable

energy sources, solar energy, wind energy, hydro energy, biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT-3 ECOSYSTEMS:

Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids; characteristic features, structure and function of the following ecosystem -forest ecosystem, grassland ecosystem desert ecosystem and aquatic ecosystems.

UNIT-4 BIODIVERSITY AND ITS CONSERVATION:

Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT-5 ENVIRONMENTAL POLLUTION AND SOCIAL ISSUES:

Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution; solid waste management, e-waste management; disaster management –floods, earthquake, cyclone and landslides. Water conservation, rain water harvesting, watershed management; climate change, global warming, acid rain, ozone layer depletion; Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act.

COURSE CODE	COURSE NAME	L-T-P	Cr.
PDP-102	**People Connect**	**0-0-2**	**1**

Course Outcomes: Students will be able to

1. Identify the characteristics of written communication
2. Apply the techniques to improve communication
3. Analyse the nuances of interpersonal skills and communication
4. Understand the benefits of public speaking and apply the same in Presentations
5. Illustrate correct usage of English grammar in writing and speaking

UNIT 1- WRITTEN COMMUNICATION:

A) Memorandum B) Minutes of Meeting C) Email Composing & Writing D) Report Writing E) Resume – Types and practice sessions for writing

UNIT 2 – TECHNIQUES FOR IMPROVING COMMUNICATION

A) MTI - Removal exercises B) Business Idioms & Phrases, Rapid Reading C) Writing Drafts and revising

UNIT 3 – COMMUNICATION SKILLS

A) Inter personal skills- dos and don'ts (B) Spoken English- Common mistakes, dos and don'ts C) Interpersonal Communication and Relations (D) Striking the 1st Conversation- who, what, when, where and how? (E) Team Building & Public Speaking (F) Practice Sessions

UNIT 4 - PUBLIC SPEAKING

A) Group Discussion B) Oral Presentations & Interviews C) Presentation Aids and their usage D) Graphic Presentation E) Project proposal, manuals, brochures, technical articles

UNIT 5 – Grammar- Parts of Speech, Letter Writing (Formal) – Components, format & Sample Letter, Idioms & Phrases.

SEMESTER-III

Course No.	Course Name	L-T-P	Cr.
BEN-201	Soft Skills	4-0-0	4

Course Outcomes - Students will be able to:

1. Demonstrate leadership qualities
2. Develop the ability to connect with other's emotionally and adapt to situations.

Unit-1: Teamwork

Unit-2: Emotional Intelligence

Unit-3: Adaptability

Unit-4: Leadership

Unit-5: Problem solving

Course No.	Course Name	L-T-P	Cr.
BEN-202	American Literature	4-1-0	5

Course Outcomes - Students will be able to:

1. Gain an introductory understanding of American literature. In addition, they will be able to distinguish American literary trends from those of other regions.
2. Appreciate American culture and literature
3. Analyse the experimental nature of American literature like meta fiction, magical realism and confessional literature.

Unit-I: Introduction- Students are required to study the social, political, religious, and economic conditions of the respective periods in American writings in English, significant literary movements, influences and literary schools.

Unit-II: Walt Whitman-: Song of Myself, Robert Frost: The Road Not Taken, Stopping by Woods in a Snowy Evening, Sylvia Plath: Tulip Mirror

Unit-III: Ernest Hemingway: The Old man and The Sea

Unit-IV: Arthur Miller: Death of a Salesman

Unit-V: Emerson: Self Reliance

Course No.	Course Name	L-T-P	Cr.
BEN-205	**Academic Writing and Composition**	**4-1-0**	**5**

Course Outcome: Students will be able to:

1. Demonstrate an understanding of literary conventions of academic writing.
2. Develop a basic understanding of critical thinking.
3. Structure arguments, summarize and paraphrase.

Unit-1: Introduction to the Writing Process

Unit-2: Introduction to the Conventions of Academic Writing

Unit-3: Writing in one's own words: Summarizing and Paraphrasing

Unit-4: Critical Thinking: Syntheses, Analyses, and Evaluation

Unit-5: Structuring an Argument: Introduction, Interjection, and Conclusion, Citing Resources; Editing, Book and Media Review.

Course No.	Course Name	L-T-P	Cr.
BEN-206	**British Poetry & Drama: 17th to 18th Century**	**4-1-0**	**5**

Course Outcome - Students will be able to:

1. Demonstrate an ability to engage in an intellectual discussion on the poets and dramatists in the syllabus
2. Critically analyse restoration comedy.
3. Analyse the genre of mock epic and epic.

UNIT:1 Introduction to British poetry and Drama 17th to 18th century.

UNIT:2 John Milton: *Paradise Lost: Book 1*

UNIT:2 John Webster: *The Duchess of Malfi*

UNIT:3 Aphra Behn: *The Rover*

UNIT:4 Alexander Pope: *The Rape of the Lock*

Course No.	COURSE NAME	L-T-P	Cr.
BEN-202B	**Seminar on American Literature**	**2-0-0**	**2**

Course Outcome - Students will be able to:

1. Exhibit knowledge of American literature, its central themes, literary periods, and key artistic features
2. Make effective presentation on related area.

Details:

- Students will be assigned with topics regularly related to the syllabus and of current importance
- They must be encouraged to do sincere library reading of related books with the help of the teacher.
- Every week, the students should be given chance to prepare & present a topic. The presentation should be evaluated and the record of the content and evaluation should be kept with the faculty member's signature.
- Each student should have a Seminar file which keeps the records of all their presentations with the evaluation
- One student should complete 8 EFFECTIVE & SUCCESSFUL presentations in a semester to secure the 2 credits
- In case of PPt. presentation, the faculty should collect the PPt. Presentation and the full paper prepared on that.
- Topics should be different for each student in each presentation. The faculty should prepare meaningful topics well in advance.
- Faculty members should have a clear idea about the reference books available on the Courses they are dealing with.
- Along with oral presentation, assess the handwriting of the students also.

Course No.	COURSE NAME	L-T-P	Cr.
BEN-251	**Soft Skills Lab**	**0-0-2**	**1**

Course Outcome - Students will be able to:

1. Develop formal communication skills in a work place.
2. Acquire team skill by working in-group activities.
3. Use suitable language and speech patterns in a workplace.
4. Enhance the ability of critical & lateral thinking while addressing the issues at any situation.
5. Present themselves confidently in job interviews.

Details:

- Newspaper reading and making write up on news events; presenting the write up, Listening Comprehension: a) Video Tapes b) Dialogue
- Preparing speech on given topic with the help of Internet
- Creative Writing
- Role Play, Turn Coat
- Group Discussion
- Reading Comprehension
- Picture/Cartoon Interpretation
- Telephone Conversation

Course No.	COURSE NAME	L-T-P	Cr.
PDP-201	PERSONALITY DEVELOPMENT & GROOMING	0-0-2	1

Course Outcome - Students will be able to:

1. Demonstrate interpersonal skills in day-today communication
2. Analyse and apply human values & ethics esp. at workplace
3. Learn to be presentable while considering etiquette, grooming and attitude

UNIT-1: Interpersonal Skills - Meaning, components, techniques to develop IS & its benefits.

UNIT-2: Creativity - Meaning, Creativity v/s Innovation, barriers, importance of creativity.

UNIT-3: Human Values & Ethics - Importance, Professional/ Work Ethics & Becoming a Role Model.

UNIT-4: Etiquette & Manners - Meaning, Importance of Professional Etiquette.

UNIT-5: Corporate Dressing & Grooming – The Corporate Fit, Corporate Culture, Dress Code, Clothing Do's & Don'ts, Interview Dress Code, Personal Hygiene, Hairstyles etc.

UNIT 6 - Attitude - Concept, Significance, Types, Importance of Positive Attitude.

SEMESTER- IV

Course No.	Course Name	L-T-P	Cr.
BEN-211	**Presentation Skills**	**4-1-0**	**5**

Course Outcomes - Students will be able to:

1. Engage in meaningful communication and conversations including those on the telephone.
2. Demonstrate their ability to make presentations.

UNIT 1: Theories of Communication – Oral and Written Communication – Features of oral communication –word stress – intonation - falling and rising tones

UNIT 2: Conversations – Vocabulary – Introducing yourself – Body Language – Public speaking - Debates – Group Discussion – Discussion Skills – Interview skills and etiquettes – Meetings - Voice and delivery – Dress code – Class seminar presentation – Viva voce.

UNIT 3: Effective Presentation- Planning, Preparation, Delivery, Feedback, Tips to overcome fear

UNIT 4: Telephone skills – Handling calls – Leaving messages – Making enquiries – Placing an order – Booking and arrangements – Change of plan – Handling complaints.

UNIT 5: Computer aided presentations – Basic computer skills – OHP – Preparation of slides – Power point presentation – Visuals and sounds.

Course No.	Course Name	L-T-P	Cr.
BEN-252	**Presentation Skills Lab**	**0-0-2**	**1**

Course Outcome - Students will be able to:

1. Demonstrate adequate reading, writing and verbal skills.
2. Demonstrate ability to show familiarity with Newspapers and Advertisements.

1. **Listening Skills:** Make each student speak for one minute on any topic of choice, make another student repeat the content of the speech, assess the comprehension skill of the second student and the expression skill of the first student. Give healthy feedback.
2. **Reading Skill:** Make the students read the given text material with proper tone & clarity, Let the teacher ask questions based on the read matter, make students also frame questions and present them to the other students. Each student's participation is mandatory.
3. **News paper Headlines:** Give a demo of News reading, make the students read the news in proper tone and clarity; make them prepare news from the news paper and present it.
4. **Elocution:** Assign topics in advance and make them prepare well for 3 to 4 minutes speech and to give the presentation; focus on the body language, paralanguage & the delivery of content. This activity should enable students to get out of stage fear.
5. **Extempore:** Assign instant topics of great interest and and of current value, encourage them to express their views for 1 to 2 minutes, evaluate their performance with effective feedback
6. **Advertising:** Let the students go through variety of advertisements, make them imitate the ads of their interest in pairs or groups, assign them with products and encourage them to advertise that product. Let the student assess the quality of the presentation.
7. **Formal speech:** - Make the students understand the types of speeches like Welcome address, Introduction speech, Vote of thanks, Inaugural address, felicitation speech etc. Assign them with different types of speeches with a context and make them deliver the speech.

8. **Group Discussion:** Students are now familiar with GD. Assign them with topics of more importance and encourage to discuss in groups of 5 to 6 students. Give effective feedback about their various group behaviour.
9. **Power point Presentation:** Assign topics of academic importance and ask them to give presentation. Evaluate the preparation of the slide and also the delivery of the content.
10. **Interview:** Assign with different contexts / industry and conduct interview. Assess their presentation including their appearance, soft skills & the subject knowledge.
11. **Evaluation:** Practical classes carry 7 marks each for 10 Labs which goes to the internal marks under the label Lab activity for 70 Marks. Viva carries 30 Marks which includes a general evaluation of the students' language proficiency. Marks are given as per the grades.

Course No.	Course Name	L-T-P	Cr.
BEN-212	**European Classical Literature – An Overview**	**4-1-0**	**5**

Course Outcomes - Students will be able to:

1. Develop enhanced acquaintance with classical texts from Europe- with particular focus on ancient Greek and Roman texts.
2. Relate how literature is a practice embedded in a socio-political, economic and cultural context.

UNIT 1: The Epic; Comedy & Tragedy in Classical drama; The Athenian City State; Catharsis & Mimesis; Satire; Literary culture in Augustan Rome

UNIT 2: Homer: *The Iliad*, E.V. Rieu (Harmondsworth, Penguin, 1985)

UNIT 3: Sophocles: *Oedipus the King*, tr. Robert Fagles in *Sophocles: The Three Theban Plays, Sophocles* (Harmondsworth, Penguin, 1984)

UNIT 4: Plautus: *Pot of Gold*, tr. E.F. Watling (Harmondsworth, Penguin, 1965)

UNIT 5: Ovid: *Selections from Metamorphoses, Bacchus' (*Book III), '*Pyramusand Thisbe'* (Book IV), '*Philomela'* (Book VI) tr. Mary M. Innes (Harmondsworth, Penguin , 1975); Horace Satires 1:4 In *Horace: Satires and Epistles and Persius: Satires*, tr. Niall Rudd (Harmondsworth, Penguin , 2005).

Course No.	Course Name	L-T-P	Cr.
BEN-213	**British Literature: 19 Century & Early 20th Century**	**4-1-0**	**5**

Course Outcomes - Students will be able to:

1. Familiarize themselves with some of the seminal works on colonialism.
2. Acquaint themselves with the key concepts of postcolonial literary theory through the study of postcolonial texts.
3. Analyse the aspects of subjectivity, race, class and feminism as they inhere in the postcolonial space.
4. Appreciate and evaluate the key debates in postcolonial theory

UNIT 1: Postcolonialism – An Introduction: post-modernism, post-colonialism, feminism, humanism, realism, magic realism, naturalism, Characteristics of Postcolonial world & Literature

UNIT 2: Gayatri Spivak: *Can the Subaltern Speak?*

UNIT 3: Frantz Fanon, *The Wretched of the Earth* (Chapter-1)

UNIT 4: Chinua Achebe: *Things Fall Apart;* Jean Rhys: *Wide Sargasso Sea*

UNIT5: J.M. Coetzee: *Disgrace*; Salman Rushdie: *Midnight's Children*

Course No.	Course Name	L-T-P	Cr.
BEN-214	**Literary Criticism – An Introduction**	**4-1-0**	**5**

Course Outcomes - Students will be able to:

1. Comprehend the nature and functions of literary criticism.
2. Analyse the writings of literary scholars and critics with understanding and judicious appreciation.
3. Recognize and define major critical schools.

UNIT 1 - CLASSICAL AGE Aristotle: Concepts of tragedy, plot, Character; Plato: Concept of Art, criticism of poetry and drama (Contemporary relevance of the ideas in the above to be discussed)

UNIT 2 – INDIAN AESTHETICS Theory of Rasa, Vyanjana and Alankara.(The relationship between Module I & II to be discussed. For eg. The concept of Rasa and purgation, Alankara and figures of speech etc.

UNIT 3 – MODERN CRITICISM (This section is meant to make the students familiar with modern critical Movements and writing.) MOVEMENTS IN CRITICISM: Classicism, neo-classicism, romanticism, symbolism, Russian formalism, Marxist criticism, absurd literature, modernism, structuralism, post-structuralism, deconstruction, , psycho- analytic criticism

* William Wordsworth: *Preface to Lyrical Ballads*- Paragraphs 5-12 ∗ Ferdinand de Saussure: *Nature of the Linguistic Sign*. ∗ Elaine Showalter- *Towards a Feminist Poetics*

UNIT 4: CRITICAL TERMS AND CONCEPTS This is a section meant to familiarize students with the various tools, movements and concepts in criticism. This may include the following: - Figures of Speech: Simile, metaphor, synecdoche, metonymy, symbol, irony, paradox. Movements: Concepts: Objective correlative, Ambiguity, intentional fallacy, affective fallacy, negative capability, myth, archetype. Literary Forms: Lyric, Ode, Elegy, epic, sonnet, ballad, dramatic monologue, melodrama, tragic- comedy, farce, and satire

UNIT 5: CRITICAL APPRECIATION: Critical analysis of short poems and short stories are to be done by students. The students may be asked to analyse pieces in terms of theme, diction, tone, figures of speech, imagery etc.

Course No.	Course Name	L-T-P	Cr.
BEN-215	**Science Fiction & Detective Literature**	**4-1-0**	**5**

Course Outcomes - Students will be able to:

1. Examine representative works of science fiction and detective literature from the twentieth century to the present within the historical and cultural contexts in which the genre developed.
2. Critically engage with detective literature.

UNIT 1: Introduction to Detective Literature- Crime across the media; constructions of criminal identity; cultural stereotypes in crime fiction; Crime fiction & cultural nostalgia; Crime fiction & ethics; crime & censorship

UNIT 2: Willkie Collins: The *Woman in White*

UNIT 3: Arthur Conan Doyle: The *Hound of the Baskervilles*

UNIT 4: Raymond Chandler: The *Big Sleep*

UNIT 5: H.R.F. Keating: *Inspector Ghote Goes by Train*

Course No.	COURSE NAME	L-T-P	Cr.
PDP-202	LIFE SKILLS	0-0-2	1

Course Outcomes: Students will be able to:

1. Develop and exhibit accurate sense of self through SWOT analysis
2. Apply the techniques to improve communication
3. Distinguish between self-awareness and self esteem
4. Evaluate and apply the techniques of Self-Motivation

UNIT 1 – Personality Development & TA– Concept of PD- Significance of PD. The 4 OK States & PAC Concept SWOT Analysis, Success & Failure, Dimensions of Personality – Theories of Freud & Erickson, Transactional Analysis – Dr. Eric Berne

UNIT 2 – Stress Management – Meaning of Stress, Effects of Stress on Body & Mind. How to overcome stress

UNIT 3 – Time Management – Concept of TM, Time Matrix, 24 hr Time tracker. How to manage time effectively?

UNIT 4 - Self -Awareness & Self - Esteem – What is SA & SE? Importance of Self Awareness, Emotional Intelligence – Definition and significance

UNIT 5 – Art of Conversation – Conversational Skills - How to start, sustain and conclude conversation?

UNIT 6 - Motivation – Meaning, Internal & External Motivation, How to stay motivated? Self-Motivation

SEMESTER- V

Course No.	Course Name	L-T-P	Cr.
BEN-301	Applied Language Skills	4-0-0	4

Course Outcomes - Students will be able to:

1. Learn how to work in a team.
2. Improve body language so as to leave a positive impact on everyone.
3. Become emotionally receptive and sensitive to the needs of others.

UNIT 1: Communication – Theories of communication- Oral and Written Communication – Features of oral communication – effective way of communication – barriers of communication – disadvantage and advantage of oral and written communication

UNIT 2: Team Work - Introduction to team work- Social loafing- Difference between team building and team work- ways to solve problems in a team- Group vs Team

UNIT 3: Emotional Intelligence **- Introduction** to Emotional intelligence- Modes of Emotional intelligence- skills of Emotional intelligence- ways to deal with Emotional imbalance

UNIT 4: Professional Skills and Body Language- Introduction to Professional skills and Body Language- Effective use of Body Language- how to acquire professional skills- Professional life vs Personal life

UNIT 5: Review about the Topic- Analysis of T.V Programme- Reality vs Fake- Analysis of day-to-day activities- Analysis of Government.

Sl. No.	Course No.	Course Name	L-T-P	Cr.
5.2	BEN-351	Applied Language Skills Lab	0-0-2	1

Course Outcome - Students will be able to:

1. Engage in discussions and demonstrate effective skills to argue logically through various activities.
2. Write research papers

English Language Lab: Ten practical classes. Following activities are distributed: -

1. Listening to an audio clip (a speech / an interview) a write down the summary or answer the questions.
2. Read the given passage and answer the given questions and also make a precise of the given passage.
3. Reading skill: Make the students read the given text individually in front of the class. The reading should be audible, clear and with proper intonation and pausing.
4. English Edge Self learning Intermediate & Advanced programme – Each module should be cleared systematically as time permits. Students are free to go at their pace with the module even while they are away from the campus.
5. JAM – Train the student to speak on the topic with clarity and confidence. They may be given sometime to write down the points and then to present it in front of the class.
6. GD – Give clear idea about the rules and purpose of GD, give a video clip on GD and discuss the merits and demerits, start with the most comfortable topic like the discussion on the popularity of a movie or some topics which they all are very familiar with, give correct feedback; ensure the participation of each student.
7. Interpretation – Show video clips of cartoons / some interesting pictures and make students express their feelings orally in simple sentences. Make each student interpret the same picture and let them enjoy the variety of ideas. They have to record their thoughts in paper.
8. Discussion – Conduct discussion on the prescribed soft skills and let them do case studies and share their observations from the prominent corporate offices; Make them realize the importance of those soft skills in their personal life.

9. Research Paper: Make the students go through the sample Research papers, and then give topics to prepare Research papers
10. Presentation: - Give a presentation (well prepared) on the given topic.

Note: By the end of the semester, the student must be well versed in expressing their thoughts independently, sharing their views in a group with confidence, to think freely and critically on any issue and to refine their personality with positive qualities.

Course No.	Course Name	L-T-P	Cr.
BEN-302	**Postcolonial Literature**	**4-1-0**	**5**

Course Outcomes - Students will be able to:

1. Recognize the concept of the marginalized segments in society.
2. Distinguish writers, forms, and movements associated with the marginalized.

UNIT 1: Post Colonialism – Introduction to Post Colonialism, Feminism-Humanism- Magic realism- Characteristics of Postcolonial world & Literature

UNIT 2: Chinua Achebe**:** Things Fall Apart- Gabriel Garcia Marquez: Chronicle of a Death Foretold

UNIT 3: Bessie Head: The Collector of Treasures- Ama Ata Aidoo: The Girl who can

UNIT 4: Mamang Dai: Small Towns and the River, The Voice of the Mountain- Grace Ogot: The Green Leaves

UNIT 5: Pablo Neruda: Tonight, I can Write, The Way Spain Was- Derek Walcott: A Far Cry from Africa, Names.

Course No.	Course Name	L-T-P	Cr.
BEN-303	LANGUAGE LITERATURE AND CULTURE	4-1-0	5

Course Outcomes - Students will be able to:

1. Identify language structure apropos language, identity and gender.
2. Identify and appreciate the importance of language and culture.
3. Analyse and demonstrate knowledge of the cultural roots and heritage of the rich and diverse literature of India.

UNIT 1: Morpheme, Slang

UNIT 2: Language and Identity, Language and gender, Link Language

UNIT 3: Multilingualism, Communication, National language, Written Language

UNIT 4: Factors contributing to Language change, Role of speaker, listener and message in communication, Role of Hindi in independence movement in India, NIRGUN AND SAGUN BHAKTI MOVEMENT, Sangam literature, Eklavya episode from Mahabharata Relevance of folk songs/

UNIT 5: Select poems of Mirabai, her rebellious attitude. Kabir. Cinema as a socially meaningful medium. Role of advertisement on children. Globalisation and culture.

Course No.	Course Name	L-T-P	Cr.
BEN-304	Literary Theory	4-1-0	5

Course Outcomes - Students will be able to:

1. Understand the different schools of literary theory.
2. Comprehend the basic tenets of modern literary theory and the jargon associated with it.
3. Apply literary theory and critically appreciate a work of literature.

Unit 1: Basic concepts of structuralism, Post structuralism, Saussurean linguistics, Dialogism, Deconstruction.

Unit 2: Introduction to different theories of Postcolonialism, Orientalism, Psychopathology of Colonialism, Subaltern, Diaspora, Cosmopolitanism.

Unit 3: Marxist theory and class, Marxism and culture, Art, work and production, Ideology, Hegemony.

Unit 4: Introduction to feminism, Difference between sex and gender, Social construction of gender, Materialistic view of feminism, A brief study of the works of Mary Wollstonecraft and Simone de Beauvoir.

Unit 5: Introduction to the basic concepts of Neo Historicism and Cultural Materialism, Culture as text and Cultural Text, the politics of interpretation.

Course No.	Course Name	L-T-P	Cr.
BEN-305	**Indian Classical Literature**	**4-1-0**	**5**

Course Outcomes - Students will be able to:

1. Perceive aesthetic and philosophical, social aspects of ancient Indian society.
2. Appreciate ancient Indian classics.
3. Comprehend Indian poetics.

UNIT 1: Introduction to Indian Classical Literature

UNIT 2: Kalidas: Abhijanamshakuntalm

UNIT 3: Mahabharat: Dicing, Dicing sequel

UNIT 4: Silappatikaram: The Tale of an Anklet

UNIT 5: Ashtadhayi

Course No.	Course Name	L-T-P	Cr.
PDP-301	**Leadership & Entrepreneurship Development**	**0-0-2**	**1**

Course Outcomes: Students will be able to

1. Develop critical thinking skills
2. Recognize their strengths and weaknesses and apply the same in decision making and goal setting
3. Develop and systematically apply an entrepreneurial way of thinking

UNIT 1- Leadership- Concept, styles of Leadership, Qualities to become a Leader. Case study on world renowned leaders

UNIT 2- Teamwork & Team Building – Importance of Team Work, Stages of Team Formation, Benefits of Working in a Team.

UNIT 3- Decision Making -7 steps of DM, Strategies to make good decisions

UNIT 4- Goal Setting – Difference between Goal & Dreams. SMART Technique of setting Goals, Types of Goals, Goal Tracker

UNIT 5 – Entrepreneurship – Concept of Entrepreneurship, Qualities of Entrepreneur

SEMESTER- VI

Course No.	Course Name	L-T-P	Cr.
BEN-307	Literature of the Indian Diaspora	4-1-0	5

Course Outcome: Students will be able to

1. Critically analyse texts of Indian Diaspora
2. Analyse concepts like subaltern, hybridity and neo-colonialism iin context of Indian Diaspora.

Unit 1: A brief introduction to Diaspora and Diasporic writings, Homi. K Bhabha: The Location of Culture, K.R. Srinivas Iyengar: Indian Writing in English, Spivak: 'Diasporas Old and New: Women in the transnational world.

Unit 2: Lahiri, Jhumpa: The Namesake

Unit 3: Naipaul, V.S: A House for Mr Biswas

Unit 4: Rohiton Mistry: Tales from Ferozshah Bagh

Unit 5: Arvind Adiga: The White Tiger

Course No.	Course Name	L-T-P	Cr.
BEN-308	Modern European Drama	4-1-0	5

Course Outcomes - Students will be able to:

1. Understand and appreciate the historical and cultural background in which a particular text took shape.
2. Develop knowledge of literary terms and key concepts involved in reading and analysing modern drama.

MODERN EUROPEAN DRAMA

UNIT 1: Henrik Ibsen: *Ghosts*

UNIT 2: Bertolt Brecht: *The Good Woman of Szechuan*

UNIT 3: Samuel Beckett: *Waiting for Godot*

UNIT 4: Eugene Ionesco: *Rhinoceros*

UNIT 5: August Strindberg: *Miss Julie* (Methuen)

Course No.	Course Name	L-T-P	Cr.
BEN-309	**BRITISH LITERATURE POST WORLD WAR-II**	**4-1-0**	**5**

Course Outcomes - Students will be able to:

1. Recognise salient features of British Literature
2. Analyse through studying, the origin of the Post War British Literature from a historical perspective

UNIT 1: John Fowles *The French Lieutenant's Woman*

UNIT 2: Jeanette Winterson *Sexing the Cherry*

UNIT 3: T.S Eliot 'The Love Song of J. Alfred Prufrock' 'Sweeney among the Nightingales' 'The Hollow Men'

UNIT 4: Phillip Larkin 'Whitsun Weddings' 'Church Going' Ted Hughes 'Hawk Roosting' 'Crow's Fall' Seamus Heaney 'Digging' 'Casualty'

UNIT 5: *Look Back in Anger* John Osborne

Course No.	Course Name	L-T-P	Cr.
BEN-310	**Women Writings**	**4-1-0**	**5**

Course Outcomes - Students will be able to:

1. Learn to recognize the meaning and significance of feminine voices and concerns in a text.
2. Classify theoretical terminology of feminist criticism with an increased sensibility towards issues of women's literary and political marginalization, and their continual resistance to both.

Women's writing in the Nineteenth and Twentieth Century

1. Elizabeth Barrett Browning: Aurora Leigh, Book V, lines 1-447

2. Emily Dickinson: Because I Could not Stop for Death, Elysiun is as Far as to, I Had no Time to Hate, I Felt a Funeral in My Brain, I Heard a Fly Buzz, The Soul Selects Her Own Society.

3. Sylvia Plath: Daddy, Lady Lazarus, Soliloquy of a Soliloquist, Mirror.

4. Katherine Mansfield: Bliss

5. Mahasweta Devi: 'Draupadi,' in Gayatri Chakravarty Spivak, *In Other Worlds,* pp. 179-96

Course No.	Course Name	L-T-P	Cr.
BEN-311	**Research Methodology**	**4-1-0**	**5**

Course Outcomes - students should be able to:

1. Understand some basic concepts of research and its methodologies
2. Identify appropriate research topics
3. Select and define appropriate research problem and parameters
4. Prepare a project proposal (to undertake a project)
5. Organize and conduct research (advanced project) in a more appropriate manner

Unit 1: Definition, Characteristics, Objectives. Types of Research. Research Ethics and Integrity. Criteria of Good Research.

Unit 2: Research Process. Basic Overview: Formulating the Research Problem, Defining the Research Problem, Research Questions, Research Methods vs. Research Methodology.

Unit 3: Literature Review, Formulation of Hypothesis, Characteristics of Hypothesis, Research Design, Data Collection, Questionnaires, Case Study Method.

Unit 4: Writing an Article, Essay, Research Paper, Thesis, Dissertation, Reviews - Book Review, Case Review.

Unit 5: Citation Methods, Foot Note, End Note, Bibliography, Citation Rules: MLA, APA, Chicago.

Course No.	Course Name	L-T-P	Cr.
BEN-312	Functional English	4-1-0	5

Course Outcome: students should be able to:

1. Write their Resume and CV.
2. Communicate through official channels, use Emails and make presentations.
3. Demonstrate adequate reading and writing skills

UNIT-1: Preparing for a career; Identifying job Openings; Applying for a job; Preparing Cover Letters; Preparing a CV/Resume and Effective Profiling

UNIT-2: Presentation Skills; Preparing a PowerPoint Presentation; Greeting and Introducing; Presenting a Paper; Group Discussion; Preparing for and Facing a Job Interview

UNIT-3: Business Communication; Preparing Agenda and Minutes for Meeting; Writing Notices and Memos; Drafting an E-mail, Press Release; Correspondence with Govt./Authorities, Office Orders, Enquiries and Replies

UNIT-4: Age of Globalization and the need for communicating in English; English as the First or Second Language; Uses of English in Academic and Non-Academic situations in India.

UNIT-5: Effective Writing Skills; Elements of Effective Writing; Precise Writing; Essay Writing; Note Making

SCHEME FOR M.A ENGLISH

M.A ENGLISH			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MEN-101	Modern British Literature	4	0	0	4
2	MEN-102	Indian Writing in English	4	0	0	4
3	MEN-103	History of Language and Linguistics	4	0	0	4
4	MEN-104	English Drama	4	0	0	4
		Total	**16**	**0**	**0**	**16**

SCHEME FOR M.A ENGLISH

M.A ENGLISH			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MEN-105	English Poetry	4	0	0	4
2	MEN-106	American Literature: A Review	4	0	0	4
3	MEN-107	Advanced Communication in English	4	0	0	4
4	MEN-108	English Prose and Fiction	4	0	0	4
		Total	**16**	**0**	**0**	**16**

SCHEME FOR M.A ENGLISH

M.A ENGLISH			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MEN-109	From Chaucer to Jane Austen	4	0	0	4
2	MEN-110	Literary Criticism	4	0	0	4
3	MEN-111	Commonwealth Literature	4	0	0	4
4	MEN-112	Indian Writing in Translation	4	0	0	4
		Total	**16**	**0**	**0**	**16**

SCHEME FOR M.A ENGLISH

M.A ENGLISH			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	MEN-113	English Novel	4	0	0	4
2	MEN-114	English Language and Linguistics	4	0	0	4
3	MEN-115	American Literature-II	4	0	0	4
4	MEN-116	Literary Theory	4	0	0	4
		Total	**16**	**0**	**0**	**16**

SEMESTER-I

Sl. No.	Course No.	Course Name	L-T-P	Cr.
1.1	**MEN-101**	**MODERN BRITISH LITERATURE**	**4-0-0**	**4**

COURSE OUTCOMES: To enable the students to-

1. Demonstrate knowledge of the history or culture of the English language and understandthe themes and poetic devices of British literature.
2. Identify the salient features of literary texts from a broad range of English literaryperiods.
3. Evaluate from different critical perspectives and appreciate how differences in theoreticalframework can produce multiple readings of a text

UNIT 1: LITERARY MOVEMENTS: Modernism, Imagism, Expressionism, Surrealism, The Avant-garde, Stream of Consciousness, Movement Poetry, Epic Theatre of the Absurd, Existentialism, Angry Theatre, Postmodernism.

UNIT 2: POETRY: *Auden: The Unknown Citizen, Yeats: Easter 1916, Eliot: The Love song ofJ Alfred Prufrock, *Philip Larkin: "Whitson Wedding"

UNIT3: PROSE & FICTION: Virginia Woolf: How Should One Read a Book (Essay)*, JamesJoyce: Araby (Short Story), Fowler: The French Lieutenant's Woman (Novel), Doris Lessing: The Golden Note Book

UNIT 4: DRAMA: *Osborne: Look Back in Anger (Play)

UNIT 5: Pinter: The Dumb Waiter (OAP)

Sl. No.	Course No.	Course Name	L-T-P	Cr.
1.2	MEN-102	INDIAN WRITING IN ENGLISH	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Identify social, political, and cultural issues reflected in Indian writing in English
2. Critically evaluate Indian literary texts written in English in terms of colonialism/postcolonialism, regionalism, and nationalism

UNIT 1- Introduction to the Course: An overview of the history of Indian Writing in English, introducing the different phases in its evolution- British Raj and the emergence of Indian writingin English, the National movement and its impacts, independence and post-independence periodsand the new voices and trends.

UNIT 2- POETRY: Sarojini Naidu 'Palanquin Bearers', Bangle Sellers, Kamala Das My,Grandmother's House, Nissim Ezekiel –Night of Scorpion, Enterprise

UNIT 3- FICTION: Shashi Deshpande –Roots and Shadows, Kiran Desai – The Inheritance ofLoss, Mulk Raj Anand – The Untouchable

UNIT 4 – PROSE AND SHORT FICTION: Sadat Hassan Manto: The Price of Freedom, R.K.Narayan – The Man-eater of Malgudi, Amrita Pritam – The Weed, Jhumpa Lahiri – An Interpreter of Maladies [short story]

UNIT 5 – DRAMA: Girish Karnad – Naga-Mandala (OUP.1990) *, Vijay Tendulkar –Ghashiram Kotwal, Mahesh Dattani – Tara

Sl. No.	Course No.	Course Name	L-T-P	Cr.
1.3	MEN-103	HISTORY OF LANGUAGE AND LINGUISTICS	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Interpret the origin of language from its earliest times and evolution of English languagefrom the Indo-European family of languages
2. Analyze how foreign elements help the growth of vocabulary and meaning of the Englishlanguage.
3. Apply the terminology of linguistics to describe language phenomena

UNIT 1- Elements of Semiology. The Study of Language as part of Semiology; The characteristics of human language as a system of communication. The distinction between human language and animal communication. The features of language that help the communication of ideas: Binary opposition between phonemes. Phonetic transcription- Stress, Intonation etc. The Indo-European family of languages and position of English in it.

UNIT 2- The various stages in the evolution of the English Language: Indo European Family of Languages; Old English, Middle English. Modern English, Foreign influence on the English Language: Greek, Latin, French, Scandinavian Language, Indian Languages. Contribution of major writers to the growth of English Vocabulary: The Bible Translators, Spencer, Shakespeare,Milton.

UNIT 3- Word building in English: Composition, Derivation, Back Formation, Sample. Semantic changes: Figurative use, extension, generalization, specialization, euphemism, elevation, degeneration. Spelling and spelling reform. Varieties of English: British and AmericanEnglish in India.

UNIT 4- The Pronunciation of English: An outline of English in Phonetics. IPA Script. Organs of Speech, classification of English vowels and consonants. Suprasegmental features. Elements of English, Bound Morphemes, Elements of English, Syntax, sentence, clause, phrase, word. Traditional Grammar and Modern Grammar, grammaticality and acceptability, grammar and usage.

Transformational generative grammar: Its rational. Basic sentences and transformations. Transformation process: Negation, interrogation, passive, emphatic etc. Competence and performance. Deep structure and surface structure. Ambiguity and T.G grammar. (Short questions will cover the entire paper.

Sl. No.	Course No.	Course Name	L-T-P	Cr.
1.4	MEN-104	ENGLISH DRAMA	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Examine the literary genre of Drama.
2. Analyse and interpret dramatic texts of various literary periods

UNIT 1- A Review of English Drama: Drama from Renaissance period to the Modern Period-An analysis of the characteristics during the different periods in the History of Literature.

UNIT 2- Christopher Marlowe: Dr Faustus

UNIT 3-Willam Shakespeare: Macbeth*: A glimpse to Shakespearean age, Characteristics ofShakespearean Tragedies and Comedies; Ben Jonson: Volpone

UNIT 4- William Congreve –The Way of the World* A Glimpse to Anti –sentimentaland Comedy of Manners (Wycherley-The Country Wife)

UNIT 5– Samuel Beckett- Waiting for Godot*; Characteristics of modern drama and theatre; Asurvey of modern dramatists and their works (Brecht: Mother Courage and her Children)

Stanley Houghton: The Dear Departed (Bernard Shaw- Saint Joan)

SEMESTER-II

Sl. No.	Course No.	Course Name	L-T-P	Cr.
2.1	**MEN-105**	**English Poetry**	**4-0-0**	**4**

COURSE OUTCOMES: To enable the students to-

1. Identify a variety of forms and genres of poetry from diverse cultures and historic periods
2. Analyse the basic terminology and practical elements of poetry.
3. Apply the principles of literary criticism to the analysis of poetry

UNIT 1: Basic Elements of Poetry: Prosody: Rhythm, Meter – Rhyme-hard rhyme, soft rhyme, internal rhyme - Alliteration - Assonance - Diction – (Demonstration and Drilling) Forms: Lyric,Ode, Haiku, Tanka, Jintishi, Ghazal, Rubai etc Genres: Narrative Poetry - Epic Poetry - DramaticPoetry - Satirical Poetry - Lyric Poetry – Prose Poetry

UNIT 2: Chaucer to Elizabethan Age: Geoffrey Chaucer: Prologue to the Canterbury Tales Shakespeare: Sonnet 116; John Donne: A Valediction Forbidding Mourning;

UNIT 3: The Augustan Age: John Milton - Paradise Lost - Book I; John Dryden - MacFlecknoe; Alexander Pope - The Rape of the Lock - Canto I Thomas Gray - Elegy Written in a Country Church Yard

UNIT 4: The Romantic & Victorian Age: - Wordsworth: "Tintern Abbey" Coleridge: "Kubla Khan" Shelley: "Ode to the West Wind" Keats: "Ode on a Grecian Urn"; Mattew Arnold: Longing; Elizabeth Barret Browning: How Do I Love Thee; Tennyson: The Lotus Eaters; D.H. Lawrence: Mosquito

UNIT 5: 20th century Poetry: The 20th century – socio-political background – literature and society – Liberal Humanism – literature and media. 2. Poetry – Symbolist Movement – Yeats – poets of World War I – Owen – modernist poetry – Eliot, Pound – Auden and the poets of the thirties – World War II and its aftermath – Movement Poetry – Larkin, Gunn, Jennings – new poets of the 50's – Ted Hughes, Betjeman – Mavericks – 60's and 70's – Heaney, Motion, Geoffrey Hill – 1980s – contemporary poetry; W. B. Yeats "The Second Coming"; T. S. Eliot: "The Love Song of J. Alfred Prufrock **"; Philip Larkin: "*Church Going*"; Ted Hughes: "*Thought Fox*"; Seamus Heaney: "*Punishment*"**

Sl. No.	Course No.	Course Name	L-T-P	Cr.
2.2	MEN-106	AMERICAN LITERATURE: A REVIEW	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Comprehend the depth and diversity of American literature, keeping in mind the historyand culture of America from the colonial period to the present
2. Evaluate the historical, religious and philosophical contexts of the American spirit in literature
3. Critically analyse the complex nature of American society

UNIT 1- An introduction: - The History of American Literature; Characteristics; Land mark events; Contributions; Prominent Literary people, Literary movements

UNIT 2- Poetry Robert Frost: *Fire & Ice,* Allen Ginsberg: Howl, Edgar Allen Poe: *The Gold Bug*

Sylvia Plath: *Lady Lazarus,* Emily Dickinson: 1078, 1100, Walt Whitman: Sections 16, 17 & 18 from *Songs of Myself*

UNIT 3: Prose: Emmerson: *Self Reliance*

UNIT 4: Fiction Nathaniel Hawthorn: *The Scarlet Letter,* Herman Melville: *Moby Dick,* Toni Morrison: *Beloved*

UNIT 5:
Drama: Tennessee Williams: *The Glass Menagerie,* Eugene O'Neil: *Emperor Jones*

Sl. No.	Course No.	Course Name	L-T-P	Cr.
2.3	MEN-107	Advanced Communication in English	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Recognize and apply knowledge of human communication and language processes asthey occur across various contexts
2. Evaluate key theoretical approaches used in the interdisciplinary field of communication

UNIT I: Introduction to Communication in General: - What is communication? - Communication process - Types of communication: Intrapersonal communication /Interpersonal communication - small group communication - Public communication - Media & Mass communication

UNIT2: Culture in communication: - Identity and communication - Intercultural communication -. Communicative sensitivity - Communication for specific purposes - Communication competence

UNIT 3: Oral Communication: - Verbal & Non-Verbal Communication; How to build up confidence and overcome nervousness. The art of making friends. How to develop listening skills. How to get out of problem in conversations? Public speaking

UNIT 4: Developing Discussion Skills: Academic Discussions. Discussing a research project with the supervising teacher. Discussing with the teacher the possibility of presenting papers in academic/literary seminars outside the college. Discussing the focal points of a group discussion with friends in the class. Social Discussions; Shopping, banking, telephoning. Speeches- Welcoming, introducing guests

UNIT 5: Written Communication: - Looking for subject; Exploring topics; Making a Plan and Drafts and Revisions. The Grammatical Sentence; The basic types The Topic Sentence; Paragraph Unity; Types of Writing: Descriptive, Narrative, Argumentative, Dramatic etc The Well Written Sentence: a. Concision b. Emphasis c. Rhythm d. Variety; Meaning: Denotation and Connotation; Figurative Languages: Similes; Metaphor; Personification; Allusion; Irony; Overstatement and Understatement; Puns; Zeugma; Imagery etc.

Sl. No.	Course No.	Course Name	L-T-P	Cr.
2.4	MEN-108	English Prose & Fiction	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Comprehend a literary text in different contexts
2. Analyse socio-political and economic conditions of the society from different periods.
3. Write precisely & with brevity

UNIT 1: Bana Bhat: Kadambari; Jonathan Swift: Gulliver's Travel; Leo Tolstoy's War & Peace

UNIT 2: George Eliot: The Mill on the Floss; Charlotte Bronte: Jane Eyre; Jane Austen: Pride and Prejudice Premchand: Godaan

UNIT 3: Goldsmith: The Man in Black. Charles Lamb: A Bachelor's Complaint Against the Behaviour of Married People; A.G. Gardiner: On the Rule of the Road, Robert Lynd: The Pleasures of Ignorance, G.K. Chesterton: On Running after One's Hat

UNIT 4: Josef Conrad: Lord Jim; D. H. Lawrence: Women in Love; I William Golding: Lord of the Flies

UNIT 5: Mahaswetha Devi: "The Breast Giver"; Virginia Woolf: A Haunted House; Margaret Atwood: The Stone Mattress

SEMESTER-III

Sl. No.	Course No.	Course Name	L-T-P	Cr.
3.1	MEN-109	FROM CHAUCER TO JANE AUSTEN	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Classify the history of English literature from 1350-1660.
2. Apply different forms and aspects of poetry with reference to different poems.
3. Compare and contrast different styles of different writers.

Unit-1: Normans to Chaucer

Introduction to the era, Chaucer: Nun's Priest Tale. (Knight's Tale), Spencer: Epithalamion,John Webster: The Duchess of Malfi.

UNIT 2: Shakespeare and his Contemporaries: Introduction to the era, Shakespeare: KingLear, Marlowe: The Jew of Malta, Sidney: Astrophel and Stella

UNIT 3: Puritan, Neo-classical & Restoration: Introduction to the era, Milton: Samson Agonists, Dryden: The Hind and the Panther, Samuel Butler: the Way of All Flesh (Etherege- Man of Mode)

UNIT 4: Romantic Era: Introduction to the Era, Wordsworth Ode: Intimations of immortality, Coleridge: Dejection: An Ode

UNIT 5: Victorian Era: Introduction to the Era, Thomas Hardy: Tess of the D' Urbervilles, Charlotte Bronte: Jane Eyre, Jane Austen: Pride and Prejudice

Sl. No.	Course No.	Course Name	L-T-P	Cr.
3.2	MEN-110	Literary Criticism	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Comprehend various tools of literary criticism
2. Develop the ability to apply tools of literary criticism to literary text.

UNIT 1: Literary and Critical Concepts and Terms, Longinus & Horace, Sublime and ProprietyTheory

UNIT 2: Plato: The Republic, Book X, Dryden: An essay on Dramatic Poesy.

UNIT 3: Samuel Johnson: Preface to Shakespeare, Coleridge: Biographia Literaria (Ch. XVI)

UNIT 4: Arnold: Study of Poetry, P.B. Shelley: A Defence of Poetry

UNIT 5: T.S. Eliot: Tradition and the Individual Talent, Virginia Woolf: Modern Fiction

Sl. No.	Course No.	Course Name	L-T-P	Cr.
3.3	MEN-111	Commonwealth Literature	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Identify the History and major characteristics of Commonwealth literature
2. Evaluate the major themes and literary trends in Commonwealth Literature
3. Discuss the problem of language in creative writing in the Commonwealth Literature

UNIT 1: An Introduction- History of Commonwealth Literature, Characteristics, Contributionand Prominent Literary People.

UNIT 2: Poetry: Maya Angelou: Still I Rise, On the pulse of Morning Phenomenal Woman,Kamala Das: An Introduction, The Suicide, Punishment in Kindergarten.

UNIT 3: Fiction: Margaret Atwood: Surfacing, V.S. Naipaul: A House for Mr. Biswas, ChinuaAchebe: Things Fall Apart

UNIT 4: Drama: Girish Karnad: The Fire and the Rain, Wole Soyinka: The trials of BrotherJero, Mahesh Dattani: Seven Steps Around the Fire

UNIT 5: Prose: Ananda Coomarswami: The Dance of Shiva (Ch. 1), Jawaharlal Nehru: Lettersfrom a Father to his daughter, V.S. Naipaul: Area of Darkness.

Sl. No.	Course No.	Course Name	L-T-P	Cr.
3.4	MEN-112	Indian Writing in Translation	4-0-0	4

COURSE OUTCOMES: To enable the students to-Identify social, political, and cultural issues reflected in Indian writing in English

1. Critically evaluate Indian literary texts written in English

UNIT 1: Kalidasa: Abhijanan Shakuntalam

UNIT 2: Bhisham Sahni: Tamas

UNIT 3: U.R. Ananthamurthy: Samskara

UNIT 4: Vyasa:'The Dicing' and 'The Sequel to Dicing' "The Temptation of Karna" in TheMahabharata

UNIT 5: Mahasweta Devi: Rudali

SEMESTER-IV

Sl. No.	Course No.	Course Name	L-T-P	Cr.
4.1	**MEN-113**	**English Novel**	**4-0-0**	**4**

COURSE OUTCOMES: To enable the students to-

1. Evaluate literature and fiction using appropriate theoretical, historical, and culturalperspective.
2. Compare various cultures and construction of gender, nation and race throughout thehistory.
3. Analyse human values and the behavioural patterns from great works of art, and developthe ability to understand human race.

UNIT-I: Introduction to English Fiction: Historical and Cultural background, Features, Themes,Overview of major novelists and their works

UNIT-II: Henry Fielding: Joseph Andrews, Jane Austen: Emma

UNIT III: Charles Dickens: A Tale of Two Cities, George Eliot: Middle March

UNIT IV: Thomas Hardy: Tess of the D'Urbervilles, Emily Bronte: Wuthering Heights

UNIT V: Alice Walker: The Colour Purple, Toni Morrison: Beloved

Sl. No.	Course No.	Course Name	L-T-P	Cr.
4.2	MEN-114	English Language and Linguistics	4-0-0	4

COURSE OUTCOMES To enable the students to-

1. Comprehend the history of the English Language, insights, theoretical approaches, the changes and employability demand of the English language.
2. Enhance the LSRW skills and further analytical and interpretive arguments.

UNIT-I: Language: Origin of Language; Functions of language; Characteristics of Language; Dialects and the standard language; stress & intonation; register, slang, pidgin, Creole; language change

UNIT-II: Phonology: phonemes; phones and allophones; minimal pairs and sets; phonotactics **Phonetics:** Speech Mechanism and speech organs, Classification of English sounds; Vowels,semi vowels and consonants; voiced and voiceless sounds; Description of sounds by articulators,point of articulation and manner of articulation, phonemes and transcription

UNIT-III: Morphology: morphemes; free and bound morphemes; lexical and functionalmorphemes; derivational and inflectional morphemes

UNIT-IV: Grammar & Syntax: syntactic structure; deep and surface structures; structural ambiguity; phrase structure rules; transformational rules of grammar; traditional grammar; the parts of speech; agreement; grammatical gender; traditional analysis

UNIT –V: Socio linguistics – Language variation, dialect register, language change, languagedeath, language policies etc.

Sl. No.	Course No.	Course Name	L-T-P	Cr.
4.3	MEN-115	American Literature II	4-0-0	4

COURSE OUTCOMES: To enable the students to-

CO 1: Understand the depth and diversity of American literature, keeping in mind the history andculture of America from the colonial period to the present
CO 2: Evaluate the historical, religious and philosophical contexts of the American spirit inliterature
CO 3: Critically analyse the complex nature of American society

UNIT I: Henry James: *The Portrait of a Lady*

UNIT II: Robert Frost: ' Home Burial', 'After Apple - Picking', 'After Apple - Picking','Birches', 'Design', 'Death of the Hired Man', 'Fire & Ice'

UNIT III: Arthur Miller: *The Death of a Salesman*

UNIT IV: Adrienne Rich: A Valediction forbidding Mourning, Diving into the wreck

UNIT V: Sylvia Plath: Lady Lazarus, Daddy, Soliloquy of a Solipsist

Sl. No.	Course No.	Course Name	L-T-P	Cr.
4.4	MEN-116	LITERARY THEORY	4-0-0	4

COURSE OUTCOMES: To enable the students to-

1. Examine the basic theories, knowledge areas, and analytical tools.
2. Analyze the World, the Text, and the Critic in Theory.

UNIT 1: INTRODUCTION TO LITERARY THEORY: PETER BARRY Beginning ***Theory***

UNIT 2: POSTMODERNISM: Fredric Jameson Postmodernism or the cultural Logic of LateCapitalism

UNIT 3: POSTCOLONIALISM: Spivak: *Three Women's texts and a Critique of Imperialism*

UNIT 4: FEMINISM: Virginia Woolf: *A Room of one's own Helene* Cixious: *The Laugh of TheMedusa*

UNIT 5: NEW HISTORICISM *Stephen Greenblatt Renaissance Self-Fashioning: From More to Shakespeare. TOPICS FOR PRESENTATION* Elaine Showalter, 'Introduction' in A Literature of Their Own: British Women Novelists from Bronte to Lessing (1977). Edward Said, *Orientalism*.

SCHEME FOR (B. PHARMA)

B.Pharma			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BP101T	Human Anatomy and Physiology I– Theory	3	1		4
2	BP102T	Pharmaceutical Analysis I – Theory	3	1		4
3	BP103T	Pharmaceutics I – Theory	3	1		4
4	BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1		4
5	BP105T	Communication skills – Theory *	2	-		2
6	BP106RBT BP106RMT	Remedial Biology/ Mathematics – Theory*	2	-		2
7	BP107P	Human Anatomy and Physiology – Practical			4	2
8	BP108P	Pharmaceutical Analysis I – Practical			4	2
9	BP109P	Pharmaceutics I – Practical			4	2
10	BP110P	Pharmaceutical Inorganic Chemistry – Practical			4	2
11	BP111P	Communication skills – Practical*			2	1
12	BP112RBP	Remedial Biology – Practical*			2	1
		Total---->	**16**	**4**	**24**	**27/ 29$ /30 #**

SCHEME FOR (B. PHARMA)

B. Pharma			Semester		II	
SN	Course Code	Course Name	Periods		Credits	
			L	T	P	
1	BP201T	Human Anatomy and Physiology II – Theory	3	1		4
2	BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1		4
3	BP203T	Biochemistry – Theory	3	1		4
4	BP204T	Pathophysiology – Theory	3	1		4
5	BP205T	Computer Applications in Pharmacy – Theory *	3	-		2
6	BP206T	Environmental sciences – Theory *	3	-		2
7	BP207P	Human Anatomy and Physiology II –Practical			4	2
8	BP208P	Pharmaceutical Organic Chemistry I– Practical			4	2
9	BP209P	Biochemistry – Practical			4	2
10	BP210P	Computer Applications in Pharmacy – Practical*			2	2
		Total---->	**18**	**4**	**14**	**28**

SCHEME FOR (B. PHARMA)

B. Pharma			Semester			III
SN	Course Code	Course Name	Periods			redits
			L	T	P	
1	P301T	harmaceutical Organic Chemistry II – Theory	3	1		4
2	P302T	hysical Pharmaceutics I – Theory	3	1		4
3	P303T	harmaceutical Microbiology – Theory	3	1		4
4	P304T	harmaceutical Engineering – Theory	3	1		4
5	P305P	harmaceutical Organic Chemistry II – Practical				2
LAB						
1	P307P	harmaceutical Microbiology – Practical				2
2	P 308P	harmaceutical Engineering –Practical				2
3		**Total---->**	**12**	**4**	**16**	**24**

B. Pharma			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BP401T	Pharmaceutical Organic Chemistry III– Theory	3	1		4
2	BP402T	Medicinal Chemistry I – Theory	3	1		4
3	BP403T	Physical Pharmaceutics II – Theory	3	1		4
4	BP404T	Pharmacology I – Theory	3	1		4
5	BP405T	Pharmacognosy and Phytochemistry I– Theory	3	1		4
6	BP406P	Medicinal Chemistry I – Practical			4	2
7	BP407P	Physical Pharmaceutics II – Practical			4	2
8	BP408P	Pharmacology I – Practical			4	2
9	BP409P	Pharmacognosy and Phytochemistry I – Practical			4	2
		Total---->	**15**	**5**	**16**	**28**

SCHEME FOR (B. PHARMA)

B.Pharma			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BP501T	Medicinal Chemistry II – Theory	3	1		4
2	BP502T	Industrial PharmacyI– Theory	3	1		4
3	BP503T	Pharmacology II – Theory	3	1		4
4	BP504T	Pharmacognosy and Phytochemistry II– Theory	3	1		4
5	BP505T	Pharmaceutical Jurisprudence – Theory	3	1		4
6	BP506P	Industrial PharmacyI – Practical			4	2
7	BP507P	Pharmacology II – Practical			4	2
8	BP508P	Pharmacognosy and Phytochemistry II – Practical			4	2
		Total---->	**15**	**5**	**12**	**26**

B.Pharma			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BP601T	Medicinal Chemistry III – Theory	3			4
2	BP602T	Pharmacology III – Theory	3			4
3	BP603T	Herbal Drug Technology – Theory	3			4
4	BP604T	Biopharmaceutics and Pharmacokinetics – Theory	3			4
5	BP605T	Pharmaceutical Biotechnology– Theory	3			4
6	BP606T	Quality Assurance– Theory	3			4
7	BP607P	Medicinal chemistry III – Practical		1	4	2
8	BP608P	Pharmacology III – Practical		1	4	2
9	BP609P	Herbal Drug Technology – Practical		1	4	2
		Total---->		**3**	**12**	**30**

DEPARTMENT OF PHARMA			Semester			VI I
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	BP701T	Instrumental Methods of Analysis – Theory	3	1		4
2	BP702T	Industrial Pharmacy – Theory	3	1		4
3	BP703T	Pharmacy Practice – Theory	3	1		4
4	BP704T	Novel Drug Delivery System – Theory	3	1		4
5	BP705 P	Instrumental Methods of Analysis – Practical			4	2
6	BP706 PS	Practice School*			12	6
		Total---->	**12**	**4**	**16**	**24**

DEPARTMENT OF PHARMACY			Semester			VIII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	BP801T	Biostatistics and Research Methodology	3	1		4
2	BP802T	Social and Preventive Pharmacy	3	1		4
3	BP803ET	Pharma Marketing Management	3	1 + 1 =2		4 + 4 = 8
4	BP804ET	Pharmaceutical Regulatory Science	3			
5	BP805ET	Pharmacovigilance	3			
6	BP806ET	Quality Control and Standardization of Herbals	3 + 3 = 6			
7	BP807ET	Computer Aided Drug Design				
8	BP808ET	Cell and Molecular Biology				
9	BP809ET	Cosmetic Science				
10	BP810ET	Experimental Pharmacology				
11	BP811ET	Advanced Instrumentation Techniques	Contd….	Contd ….	Contd….	
12	BP812ET	Dietary Supplements and Nutraceuticals	-	-	-	-
13 14	BP813PW	Project Work	12	-	-	6
		Total---->	**24**	**4**		**22**

BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Explain the gross morphology, structure and functions of various organs of the human body.
- Describe the various homeostatic mechanisms and their imbalances.
- Identify the various tissues and organs of different systems of human body.
- Perform the various experiments related to special senses and nervous system.
- Appreciate coordinated working pattern of different organs of each system

Course Content:

Unit I **10 hours**

- **Introduction to human body**
  Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.
- **Cellular level of organization**
  Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine
- **Tissue level of organization**
  Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

Unit II **10 hours**

- **Integumentary system**
  Structure and functions of skin

- **Skeletal system**
  Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system
  Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction

- **Joints**
  Structural and functional classification, types of joints movements and its articulation

Unit III **10 hours**

- **Body fluids and blood**
- Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.
- **Lymphatic system**

  Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

Unit IV **08 hours**

Peripheral nervous system:

Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system.
Origin and functions of spinal and cranial nerves.

- **Special senses**
  Structure and functions of eye, ear, nose and tongue and their disorders.

Unit V **07 hours**

- **Cardiovascular system**
  Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

BP107P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)

4 Hours/week

1. Study of compound microscope.
2. Microscopic study of epithelial and connective tissue
3. Microscopic study of muscular and nervous tissue
4. Identification of axial bones
5. Identification of appendicular bones
6. Introduction to hemocytometry.
7. Enumeration of white blood cell (WBC) count
8. Enumeration of total red blood corpuscles (RBC) count
9. Determination of bleeding time
10. Determination of clotting time
11. Estimation of hemoglobin content
12. Determination of blood group.
13. Determination of erythrocyte sedimentation rate (ESR).
14. Determination of heart rate and pulse rate.
15. Recording of blood pressure.

Recommended Books (Latest Editions)

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology byTortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

Reference Books (Latest Editions)

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata

BP102T. PHARMACEUTICAL ANALYSIS (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- understand the principles of volumetric and electro chemical analysis
- carryout various volumetric and electrochemical titrations
- develop analytical skills

Course Content:

UNIT-I **10 Hours**

(a) Pharmaceutical analysis- Definition and scope

i) Different techniques of analysis
ii) Methods of expressing concentration
iii) Primary and secondary standards.
iv) Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate

(b)Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures

(c) Pharmacopoeia, Sources of impurities in medicinal agents,limit tests.

UNIT-II **10 Hours**

- **Acid base titration**: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves
- **Non aqueous titration**: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl

UNIT-III **10 Hours**

- **Precipitation titrations**: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride.
- **Complexometric titration**: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.
- **Gravimetry**: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.

- Basic Principles,methods and application of diazotisation titration.

UNIT-IV **08 Hours**

Redox titrations

(a) Concepts of oxidation and reduction

(b) Types of redox titrations (Principles and applications)

Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate

UNIT-V **07 Hours**

- **Electrochemical methods of analysis**
  - **Conductometry**- Introduction, Conductivity cell, Conductometric titrations, applications.
  - **Potentiometry** - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications.
  - **Polarography** - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications

BP108P. PHARMACEUTICAL ANALYSIS (Practical)

4 Hours / Week

I Limit Test of the following

(1) Chloride
(2) Sulphate
(3) Iron
(4) Arsenic

II Preparation and standardization of

(1) Sodium hydroxide
(2) Sulphuric acid
(3) Sodium thiosulfate
(4) Potassium permanganate
(5) Ceric ammonium sulphate

III Assay of the following compounds along with Standardization of Titrant

(1) Ammonium chloride by acid base titration
(2) Ferrous sulphate by Cerimetry
(3) Copper sulphate by Iodometry
(4) Calcium gluconate by complexometry
(5) Hydrogen peroxide by Permanganometry
(6) Sodium benzoate by non-aqueous titration
(7) Sodium Chloride by precipitation titration

IV Determination of Normality by electro-analytical methods

(1) Conductometric titration of strong acid against strong base
(2) Conductometric titration of strong acid and weak acid against strong base
(3) Potentiometric titration of strong acid against strong base

Recommended Books: (Latest Editions)

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
5. John H. Kennedy, Analytical chemistry principles
6. Indian Pharmacopoeia.

BP103T. PHARMACEUTICS- I (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Know the history of profession of pharmacy
- Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
- Understand the professional way of handling the prescription
- Preparation of various conventional dosage forms

Course Content:

UNIT – I **10 Hours**

- **Historical background and development of profession of pharmacy**: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia.
- **Dosage forms:** Introduction to dosage forms, classification and definitions
- **Prescription:** Definition, Parts of prescription, handling of Prescription and Errors in prescription.
- **Posology:** Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.

UNIT – II **10 Hours**

- **Pharmaceutical calculations**: Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight.

- **Powders:** Definition, classification, advantages and disadvantages,Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions.

- **Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques

UNIT – III **08 Hours**

- **Monophasic liquids:** Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.
- **Biphasic liquids:**
- **Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome.
- **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type ofEmulsion, Methods of preparation & stability problems and methods to overcome.

UNIT – IV **08 Hours**

- **Suppositories**: Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories.
- **Pharmaceutical incompatibilities**: Definition, classification, physical, chemical and therapeutic incompatibilities with examples.

UNIV – V **07 Hours**

- **Semisolid dosage forms:** Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms

BP109P. PHARMACEUTICSI (Practical) **3 Hours / week**

1 . Syrups

a) Syrup IP'66

b) Compound syrup of Ferrous Phosphate BPC'68

2. Elixirs a) Piperazine citrate elixir

b) Paracetamol pediatric elixir

3.Linctus a) Terpin Hydrate Linctus IP'66

b) Iodine Throat Paint (Mandles Paint)

4. Solutions

a) Strong solution of ammonium acetate

b) Cresol with soap solution

c) Lugol's solution

5. Suspensions

a) Calamine lotion

b) Magnesium Hydroxide mixture

c) Aluminimum Hydroxide gel

6. Emulsions a) Turpentine Liniment

b) Liquid paraffin emulsion

7. Powders and Granules

a) ORS powder (WHO)

b) Effervescent granules

c)Dusting powder

d)Divded powders

8. Suppositories

a) Glycero gelatin suppository

b) Coca butter suppository

c) Zinc Oxide suppository

8. Semisolids

a) Sulphur ointment

b) Non staining-iodine ointment with methyl salicylate

c) Carbopal gel

9. Gargles and Mouthwashes

a) Iodine gargle

b) Chlorhexidine mouthwash

Recommended Books: (Latest Editions)

1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
3. M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.
4. Indian pharmacopoeia.
5. British pharmacopoeia.
6. Lachmann. Theory and Practice of Industrial Pharmacy,Lea& Febiger Publisher, The University of Michigan.
7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
8. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
10. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
12. Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.

BP104T. PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
- understand the medicinal and pharmaceutical importance of inorganic compounds

Course Content:

UNIT I **10 Hours**

- **Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate

  General methods of preparation, assay for the compounds superscripted with **asterisk (*),** properties and medicinal uses of inorganic compounds belonging to the following classes

UNIT II **10 Hours**

- **Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.
- **Major extra and intracellular electrolytes**: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.
- **Dental products**: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

UNIT III **10 Hours**

- **Gastrointestinal agents**

  Acidifiers: Ammonium chloride* and Dil. HCl

  Antacid: Ideal properties of antacids, combinations of antacids, Sodium

Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture

Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite

Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations

UNIT IV **08 Hours**

- **Miscellaneous compounds**

Expectorants: Potassium iodide, Ammonium chloride*.

Emetics: Copper sulphate*, Sodium potassium tartarate

Haematinics: Ferrous sulphate*, Ferrous gluconate

Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite333

Astringents: Zinc Sulphate, Potash Alum

UNIT V **07 Hours**

- **Radiopharmaceuticals**: Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I^{131}, Storage conditions, precautions & pharmaceutical application of radioactive substances.

BP110P. PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)

4 Hours / Week

I **Limit tests for following ions**

Limit test for Chlorides and Sulphates
Modified limit test for Chlorides and Sulphates
Limit test for Iron
Limit test for Heavy metals
Limit test for Lead
Limit test for Arsenic

II **Identification test**

Magnesium hydroxide
Ferrous sulphate
Sodium bicarbonate
Calcium gluconate
Copper sulphate

III **Test for purity**

Swelling power of Bentonite
Neutralizing capacity of aluminum hydroxide gel
Determination of potassium iodate and iodine in potassium Iodide

IV **Preparation of inorganic pharmaceuticals**

Boric acid
Potash alum
Ferrous sulphate

Recommended Books (Latest Editions)

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

BP105T.COMMUNICATION SKILLS (Theory)

30 Hours

Course Outcomes: At the end of the course, students will be able to:

- Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
- Communicate effectively (Verbal and Non Verbal)
- Effectively manage the team as a team player
- Develop interview skills
- Develop Leadership qualities and essentials

Course content:

UNIT – I **07 Hours**

- **Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context

- **Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers

- **Perspectives in Communication:** Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

UNIT – II **07 Hours**

- **Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication

- **Communication Styles:** Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style

UNIT – III **07 Hours**

- **Basic Listening Skills:** Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations

- **Effective Written Communication:** Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication

- **Writing Effectively:** Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

UNIT – IV **05 Hours**

- **Interview Skills:** Purpose of an interview, Do's and Dont's of an interview

- **Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

UNIT – V **04 Hours**

- **Group Discussion:** Introduction, Communication skills in group discussion, Do's and Dont's of group discussion

BP111P.COMMUNICATION SKILLS (Practical)

2 Hours / week

Thefollowing learning modules are to be conducted using wordsworth® English language lab software

Basic communication covering the following topics

Meeting People

Asking Questions

Making Friends

What did you do?

Do's and Dont's

Pronunciations covering the following topics

Pronunciation (Consonant Sounds)

Pronunciation and Nouns

Pronunciation (Vowel Sounds)

Advanced Learning

Listening Comprehension / Direct and Indirect Speech

Figures of Speech

Effective Communication

Writing Skills

Effective Writing

Interview Handling Skills

E-Mail etiquette

Presentation Skills

Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4thEdition, Pan Mac Millan,2009
12. Bringing out the best in people, Aubrey Daniels, 2ndEdition, Mc Graw Hill, 1999

BP 106RBT.REMEDIAL BIOLOGY (Theory)

30 Hours

Course Outcomes: At the end of the course, students will be able to:

- know the classification and salient features of five kingdoms of life
- understand the basic components of anatomy & physiology of plant
- know understand the basic components of anatomy & physiology animal with special reference to human

UNIT I — 07 Hours

Living world:

- Definition and characters of living organisms
- Diversity in the living world
- Binomial nomenclature
- Five kingdoms of life and basis of classification. Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus,

Morphology of Flowering plants

- Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.
- General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones.

UNIT II — 07 Hours

Body fluids and circulation

- Composition of blood, blood groups, coagulation of blood
- Composition and functions of lymph
- Human circulatory system
- Structure of human heart and blood vessels
- Cardiac cycle, cardiac output and ECG

Digestion and Absorption

- Human alimentary canal and digestive glands
- Role of digestive enzymes
- Digestion, absorption and assimilation of digested food

Breathing and respiration

- Human respiratory system
- Mechanism of breathing and its regulation
- Exchange of gases, transport of gases and regulation of respiration
- Respiratory volumes

UNIT III **07 Hours**

Excretory products and their elimination

- Modes of excretion
- Human excretory system- structure and function
- Urine formation
- Rennin angiotensin system

Neural control and coordination

- Definition and classification of nervous system
- Structure of a neuron
- Generation and conduction of nerve impulse
- Structure of brain and spinal cord
- Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata

Chemical coordination and regulation

- Endocrine glands and their secretions
- Functions of hormones secreted by endocrine glands

Human reproduction

- Parts of female reproductive system
- Parts of male reproductive system
- Spermatogenesis and Oogenesis
- Menstrual cycle

UNIT IV **05 Hours**

Plants and mineral nutrition:

- Essential mineral, macro and micronutrients
- Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation

Photosynthesis

- Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.

UNIT V **04 Hours**

Plant respiration: Respiration, glycolysis, fermentation (anaerobic).

Plant growth and development

- Phases and rate of plant growth, Condition of growth,Introduction to plant growth regulators

Cell - The unit of life

- Structure and functions of cell and cell organelles.Cell division

Tissues

- Definition, types of tissues, location and functions.

Text Books

a. Text book of Biology by S. B. Gokhale
b. A Text book of Biology by Dr. Thulajappa and Dr. Seetaram.

Reference Books

a. A Text book of Biology by B.V. Sreenivasa Naidu
b. A Text book of Biology by Naidu and Murthy
c. Botany for Degree students By A.C.Dutta.
d.Outlines of Zoology by M. Ekambaranatha ayyer and T. N. Ananthakrishnan.
e. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

BP112RBP.REMEDIAL BIOLOGY (Practical)

30 Hours

1. Introduction to experiments in biology
   a) Study of Microscope
   b) Section cutting techniques
   c) Mounting and staining
   d) Permanent slide preparation
2. Study of cell and its inclusions
3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications
4. Detailed study of frog byusing computer models
5. Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower
6. Identification of bones
7. Determination of blood group
8. Determination of blood pressure
9. Determination of tidal volume

Reference Books

1. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.
2. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.
3. Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof .M.J.H.Shafi

BP 106RMT.REMEDIAL MATHEMATICS (Theory)

30 Hours

Course Outcomes: At the end of the course, students will be able to:

- Know the theory and their application in Pharmacy
- Solve the different types of problems by applying theory
- Appreciate the important application of mathematics in Pharmacy

Course Content:

UNIT – I **06 Hours**

- **Partial fraction**

Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction , Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics

- **Logarithms**

Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems.

- **Function***:*

Real Valued function, Classification of real valued functions,

- **Limits and continuity** :

Introduction , Limit of a function, Definition of limit of a function (- definition) , $\lim \frac{x^n - a}{n} = na^{n-1}$, $\lim \frac{\sin}{} = 1$,

$x \to a$ $x \to a$ $\to 0$

UNIT –II **06 Hours**

- **Matrices and Determinant:**

Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants , Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix , Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley–Hamilton theorem,Applicationof Matrices in solving Pharmacokinetic equations

UNIT – III **06 Hours**

- **Calculus**

Differentiation : Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function , Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – **Without Proof**, Derivative of x^n *w.r.t*x,where *n* is any rational number, Derivative of e^x,, Derivative of $\log_e x$, Derivative of a^x,Derivative of trigonometric functions from first principles **(without Proof)**, Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application

UNIT – IV **06 Hours**

- **Analytical Geometry**

Introduction: Signs of the Coordinates, Distance formula,

Straight Line : Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line

Integration:

Introduction, Definition, Standard formulae, Rules of integration , Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application

UNIT-V **06 Hours**

- **Differential Equations** : Some basic definitions, Order and degree, Equations in separable form , Homogeneous equations, Linear Differential equations, Exact equations, **Application in solving Pharmacokinetic equations**
- **Laplace Transform** : Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, **Application in solving Chemical kinetics and Pharmacokinetics equations**

Recommended Books (Latest Edition)

1. Differential Calculus by Shanthinarayan
2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
3. Integral Calculus by Shanthinarayan
4. Higher Engineering Mathematics by Dr.B.S.Grewal

Semester II

BP 201T. HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Explain the gross morphology, structure and functions of various organs of the human body.
- Describe the various homeostatic mechanisms and their imbalances.
- Identify the various tissues and organs of different systems of human body.
- Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
- Appreciate coordinated working pattern of different organs of each system
- Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

Course Content:

Unit I **10 hours**

- **Nervous system**

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.

Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid.structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts,reflex activity)

Unit II **06 hours**

- **Digestive system**

Anatomy of GI Tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.

- **Energetics**

Formation and role of ATP, Creatinine Phosphate and BMR.

Unit III

- **Respiratory system** **10 hours**

Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration

Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.

- **Urinary system**

Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.

Unit IV **10 hours**

- **Endocrine system**

Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal
gland, pancreas, pineal gland, thymus and their disorders.

Unit V **09 hours**

- **Reproductive system**

Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition

- **Introduction to genetics**

Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance

BP 207 P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)

4 Hours/week

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject**.**

1. To study the integumentary and special senses using specimen, models, etc.,
2. To study the nervous system using specimen, models, etc.,
3. To study the endocrine system using specimen, models, etc
4. To demonstrate the general neurological examination
5. To demonstrate the function of olfactory nerve
6. To examine the different types of taste.
7. To demonstrate the visual acuity
8. To demonstrate the reflex activity
9. Recording of body temperature
10. To demonstrate positive and negative feedback mechanism.
11. Determination of tidal volume and vital capacity.
12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
13. Recording of basal mass index Study of familyplanning devices and pregnancy diagnosis test.
14. Demonstration of total blood count by cell analyser
15. Permanent slides of vital organs and gonads.

Recommended Books (Latest Editions)

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA

4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology byTortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

Reference Books:

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata

BP202T. PHARMACEUTICAL ORGANIC CHEMISTRY –I (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- write the structure, name and the type of isomerism of the organic compound
- write the reaction, name the reaction and orientation of reactions
- account for reactivity/stability of compounds,
- identify/confirm the identification of organic compound

Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

UNIT-I **07 Hours**

- **Classification, nomenclature and isomerism**

  Classification of Organic Compounds

  Common and IUPAC systems of nomenclature of organic compounds

  (up to 10 Carbons open chain and carbocyclic compounds)

Structural isomerisms in organic compounds

UNIT-II10 Hours

- **Alkanes*, Alkenes* and Conjugated dienes***

  SP^3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins.

  Stabilities of alkenes, SP^2 hybridization in alkenes

  E_1 and E_2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E_1 verses E_2 reactions, Factors affecting E_1 and E_2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.

  Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement

UNIT-III **10 Hours**

- **Alkyl halides***

  SN_1 and SN_2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations.

  SN_1 versus SN_2 reactions, Factors affecting SN_1 and SN_2 reactions

  Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform.

- **Alcohols*-** Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol

UNIT-IV10 Hours

- **Carbonyl compounds* (Aldehydes and ketones)**

  Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.

UNIT-V **08 Hours**

- **Carboxylic acids***

  Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids ,amide and ester

  Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid

- **Aliphatic amines* -** Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine

BP208P. PHARMACEUTICAL ORGANIC CHEMISTRY -I (Practical)

4 Hours / week

1. Systematic qualitative analysis of unknown organic compounds like
    1. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.
    2. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test
    3. Solubility test
    4. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.
    5. Melting point/Boiling point of organic compounds
    6. Identification of the unknown compound from the literature using melting point/ boiling point.
    7. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.
    8. Minimum 5 unknown organic compounds to be analysed systematically.
2. Preparation of suitable solid derivatives from organic compounds
3. Construction of molecular models

Recommended Books (Latest Editions)

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.
9. Reaction and reaction mechanism by Ahluwaliah/Chatwal.

BP203 T. BIOCHEMISTRY (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
- Understand the metabolism of nutrient molecules in physiological and pathological conditions.
- Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

Course Content:

UNIT I **08 Hours**

- **Biomolecules**

  Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.

- **Bioenergetics**

  Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential.

  Energy rich compounds; classification; biological significances of ATP and cyclic AMP

UNIT II **10 Hours**

- **Carbohydrate metabolism**

  Glycolysis – Pathway,

  energetics and significance

  Citric acid cycle- Pathway,

  energetics and significance

  HMP shunt and its significance; Glucose-6-

Phosphate dehydrogenase (G6PD) deficiency Glycolytic

ogen metabolism Pathways and glycogen
storage diseases (GSD) Gluconeogenesis-
Pathway and its significance
Hormonal regulation of blood glucose level and Diabetes mellitus

- **Biological oxidation** level

  Electron transport chain (ETC) and its mechanism.

  Oxidative phosphorylation & its mechanism and substrate phosphorylation

  Inhibitors ETC and oxidative phosphorylation/Uncouplers

UNIT III **10 Hours**

- **Lipid metabolism**

  β-Oxidation of saturated fatty acid (Palmitic acid)

  Formation and utilization of ketone bodies; ketoacidosis

  De novo synthesis of fatty acids (Palmitic acid)

  Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D

  Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.

- **Amino acid metabolism**

  General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders

  Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia)

  Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline

  Catabolism of heme; hyperbilirubinemia and jaundice

UNIT IV **10 Hours**

- **Nucleic acid metabolism and genetic information transfer**

  Biosynthesis of purine and pyrimidine nucleotides

  Catabolism of purine nucleotides and Hyperuricemia and Gout disease

  Organization of mammalian genome

  Structure of DNA and RNA and their functions

  DNA replication (semi conservative model)

  Transcription or RNA synthesis

  Genetic code, Translation or Protein synthesis and inhibitors

UNIT V **07 Hours**

- **Enzymes**

  Introduction, properties, nomenclature and IUB classification of enzymes

  Enzyme kinetics (Michaelis plot, Line Weaver Burke plot)

  Enzyme inhibitors with examples

  Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation

  Therapeutic and diagnostic applications of enzymes and isoenzymes

  Coenzymes –Structure and biochemical functions

BP 209 P. BIOCHEMISTRY (Practical)

4 Hours / Week

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch)
2. Identification tests for Proteins (albumin and Casein)
3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of pH
9. Study of enzymatic hydrolysis of starch
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity.
12. Study the effect of substrate concentration on salivary amylase activity.

Recommended Books (Latest Editions)

1. Principles of Biochemistry by Lehninger.
2. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
3. Biochemistry by Stryer.
4. Biochemistry by D. Satyanarayan and U.Chakrapani
5. Textbook of Biochemistry by Rama Rao.
6. Textbook of Biochemistry by Deb.
7. Outlines of Biochemistry by Conn and Stumpf
8. Practical Biochemistry by R.C. Gupta and S. Bhargavan.
9. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
10. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
11. Practical Biochemistry by Harold Varley.

BP 204T.PATHOPHYSIOLOGY (THEORY)

45Hours

Course Outcomes: At the end of the course, students will be able to:

- Describe the etiology and pathogenesis of the selected disease states;
- Name the signs and symptoms of the diseases; and
- Mention the complications of the diseases.

Course content:

Unit I **10Hours**

- **Basic principles of Cell injury and Adaptation:**
  Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury**,** Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage),Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia)**,**Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis &Alkalosis,Electrolyte imbalance

- **Basic mechanism involved in the process of inflammation and repair:**
  Introduction, Clinical signs of inflammation, Different types of Inflammation,Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's,Mediators of inflammation,Basic principles of wound healing in the skin,Pathophysiology of Atherosclerosis

Unit II **10Hours**

- **Cardiovascular System:**
  Hypertension, congestive heart failure, ischemic heart disease (angina,myocardial infarction, atherosclerosis and arteriosclerosis)
- **Respiratory system:**Asthma, Chronic obstructive airways diseases.
- **Renal system:**Acute and chronic renal failure .

Unit II **10Hours**

- **Haematological Diseases:**
  Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia
- **Endocrine system:** Diabetes, thyroid diseases, disorders of sex hormones
- **Nervous system:** Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.
- **Gastrointestinal system:** Peptic Ulcer
-

Unit IV **8 Hours**

- Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.
- **Disease of bones and joints:** Rheumatoid arthritis, osteoporosis and gout
- **Principles of cancer:** classification, etiology and pathogenesis of cancer
- **Diseases of bones and joints:**Rheumatoid Arthritis, Osteoporosis,Gout

- **Principles of Cancer:** Classification, etiology and pathogenesis of Cancer

Unit V **7 Hours**

- **Infectious diseases:**Meningitis,Typhoid, Leprosy,

Tuberculosis Urinary tract infections

- **Sexually transmitted diseases:**AIDS, Syphilis, Gonorrhea

Recommended Books (Latest Editions)

1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins &Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010.
3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011.
4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states;
5. William and Wilkins, Baltimore;1991 [1990 printing].
6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston;Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.
7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010.
8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014.
9. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6th edition; Philadelphia; WB Saunders Company; 1997.
10. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003.

Recommended Journals

1. The Journal of Pathology. ISSN: 1096-9896 (Online)
2. The American Journal of Pathology. ISSN: 0002-9440
3. Pathology. 1465-3931 (Online)
4. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
5. Indian Journal of Pathology and Microbiology. ISSN-0377-4929.

BP205 T. COMPUTER APPLICATIONS IN PHARMACY (Theory)

30 Hrs (2 Hrs/Week)

Course Outcomes: At the end of the course, students will be able to:

- know the various types of application of computers in pharmacy
- know the various types of databases
- know the various applications of databases in pharmacy

Course content:

UNIT – I **06 hours**

Number system: Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement ,Two's complement method, binary multiplication, binary division

Concept of Information Systems and Software : Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and

UNIT –II **06 hours**

Web technologies:Introduction to HTML, XML,CSS and Programming languages, introduction to web servers and Server

Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database

UNIT – III **06 hours**

Application of computers in Pharmacy – Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring

Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System

UNIT – IV **06 hours**

Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery

UNIT-V **06 hours**

Computers as data analysis in Preclinical development:
Chromatographic dada analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMS)

BP210P. COMPUTER APPLICATIONS IN PHARMACY (Practical)

1. Design a questionnaire using a word processing package to gather information about a particular disease.
2. Create a HTML web page to show personal information.
3. Retrieve the information of a drug and its adverse effects using online tools
4. Creating mailing labels Using Label Wizard , generating label in MS WORD
5. Create a database in MS Access to store the patient information with the required fields Using access
6. Design a form in MS Access to view, add, delete and modify the patient record in the database
7. Generating report and printing the report from patient database
8. Creating invoice table using – MS Access
9. Drug information storage and retrieval using MS Access
10. Creating and working with queries in MS Access
11. Exporting Tables, Queries, Forms and Reports to web pages
12. Exporting Tables, Queries, Forms and Reports to XML pages

Recommended books (Latest edition):

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002

BP 206 T. ENVIRONMENTAL SCIENCES (Theory)

30 hours

Course Outcomes: At the end of the course, students will be able to:

- Create the awareness about environmental problems among learners.
- Impart basic knowledge about the environment and its allied problems.
- Develop an attitude of concern for the environment.
- Motivate learner to participate in environment protection and environment improvement.
- Acquire skills to help the concerned individuals in identifying and solving environmental problems.
- Strive to attain harmony with Nature.

Course content:

Unit-I **10hours**

The Multidisciplinary nature of environmental studies

Natural Resources

Renewable and non-renewable resources:

Natural resources and associated problems

a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

Unit-II **10hours**

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit- III **10hours**

Environmental Pollution: Air pollution; Water pollution; Soil pollution

Recommended Books (Latest edition):

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Pu blishing Pvt. Ltd., Ahmedabad – 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clanderson Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down of Earth, Centre for Science and Environment

SEMESTER III

BP301T. PHARMACEUTICAL ORGANIC CHEMISTRY –II (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- write the structure, name and the type of isomerism of the organic compound
- write the reaction, name the reaction and orientation of reactions
- account for reactivity/stability of compounds,
- prepare organic compounds

Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

UNIT I **10 Hours**

- **Benzene and its derivatives**
  - **A.** Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule
  - **B.** Reactions of benzene - nitration, sulphonation, halogenation-reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation.
  - **C.** Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction
  - **D.** Structure and uses of DDT, Saccharin, BHC and Chloramine

UNIT II **10 Hours**

- **Phenols*** - Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols
- **Aromatic Amines* -** Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts
- **Aromatic Acids* –**Acidity, effect of substituents on acidity and important reactions of benzoic acid.

UNIT III **10 Hours**

- **Fats and Oils**
  a. Fatty acids – reactions.
  b. Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.
  c. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination.

UNIT IV **08 Hours**

- **Polynuclear hydrocarbons:**
  a. Synthesis, reactions
  b. Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives

UNIT V **07 Hours**

- **Cyclo alkanes***
  Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only

BP305P. PHARMACEUTICAL ORGANIC CHEMISTRY -II (Practical)

4 Hrs/week

I Experiments involving laboratory techniques

- Recrystallization
- Steam distillation

II Determination of following oil values (including standardization of reagents)

- Acid value
- Saponification value
- Iodine value

III Preparation of compounds

- Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.
- 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/
- Acetanilide by halogenation (Bromination) reaction.
- 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.
- Benzoic acid from Benzyl chloride by oxidation reaction.
- Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
- 1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.
- Benzil from Benzoin by oxidation reaction.
- Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction
- Cinnammic acid from Benzaldehyde by Perkin reaction
- *P*-Iodo benzoic acid from *P*-amino benzoic acid

Recommended Books (Latest Editions)

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

BP302T. PHYSICAL PHARMACEUTICS-I (Theory)

45Hours

Course Outcomes: At the end of the course, students will be able to:

- Understand various physicochemical properties of drug molecules in the designing the dosage forms
- Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations
- Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Content:

UNIT-I **10 Hours**

Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications

UNIT-II **10Hours**

States of Matter and properties of matter: State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols

– inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid-crystalline, amorphous & polymorphism.

Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications

UNIT-III **08 Hours**

Surface and interfacial phenomenon: Liquid interface, surface & interfacial tensions,

surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilisation, detergency, adsorption at solid interface.

UNIT-IV **08Hours**

Complexation and protein binding: Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.

UNIT-V **07 Hours**

pH, buffers and Isotonic solutions: Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.

BP306P. PHYSICAL PHARMACEUTICS – I (Practical)

4 Hrs/week

1. Determination the solubility of drug at room temperature
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water
4. Determination of Partition co- efficient of Iodine in CCl_4 and water
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
6. Determination of surface tension of given liquids by drop count and drop weight method
7. Determination of HLB number of a surfactant by saponification method
8. Determination of Freundlich and Langmuir constants using activated char coal
9. Determination of critical micellar concentration of surfactants
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

Recommended Books: (Latest Editions)

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam
10. Test book of Physical Phramacy, by Gaurav Jain & Roop K. Khar

BP 303 T. PHARMACEUTICAL MICROBIOLOGY (Theory)

45Hour

Course Outcomes: At the end of the course, students will be able to:

- Understand methods of identification, cultivation and preservation of various microorganisms
- To understand the importance and implementation of sterlization in pharmaceutical processing and industry
- Learn sterility testing of pharmaceutical products.
- Carried out microbiological standardization of Pharmaceuticals.
- Understand the cell culture technology and its applications in pharmaceutical industries.

Course content:

Unit I **10 Hours**

Introduction, history of microbiology, its branches, scope and its importance.

Introduction to Prokaryotes and Eukaryotes

Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count).

Study of different types of phase constrast microscopy, dark field microscopy and electron microscopy.

Unit II **10 Hours**

Identification of bacteria using staining techniques (simple, Gram's &Acid fast staining) and biochemical tests (IMViC).

Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous,radiation and mechanical method of sterilization.

Evaluation of the efficiency of sterilization methods.

Equipments employed in large scale sterilization.

Sterility indicators.

Unit III **10 Hours**

Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses.

Classification and mode of action of disinfectants

Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions

Evaluation of bactericidal & Bacteriostatic.

Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

Unit IV **08 Hours**

Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.
Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids.
Assessment of a new antibiotic.

Unit V **07Hours**

Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.

Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.

Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures.

Application of cell cultures in pharmaceutical industry and research.

BP 307P.PHARMACEUTICAL MICROBIOLOGY (Practical)

4 Hrs/week

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

Recommended Books (Latest edition)

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

BP 304 T. PHARMACEUTICAL ENGINEERING (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- To know various unit operations used in Pharmaceutical industries.
- To understand the material handling techniques.
- To perform various processes involved in pharmaceutical manufacturing process.
- To carry out various test to prevent environmental pollution.
- To appreciate and comprehend significance of plant lay out design for optimum use of resources.
- To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

Course content:

UNIT-I **10 Hours**

- **Flow of fluids:** Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.
- **Size Reduction:** Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill.
- **Size Separation:** Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.

UNIT-II **10 Hours**

- **Heat Transfer:** Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.

- **Evaporation:** Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator.

- **Distillation:** Basic Principles and methodology of simple distillation,flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation

UNIT- III **08 Hours**

- **Drying:** Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.

- **Mixing:** Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier,

UNIT-IV **08 Hours**

- **Filtration:** Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter.
- **Centrifugation:** Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.

UNIT- V **07 Hours**

- **Materials of pharmaceutical plant construction, Corrosion and its prevention:** Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.

Recommended Books: (Latest Editions)

1. Introduction to chemical engineering – Walter L Badger & Julius Banchero, Latest edition.
2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition.
3. Unit operation of chemical engineering – Mcabe Smith, Latest edition.
4. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition.
5. Remington practice of pharmacy- Martin, Latest edition.
6. Theory and practice of industrial pharmacy by Lachmann., Latest edition.
7. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition.
8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

BP308P - PHARMACEUTICAL ENGINEERING (Practical)

4 Hours/week

I. Determination of radiation constant of brass, iron, unpainted and painted glass.
II. Steam distillation – To calculate the efficiency of steam distillation.
III. To determine the overall heat transfer coefficient by heat exchanger.
IV. Construction of drying curves (for calcium carbonate and starch).
V. Determination of moisture content and loss on drying.
VI. Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method.
VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.
VIII. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic andlogarithmic probability plots.
IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.
X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such othermajor equipment.
XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity
XII. To study the effect of time on the Rate of Crystallization.
XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.

SEMESTER IV

BP401T. PHARMACEUTICAL ORGANIC CHEMISTRY –III (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- understand the methods of preparation and properties of organic compounds
- explain the stereo chemical aspects of organic compounds and stereo chemical reactions
- know the medicinal uses and other applications of organic compounds

Course Content:

Note: To emphasize on definition, types, mechanisms, examples, uses/applications

UNIT-I **10 Hours**

Stereo isomerism

Optical isomerism –

Optical activity, enantiomerism, diastereoisomerism, meso compounds

Elements of symmetry, chiral and achiral molecules

DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers

Reactions of chiral molecules

Racemic modification and resolution of racemic mixture.

Asymmetric synthesis: partial and absolute

UNIT-II **10 Hours**

Geometrical isomerism

Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)

Methods of determination of configuration of geometrical isomers.

Conformational isomerism in Ethane, n-Butane and Cyclohexane.

Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.

Stereospecific and stereoselective reactions

UNIT-III **10 Hours**

Heterocyclic compounds:

Nomenclature and classification, Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene

Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene

UNIT-IV **8 Hours**

Synthesis, reactions and medicinal uses of following compounds/derivatives, Pyrazole, Imidazole, Oxazole and Thiazole. Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives

UNIT-V **07 Hours**

Reactions of synthetic importance

Metal hydride reduction ($NaBH_4$ and $LiAlH_4$), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmanns rearrangement and Schmidt rearrangement. Claisen-Schmidt condensation

Recommended Books (Latest Editions)

1. Organic chemistry by I.L. Finar, Volume-I & II.
2. A text book of organic chemistry – Arun Bahl, B.S. Bahl.
3. Heterocyclic Chemistry by Raj K. Bansal
4. Organic Chemistry by Morrison and Boyd
5. Heterocyclic Chemistry by T.L. Gilchrist

BP402T. MEDICINAL CHEMISTRY – I (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- understand the chemistry of drugs with respect to their pharmacological activity
- understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
- know the Structural Activity Relationship (SAR) of different class of drugs
- write the chemical synthesis of some drugs

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

UNIT- I **10 Hours**

Introduction to Medicinal Chemistry

History and development of medicinal chemistry

Physicochemical properties in relation to biological action

Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism.

Drug metabolism

Drug metabolism principles- Phase I and Phase II.

Factors affecting drug metabolism including stereo chemical aspects.

UNIT- II **10 Hours**

Drugs acting on Autonomic Nervous System

Adrenergic Neurotransmitters:

Biosynthesis and catabolism of catecholamine.

Adrenergic receptors (Alpha & Beta) and their distribution.

Sympathomimetic agents: SAR of Sympathomimetic agents

Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine,

Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.

- Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine.
- Agents with mixed mechanism: Ephedrine, Metaraminol.

Adrenergic Antagonists:

Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide.

Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.

UNIT-III **10 Hours**

Cholinergic neurotransmitters:

Biosynthesis and catabolism of acetylcholine.

Cholinergic receptors (Muscarinic & Nicotinic) and their distribution.

Parasympathomimetic agents: SAR of Parasympathomimetic agents

Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine.

Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorphate, Echothiophate iodide, Parathione, Malathion.

Cholinesterase reactivator: Pralidoxime chloride.

Cholinergic Blocking agents: SAR of cholinolytic agents

Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*.

Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.

UNIT- IV **08 Hours**

Drugs acting on Central Nervous System

A. Sedatives and Hypnotics:

Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem

Barbiturtes: SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital

Miscelleneous:

Amides & imides: Glutethmide.

Alcohol & their carbamate derivatives: Meprobomate, Ethchlorvynol.

Aldehyde & their derivatives: Triclofos sodium, Paraldehyde.

B. Antipsychotics

Phenothiazeines: SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.

Ring Analogues of Phenothiazeines: Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine.

Fluro buterophenones: Haloperidol, Droperidol, Risperidone.

Beta amino ketones: Molindone hydrochloride.

Benzamides: Sulpieride.

C. Anticonvulsants: SAR of Anticonvulsants**,** mechanism of anticonvulsant action

Barbiturates: Phenobarbitone, Methabarbital. **Hydantoins:**

Phenytoin*, Mephenytoin, Ethotoin **Oxazolidine diones:**

Trimethadione, Paramethadione **Succinimides:**

Phensuximide, Methsuximide, Ethosuximide* **Urea and**

monoacylureas: Phenacemide, Carbamazepine*

Benzodiazepines: Clonazepam

Miscellaneous: Primidone, Valproic acid , Gabapentin, Felbamate

UNIT – V **07 Hours**

Drugs acting on Central Nervous System

General anesthetics:

Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.

Ultra short acting barbitutrates: Methohexital sodium*, Thiamylal sodium, Thiopental sodium.

Dissociative anesthetics: Ketamine hydrochloride.*

Narcotic and non-narcotic analgesics

Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride, Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate.

Narcotic antagonists: Nalorphine hydrochloride, Levallorphan tartarate, Naloxone hydrochloride.

Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.

BP406P. MEDICINAL CHEMISTRY – I (Practical)

4 Hours/Week

I	**Preparation of drugs/ intermediates**
1	1,3-pyrazole
2	1,3-oxazole
3	Benzimidazole
4	Benztriazole
5	2,3- diphenyl quinoxaline
6	Benzocaine
7	Phenytoin
8	Phenothiazine
9	Barbiturate
II	**Assay of drugs**
1	hlorpromazine
2	Phenobarbitone
3	Atropine
4	Ibuprofen
5	Aspirin
6	Furosemide
III	**Determination of Partition coefficient for any two drugs**

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of Spractical organic chemistry- A.I.Vogel.

BP 403 T. PHYSICAL PHARMACEUTICS-II (Theory)

45Hours

Course Outcomes: At the end of the course, students will be able to:

- Understand various physicochemical properties of drug molecules in the designing the dosage forms
- Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations
- Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Content:

UNIT-I **07 Hours**

Colloidal dispersions: Classification of dispersed systems & their general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization& protective action.

UNIT-II **10 Hours**

Rheology: Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling Sphere, rotational viscometers

Deformation of solids: Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus

UNIT-III **10 Hours**

Coarse dispersion: Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method.

UNIT-IV **10Hours**

Micromeretics: Particle size and distribution, mean particle size, number and weight distribution, particle number, methods for determining particle size by different methods, counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties.

UNIT-V **10 Hours**

Drug stability: Reaction kinetics: zero, pseudo-zero, first & second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention

BP 407P. PHYSICAL PHARMACEUTICS- II (Practical)

3 Hrs/week

1. Determination of particle size, particle size distribution using sieving method
2. Determination of particle size, particle size distribution using Microscopic method
3. Determination of bulk density, true density and porosity
4. Determine the angle of repose and influence of lubricant on angle of repose
5. Determination of viscosity of liquid using Ostwald's viscometer
6. Determination sedimentation volume with effect of different suspending agent
7. Determination sedimentation volume with effect of different concentration of single suspending agent
8. Determination of viscosity of semisolid by using Brookfield viscometer
9. Determination of reaction rate constant first order.
10. Determination of reaction rate constant second order
11. Accelerated stability studies

Recommended Books: (Latest Editions)

1. Physical Pharmacy by Alfred Martin, Sixth edition
2. Experimental pharmaceutics by Eugene, Parott.
3. Tutorial pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical calculations, Lea & Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C, and Manavalan R.

BP 404 T. PHARMACOLOGY-I (Theory)

45 Hrs

Course Outcomes: At the end of the course, students will be able to:

- Understand the pharmacological actions of different categories of drugs
- Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
- Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
- Observe the effect of drugs on animals by simulated experiments
- Appreciate correlation of pharmacology with other bio medical sciences

Course Content:

UNIT-I **08 hours**

1. General Pharmacology

a. Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists(competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.

b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination

UNIT-II **12 Hours**

General Pharmacology

a. Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action.

b. Adverse drug reactions.

c. Drug interactions (pharmacokinetic and pharmacodynamic)

d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.

UNIT-III **10 Hours**

2. Pharmacology of drugs acting on peripheral nervous system

a. Organization and function of ANS.

b.Neurohumoral transmission,co-transmission and classification of neurotransmitters.

c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics.

d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).

e. Local anesthetic agents.

f. Drugs used in myasthenia gravis and glaucoma

UNIT-IV **08 Hours**

3. Pharmacology of drugs acting on central nervous system

a. Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine.

b. General anesthetics and pre-anesthetics**.**

c. Sedatives, hypnotics and centrally acting muscle relaxants.

d. Anti-epileptics

e. Alcohols and disulfiram

UNIT-V **07 Hours**

3. Pharmacology of drugs acting on central nervous system

a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxietyagents, anti-manics and hallucinogens.

b. Drugs used in Parkinsons disease and Alzheimer's disease.

c. CNS stimulants and nootropics.

d. Opioid analgesics and antagonists

e. Drug addiction, drug abuse, tolerance and dependence.

BP 408 P.PHARMACOLOGY-I (Practical)

4Hrs/Week

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.
10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.
13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology,.Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology

BP 405 T.PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- to know the techniques in the cultivation and production of crude drugs
- to know the crude drugs, their uses and chemical nature
- know the evaluation techniques for the herbal drugs
- to carry out the microscopic and morphological evaluation of crude drugs

Course Content:

UNIT-I **10 Hours**

Introduction to Pharmacognosy:

(a) Definition, history, scope and development of Pharmacognosy

(b) Sources of Drugs – Plants, Animals, Marine & Tissue culture

(c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins).

Classification of drugs:

Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs

Quality control of Drugs of Natural Origin:

Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.

Quantitative microscopy of crude drugs including lycopodium spore method, leafconstants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

UNIT-II **10 Hours**

Cultivation, Collection, Processing and storage of drugs of natural origin:

Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications.

Polyploidy, mutation and hybridization with reference to medicinal plants

Conservation of medicinal plants

UNIT-III **07 Hours**

Plant tissue culture:

Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.

Applications of plant tissue culture in pharmacognosy.
Edible vaccines

UNIT IV **10 Hours**

Pharmacognosy in various systems of medicine:

Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.

Introduction to secondary metabolites:

Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

UNIT V **08 Hours**

Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs

Plant Products:

Fibers - Cotton, Jute, Hemp

Hallucinogens, Teratogens, Natural allergens

Primary metabolites:

General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:

Carbohydrates: Acacia, Agar, Tragacanth, Honey

Proteins and Enzymes : Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

Lipids(Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax

Marine Drugs:

Novel medicinal agents from marine sources

BP408 P. PHARMACOGNOSY AND PHYTOCHEMISTRY I (Practical)

4 Hours/Week

1. Analysis of crude drugs by chemical tests: **(**i)Tragaccanth (ii) Acacia (iii)Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and paliside ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

Recommended Books: (Latest Editions)

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.
2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
3. Text Book of Pharmacognosy by T.E. Wallis
4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers& Distribution, New Delhi.
5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
6. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
7. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae
9. Anatomy of Crude Drugs by M.A. Iyengar

SEMESTER V

BP501T. MEDICINAL CHEMISTRY – II (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Understand the chemistry of drugs with respect to their pharmacological activity
- Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
- Know the Structural Activity Relationship of different class of drugs
- Study the chemical synthesis of selected drugs

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

UNIT- I **10 Hours**

Antihistaminic agents: Histamine, receptors and their distribution in the humanbody

H_1–antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines cuccinate, Clemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium

H_2-antagonists: Cimetidine*, Famotidine, Ranitidin.

Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole

Anti-neoplastic agents:

Alkylating agents: Meclorethamine*, Cyclophosphamide, Melphalan,

Chlorambucil, Busulfan, Thiotepa

Antimetabolites: Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine

Antibiotics: Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin

Plant products: Etoposide, Vinblastin sulphate, Vincristin sulphate

Miscellaneous: Cisplatin, Mitotane.

UNIT – II **10 Hours**

Anti-anginal:

Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole.

Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.

Diuretics:

Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide.

Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide,

Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid.

Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride.

Osmotic Diuretics: Mannitol

Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride.

UNIT- III **10 Hours**

Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcainide hydrochloride, Amiodarone, Sotalol.

Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol

Coagulant & Anticoagulants: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel

Drugs used in Congestive Heart Failure: Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.

UNIT- IV **08 Hours**

Drugs acting on Endocrine system

Nomenclature, Stereochemistry and metabolism of steroids

Sex hormones: Testosterone, Nandralone, Progestrones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol.
Drugs for erectile dysfunction: Sildenafil, Tadalafil.

Oral contraceptives: Mifepristone, Norgestril, Levonorgestrol

Corticosteroids: Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone
Thyroid and antithyroid drugs: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.

UNIT – V **07 Hours**

Antidiabetic agents:

Insulin and its preparations

Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride.

Biguanides: Metformin.

Thiazolidinediones: Pioglitazone, Rosiglitazone.

Meglitinides: Repaglinide, Nateglinide.

Glucosidase inhibitors: Acrabose, Voglibose.

Local Anesthetics: SAR of Local anesthetics

Benzoic Acid derivatives; Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine.

Amino Benzoic acid derivatives: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate.

Lidocaine/Anilide derivatives: Lignocaine, Mepivacaine, Prilocaine, Etidocaine.

Miscellaneous: Phenacaine, Diperodon, Dibucaine.*

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1to 5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

BP 502 T. Industrial PharmacyI (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Know the various pharmaceutical dosage forms and their manufacturing techniques.
- Know various considerations in development of pharmaceutical dosage forms
- Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

Course content:

3 hours/ week

UNIT-I **07 Hours**

Preformulation Studies: Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances.

a. Physical properties: Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism

b. Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerization

BCS classification of drugs & its significant

Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.

UNIT-II **10 Hours**

Tablets:

a. Introduction, ideal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling.

b. Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating.

c. Quality control tests: In process and finished product tests

Liquid orals: Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in pharmacopoeia

UNIT-III **08 Hours**

Capsules:

a. ***Hard gelatin capsules:*** Introduction, Production of hard gelatin capsule shells. size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules.

b. ***Soft gelatin capsules:*** Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications.

Pellets: Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets

UNIT-IV **10 Hours**

Parenteral Products:

a. Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity

b. Production procedure, production facilities and controls, aseptic processing

c. Formulation of injections, sterile powders, large volume parenterals and lyophilized products.

d. Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products.

Ophthalmic Preparations: Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions; methods of preparation; labeling, containers; evaluation of ophthalmic preparations

UNIT-V **10 Hours**

Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens.

Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies.

Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests.

BP 506 P. Industrial PharmacyI (Practical)

4 Hours/week

1. Preformulation studies on paracetamol/asparin/or any other drug
2. Preparation and evaluation of Paracetamol tablets
3. Preparation and evaluation of Aspirin tablets
4. Coating of tablets- film coating of tables/granules
5. Preparation and evaluation of Tetracycline capsules
6. Preparation of Calcium Gluconate injection
7. Preparation of Ascorbic Acid injection
8. Qulaity control test of (as per IP) marketed tablets and capsules
9. Preparation of Eye drops/ and Eye ointments
10. Preparation of Creams (cold / vanishing cream)
11. Evaluation of Glass containers (as per IP)

Recommended Books: (Latest Editions)

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman &J.B.Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill livingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C.Ansel, Lea &Febiger, Philadelphia, 5th edition, 2005
9. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107.

BP503.T. PHARMACOLOGY-II (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Understand the mechanism of drug action and its relevance in the treatment of different diseases
- Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
- Demonstrate the various receptor actions using isolated tissue preparation
- Appreciate correlation of pharmacology with related medical sciences

Course Content:

UNIT-I **10hours**

1. Pharmacology of drugs acting on cardio vascular system

a. Introduction to hemodynamic and electrophysiology of heart.
b. Drugs used in congestive heart failure
c. Anti-hypertensive drugs.
d. Anti-anginal drugs.
e. Anti-arrhythmic drugs.
f. Anti-hyperlipidemic drugs.

UNIT-II **10hours**

1. Pharmacology of drugs acting on cardio vascular system

a. Drug used in the therapy of shock.
b. Hematinics, coagulants and anticoagulants.
c. Fibrinolytics and anti-platelet drugs
d. Plasma volume expanders

2. Pharmacology of drugs acting on urinary system

a. Diuretics
b. Anti-diuretics.

UNIT-III **10hours**

3. Autocoids and related drugs

a. Introduction to autacoids and classification
b. Histamine, 5-HT and their antagonists.
c. Prostaglandins, Thromboxanes and Leukotrienes.
d. Angiotensin, Bradykinin and Substance P.
e. Non-steroidal anti-inflammatory agents
f. Anti-gout drugs
g. Antirheumatic drugs

UNIT-IV **08hours**

5. Pharmacology of drugs acting on endocrine system

a. Basic concepts in endocrine pharmacology.
b. Anterior Pituitary hormones- analogues and their inhibitors.
c. Thyroid hormones- analogues and their inhibitors.
d. Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D.
d. Insulin, Oral Hypoglycemic agents and glucagon.
e. ACTH and corticosteroids.

UNIT-V **07hours**

5. Pharmacology of drugs acting on endocrine system

a. Androgens and Anabolic steroids.
b. Estrogens, progesterone and oral contraceptives.
c. Drugs acting on the uterus.

6. Bioassay

a. Principles and applications of bioassay.
b.Types of bioassay
c. Bioassay of insulin, oxytocin, vasopressin, ACTH,d-tubocurarine,digitalis, histamine and 5-HT

BP 507 P. PHARMACOLOGY-II (Practical)

4Hrs/Week

1. Introduction to *in-vitro* pharmacology and physiological salt solutions.
2. Effect of drugs on isolated frog heart.
3. Effect of drugs on blood pressure and heart rate of dog.
4. Study of diuretic activity of drugs using rats/mice.
5. DRC of acetylcholine using frog rectus abdominis muscle.
6. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.
7. Bioassay of histamine using guinea pig ileum by matching method.
8. Bioassay of oxytocin using rat uterine horn by interpolation method.
9. Bioassay of serotonin using rat fundus strip by three point bioassay.
10. Bioassay of acetylcholine using rat ileum/colon by four point bioassay.
11. Determination of PA_2 value of prazosin using rat anococcygeus muscle (by Schilds plot method).
12. Determination of PD_2 value using guinea pig ileum.
13. Effect of spasmogens and spasmolytics using rabbit jejunum.
14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
15. Analgesic activity of drug using central and peripheral methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig& Robert.
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.

BP504 T. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)

45Hours

Course Outcomes: At the end of the course, students will be able to:

- to know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
- to understand the preparation and development of herbal formulation.
- to understand the herbal drug interactions
- to carryout isolation and identification of phytoconstituents

Course Content:

UNIT-I **7 Hours**

Metabolic pathways in higher plants and their determination

a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway.
b) Study of utilization of radioactive isotopes in the investigation ofBiogenetic studies.

UNIT-II **14 Hours**

General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of following

secondary metabolites:

Alkaloids: Vinca, Rauwolfia, Belladonna, Opium,

Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta

Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, Dioscorea, Digitalis

Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander,

Tannins: Catechu, Pterocarpus

Resins: Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony

Glycosides: Senna, Aloes, Bitter Almond

Iridoids, Other terpenoids & Naphthaquinones: Gentian, Artemisia, taxus, carotenoids

UNIT-III **06 Hours**

Isolation, Identification and Analysis of Phytoconstituents

a) Terpenoids: Menthol, Citral, Artemisin
b) Glycosides: Glycyrhetinic acid & Rutin
c) Alkaloids: Atropine,Quinine,Reserpine,Caffeine
d) Resins: Podophyllotoxin, Curcumin

UNIT-IV **10 Hours**

Industrial production, estimation and utilization of the following phytoconstituents: Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine

UNIT V **8 Hours**

Basics of Phytochemistry

Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.

BP 508 P. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Practical)

4 Hours/Week

1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander
2. Exercise involving isolation & detection of active principles
   a. Caffeine - from tea dust.
   b. Diosgenin from Dioscorea
   c. Atropine from Belladonna
   d. Sennosides from Senna
3. Separation of sugars by Paper chromatography
4. TLC of herbal extract
5. Distillation of volatile oils and detection of phytoconstitutents by TLC
6. Analysis of crude drugs by chemical tests: **(**i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh

Recommended Books: (Latest Editions)

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.
2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.
9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
10. The formulation and preparation of cosmetic, fragrances and flavours.
11. Remington's Pharmaceutical sciences.
12. Text Book of Biotechnology by Vyas and Dixit.
13. Text Book of Biotechnology by R.C. Dubey.

BP 505 T. PHARMACEUTICAL JURISPRUDENCE (Theory)

Course Outcomes: At the end of the course, students will be able to:

- The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
- Various Indian pharmaceutical Acts and Laws
- The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
- The code of ethics during the pharmaceutical practice

Course Content:

UNIT-I **10 Hours**

Drugs and Cosmetics Act, 1940 and its rules 1945:

Objectives, Definitions, Legal definitions of schedules to the Act and Rules

Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties**.**

Manufacture of drugs – Prohibition of manufacture and sale of certain drugs,

Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.

UNIT-II **10 Hours**

Drugs and Cosmetics Act, 1940 and its rules 1945.

Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)

Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties

Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties.

Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors

UNIT-III **10 Hours**

- **Pharmacy Act –1948**: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and Penalties

- **Medicinal and Toilet Preparation Act –1955**: Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.
- **Narcotic Drugs and Psychotropic substances Act-1985 and Rules**: Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties

UNIT-IV **08 Hours**

- **Study of Salient Features of Drugs and Magic Remedies Act and its rules:** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties
- **Prevention of Cruelty to animals Act-1960:** Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties
- **National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)-2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)

UNIT-V **07 Hours**

- **Pharmaceutical Legislations** – A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee
- **Code of Pharmaceutical ethics** D efinition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath
- **Medical Termination of Pregnancy Act**
- **Right to Information Act**
- **Introduction to Intellectual Property Rights (IPR)**

Recommended books: (Latest Edition)

1. Forensic Pharmacy by B. Suresh
2. Text book of Forensic Pharmacy by B.M. Mithal
3. Hand book of drug law-by M.L. Mehra
4. A text book of Forensic Pharmacy by N.K. Jain
5. Drugs and Cosmetics Act/Rules by Govt. of India publications.
6. Medicinal and Toilet preparations act 1955 by Govt. of India publications.
7. Narcotic drugs and psychotropic substances act by Govt. of India publications
8. Drugs and Magic Remedies act by Govt. of India publication
9. Bare Acts of the said laws published by Government. Reference books (Theory)

SEMESTER VI

BP601T. MEDICINAL CHEMISTRY – III (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Understand the importance of drug design and different techniques of drug design.
- Understand the chemistry of drugs with respect to their biological activity.
- Know the metabolism, adverse effects and therapeutic value of drugs.
- Know the importance of SAR of drugs.

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted by (*)

UNIT – I **10 Hours**

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

β-Lactam antibiotics: Penicillin, Cepholosporins, β- Lactamase inhibitors, Monobactams

Aminoglycosides: Streptomycin, Neomycin, Kanamycin

Tetracyclines: Tetracycline,Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline

UNIT – II **10 Hours**

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

Macrolide: Erythromycin Clarithromycin, Azithromycin.

Miscellaneous: Chloramphenicol*, Clindamycin.

Prodrugs: Basic concepts and application of prodrugs design.

Antimalarials: Etiology of malaria.

Quinolines: SAR, Quinine sulphate, Chloroquine*, Amodiaquine, Primaquine phosphate, Pamaquine*, Quinacrine hydrochloride, Mefloquine.

Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil.

Miscellaneous: Pyrimethamine, Artesunete, Artemether, Atovoquone.

UNIT – III **10 Hours**

Anti-tubercular Agents

Synthetic anti tubercular agents: Isoniozid*, Ethionamide, Ethambutol, Pyrazinamide, Para amino salicylic acid.*

Anti tubercular antibiotics: Rifampicin, Rifabutin, Cycloserine Streptomycine, Capreomycin sulphate.

Urinary tract anti-infective agents

Quinolones: SAR of quinolones, Nalidixic Acid,Norfloxacin, Enoxacin, Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin, Moxifloxacin

Miscellaneous: Furazolidine, Nitrofurantoin*, Methanamine.

Antiviral agents:

Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Loviride, Delavirding, Ribavirin, Saquinavir, Indinavir, Ritonavir.

UNIT – IV **08 Hours**

Antifungal agents:

Antifungal antibiotics: Amphotericin-B, Nystatin, Natamycin, Griseofulvin.

Synthetic Antifungal agents: Clotrimazole, Econazole, Butoconazole, Oxiconazole Tioconozole, Miconazole*, Ketoconazole, Terconazole, Itraconazole, Fluconazole, Naftifine hydrochloride, Tolnaftate*.

Anti-protozoal Agents: Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine Isethionate, Atovaquone, Eflornithine.

Anthelmintics: Diethylcarbamazine citrate*, Thiabendazole, Mebendazole*, Albendazole, Niclosamide, Oxamniquine, Praziquantal, Ivermectin.

Sulphonamides and Sulfones

Historical development, chemistry, classification and SAR of Sulfonamides: Sulphamethizole, Sulfisoxazole, Sulphamethizine, Sulfacetamide*, Sulphapyridine, Sulfamethoxaole*, Sulphadiazine, Mefenide acetate, Sulfasalazine.

Folate reductase inhibitors: Trimethoprim*, Cotrimoxazole.

Sulfones: Dapsone*.

UNIT – V **07 Hours**

Introduction to Drug Design

Various approaches used in drug design.

Physicochemical parameters used in quantitative structure activity relationship (QSAR) such as partition coefficient, Hammet's electronic parameter, Tafts steric parameter and Hansch analysis.

Pharmacophore modeling and docking techniques.

Combinatorial Chemistry: Concept and applications of combinatorial chemistry: solid phase and solution phase synthesis.

BP607P. MEDICINAL CHEMISTRY- III (Practical)

4 Hours / week

I Preparation of drugs and intermediates

1 Sulphanilamide
2 7-Hydroxy, 4-methyl coumarin
3 Chlorobutanol
4 Triphenyl imidazole
5 Tolbutamide
6 Hexamine

II Assay of drugs

1 Isonicotinic acid hydrazide
2 Chloroquine
3 Metronidazole
4 Dapsone
5 Chlorpheniramine maleate
6 Benzyl penicillin

III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique

IV Drawing structures and reactions using chem draw®

V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

BP602 T. PHARMACOLOGY-III (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
- comprehend the principles of toxicology and treatment of various poisoningsand
- appreciate correlation of pharmacology with related medical sciences.

Course Content:

UNIT-I **10hours**

1. Pharmacology of drugs acting on Respiratory system

a. Anti -asthmatic drugs
b. Drugs used in the management of COPD
c. Expectorants and antitussives
d. Nasal decongestants
e. Respiratory stimulants

2. Pharmacology of drugs acting on the Gastrointestinal Tract

a. Antiulcer agents.
b. Drugs for constipation and diarrhoea.
c. Appetite stimulants and suppressants.
d. Digestants and carminatives.
e. Emetics and anti-emetics.

UNIT-II **10hours**

3. Chemotherapy

a. General principles of chemotherapy.
b. Sulfonamides and cotrimoxazole.
c. Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolins, tetracycline and aminoglycosides

UNIT-III **10hours**

3. Chemotherapy

a. Antitubercular agents

b. Antileprotic agents

c. Antifungal agents

d. Antiviral drugs

e.Anthelmintics

f. Antimalarial drugs

g. Antiamoebic agents

UNIT-IV **08hours**

3. Chemotherapy

l. Urinary tract infections and sexually transmitted diseases.

m. Chemotherapy of malignancy.

4. Immunopharmacology

a. Immunostimulants

b. Immunosuppressant

Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars

UNIT-V **07hours**

5. Principles of toxicology

a. Definition and basic knowledge of acute, subacute and chronic toxicity.

b. Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity

c. General principles of treatment of poisoning

d. Clinical symptoms and management of barbiturates, morphine, organophosphosphorus compound and lead, mercury and arsenic poisoning. Chronopharmacology

e. Definition of rhythm and cycles.

f. Biological clock and their significance leading to chronotherapy.

BP 608 P. PHARMACOLOGY-III (Practical)

4Hrs/Week

1. Dose calculation in pharmacological experiments
2. Antiallergic activity by mast cell stabilization assay
3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
4. Study of effect of drugs on gastrointestinal motility
5. Effect of agonist and antagonists on guinea pig ileum
6. Estimation of serum biochemical parameters by using semi- autoanalyser
7. Effect of saline purgative on frog intestine
8. Insulin hypoglycemic effect in rabbit
9. Test for pyrogens (rabbit method)
10. Determination of acute oral toxicity (LD50) of a drug from a given data
11. Determination of acute skin irritation / corrosion of a test substance
12. Determination of acute eye irritation / corrosion of a test substance
13. Calculation of pharmacokinetic parameters from a given data
14. Biostatistics methods in experimental pharmacology(student's t test, ANOVA)
15. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)

**Experiments are demonstrated by simulated experiments/videos*

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher Modern Pharmacology with clinical Applications, by Charles R.Craig& Robert,
8. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata,
9. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,
10. N.Udupa and P.D. Gupta, Concepts in Chronopharmacology.

BP 603 T. HERBAL DRUG TECHNOLOGY (Theory)

45 hours

Course Outcomes: At the end of the course, students will be able to:

- understand raw material as source of herbal drugs from cultivation to herbal drug product
- know the WHO and ICH guidelines for evaluation of herbal drugs
- know the herbal cosmetics, natural sweeteners, nutraceuticals
- appreciate patenting of herbal drugs, GMP .

Course content:

UNIT-I **11 Hours**

Herbs as raw materials

Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation Source of Herbs

Selection, identification and authentication of herbal materials

Processing of herbal raw material

Biodynamic Agriculture

Good agricultural practices in cultivation of medicinal plants including Organic farming. Pest and Pest management in medicinal plants:
Biopesticides/Bioinsecticides.

Indian Systems of Medicine

a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy
b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika,Churna, Lehya and Bhasma.

UNIT-II **7 Hours**

Nutraceuticals

General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases.

Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina

Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper & Ephedra.

UNIT-III **10 Hours**

Herbal Cosmetics

Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products.

Herbal excipients:

Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes.

Herbal formulations :

Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes

UNIT- IV **10 Hours**

Evaluation of Drugs WHO & ICH guidelines for the assessment of herbal drugs Stability testing of herbal drugs.

Patenting and Regulatory requirements of natural products:

a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy
b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.

Regulatory Issues - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.

UNIT-V **07 Hours**

General Introduction to Herbal Industry

Herbal drugs industry: Present scope and future prospects.

A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India.

Schedule T – Good Manufacturing Practice of Indian systems of medicine

Components of GMP (Schedule – T) and its objectives

Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records.

BP 609 P. HERBAL DRUG TECHNOLOGY (Practical)

4 hours/ week

1. To perform preliminary phytochemical screening of crude drugs.
2. Determination of the alcohol content of Asava and Arista
3. Evaluation of excipients of natural origin
4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation.
5. Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.
6. Monograph analysis of herbal drugs from recent Pharmacopoeias
7. Determination of Aldehyde content
8. Determination of Phenol content
9. Determination of total alkaloids

Recommended Books: (Latest Editions)

1. Textbook of Pharmacognosy by Trease &Evans.
2. Textbook of Pharmacognosy byTyler, Brady & Robber.
3. Pharmacognosy by Kokate, Purohit and Gokhale
4. Essential of Pharmacognosy by Dr.S.H.Ansari
5. Pharmacognosy & Phytochemistry by V.D.Rangari
6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)
7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.

BP 604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
- Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
- To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
- Understand various pharmacokinetic parameters, their significance & applications.

Course Content:

UNIT-I 10 Hours

Introduction to Biopharmaceutics

Absorption; Mechanisms of drug absorption through GIT, factors influencing drug absorption though GIT, absorption of drug from Non per oral extra-vascular routes, **Distribution** Tissue permeability of drugs, binding of drugs, apparent, volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs

UNIT- II 10 Hours

Elimination: Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs

Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, *in-vitro* drug dissolution models, *in-vitro-in-vivo* correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.

UNIT- III 10 Hours

Pharmacokinetics: Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters - K_E ,t1/2,Vd,AUC,Ka, Clt and CL_R- definitions methods of eliminations, understanding of their significance and application

UNIT- IV **08 Hours**

Multicompartment models: Two compartment open model. IV bolus

Kinetics of multiple dosing, steady state drug levels, calculation of loading and mainetnance doses and their significance in clinical settings.

UNIT- V **07 Hours**

Nonlinear Pharmacokinetics: a. Introduction, b. Factors causing Non-linearity.

g. Michaelis-menton method of estimating parameters, Explanation with example of drugs.

Recommended Books: (Latest Editions)

1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.
2. Biopharmaceutics and Pharmacokinetics; By Robert F Notari
3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew B.C.YU 4th edition,Prentice-Hall Inernational edition.USA
4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and Sunil B.Jaiswal,Vallabh Prakashan Pitampura, Delhi
5. Pharmacokinetics: By Milo Glbaldi Donald, R. Mercel Dekker Inc.
6. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press.
7. Biopharmaceutics; By Swarbrick
8. Clinical Pharmacokinetics, Concepts and Applications: By Malcolm Rowland and
9. Thomas, N. Tozen, Lea and Febrger, Philadelphia, 1995.
10. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack, Publishing Company,Pennsylvania 1989.
11. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4th edition Revised and expanded by Rebort F Notari Marcel Dekker Inn, New York and Basel, 1987.
12. Remington's Pharmaceutical Sciences, By Mack Publishing Company, Pennsylvnia

BP 605 T. PHARMACEUTICAL BIOTECHNOLOGY (Theory)

45 ours

Course Outcomes: At the end of the course, students will be able to:

- Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
- Genetic engineering applications in relation to production of pharmaceuticals
- Importance of Monoclonal antibodies in Industries
- Appreciate the use of microorganisms in fermentation technology

Unit I **10 Hours**

a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.

b) Enzyme Biotechnology- Methods of enzyme immobilization and applications.

c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries.

d) Brief introduction to Protein Engineering.

e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.

f) Basic principles of genetic engineering.

Unit II **10 Hours**

a) Study of cloning vectors, restriction endonucleases and DNA ligase.

b) Recombinant DNA technology. Application of genetic engineering in medicine.

c) Application of r DNA technology and genetic engineering in the production of:

i) Interferon ii) Vaccines- hepatitis- B iii) Hormones-Insulin.

d) Brief introduction to PCR

Unit III **10 Hours**

Types of immunity- humoral immunity, cellular immunity

a) Structure of Immunoglobulins

b) Structure and Function of MHC

c) Hypersensitivity reactions, Immune stimulation and Immune suppressions.

d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity.

e) Storage conditions and stability of official vaccines

f) Hybridoma technology- Production, Purification and Applications

g) Blood products and Plasma Substituties.

Unit IV **08Hours**

a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting.

b) Genetic organization of Eukaryotes and Prokaryotes

c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons.

d) Introduction to Microbial biotransformation and applications.

e) Mutation: Types of mutation/mutants.

Unit V **07 Hours**

a) Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring.

b) Large scale production fermenter design and its various controls.

c) Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,

d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substituties.

Recommended Books (Latest edition):

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
2. RA Goldshy et. al., : Kuby Immunology.
3. J.W. Goding: Monoclonal Antibodies.
4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal

Society of Chemistry.
5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.
6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.
7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

BP606TPHARMACEUTICAL QUALITY ASSURANCE (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- understand the cGMP aspects in a pharmaceutical industry
- appreciate the importance of documentation
- understand the scope of quality certifications applicable to pharmaceutical industries
- understand the responsibilities of QA & QC departments

Course content:

UNIT – I **10 Hours**

Quality Assurance and Quality Management concepts: Definition and concept of Quality control, Quality assurance and GMP

Total Quality Management (TQM): Definition, elements, philosophies

ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines

Quality by design (QbD): Definition, overview, elements of QbD program, tools

ISO 9000 & ISO14000: Overview, Benefits, Elements, steps for registration

NABL accreditation : Principles and procedures

UNIT - II **10 Hours**

Organization and personnel: Personnel responsibilities, training, hygiene and personal records.

Premises: Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.

Equipments and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.

UNIT – III **10 Hours**

Quality Control: Quality control test for containers, rubber closures and secondary packing materials.

Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities

UNIT – IV **08 Hours**

Complaints: Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal.

Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.

UNIT – V **07 Hours**

Calibration and Validation: Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.

Warehousing: Good warehousing practice, materials management

Recommended Books: (Latest Edition)

1. Quality Assurance Guide by organization of Pharmaceutical Products of India.
2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69.
3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications.
4. A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh
5. How to Practice GMP's – P P Sharma.
6. ISO 9000 and Total Quality Management – Sadhank G Ghosh
7. The International Pharmacopoeia – Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
8. Good laboratory Practices – Marcel Deckker Series
9. ICH guidelines, ISO 9000 and 14000 guidelines

SEMESTER VII

BP701T. INSTRUMENTAL METHODS OF ANALYSIS (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
- Understand the chromatographic separation and analysis of drugs.
- Perform quantitative & qualitative analysis of drugs using various analytical instruments.

Course Content:

UNIT –I **10 Hours**

UV Visible spectroscopy

Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations.

Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode.

Applications - Spectrophotometric titrations, Single component and multi component analysis

Fluorimetry

Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications

UNIT –II **10 Hours**

IR spectroscopy

Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations

Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications

Flame Photometry-Principle, interferences, instrumentation and applications

Atomic absorption spectroscopy- Principle, interferences, instrumentation and applications

Nepheloturbidometry- Principle, instrumentation and applications

UNIT –III **10 Hours**

Introduction to chromatography

Adsorption and partition column chromatography-Methodology, advantages, disadvantages and applications.

Thin layer chromatography- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications.

Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications

Electrophoresis– Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications

UNIT –IV **08 Hours**

Gas chromatography - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications

High performance liquid chromatography (HPLC)-Introduction, theory, instrumentation, advantages and applications.

UNIT –V **07 Hours**

Ion exchange chromatography- Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications

Gel chromatography- Introduction, theory, instrumentation and applications

Affinity chromatography- Introduction, theory, instrumentation and applications

BP705P. INSTRUMENTAL METHODS OF ANALYSIS (Practical)

4 Hours/Week

1. Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
2. Estimation of dextrose by colorimetry
3. Estimation of sulfanilamide by colorimetry
4. Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy
5. Assay of paracetamol by UV- Spectrophotometry
6. Estimation of quinine sulfate by fluorimetry
7. Study of quenching of fluorescence
8. Determination of sodium by flame photometry
9. Determination of potassium by flame photometry
10. Determination of chlorides and sulphates by nephelo turbidometry
11. Separation of amino acids by paper chromatography
12. Separation of sugars by thin layer chromatography
13. Separation of plant pigments by column chromatography
14. Demonstration experiment on HPLC
15. Demonstration experiment on Gas Chromatography

Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

BP 702 T. INDUSTRIAL PHARMACYII (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Know the process of pilot plant and scale up of pharmaceutical dosage forms
- Understand the process of technology transfer from lab scale to commercial batch
- Know different Laws and Acts that regulate pharmaceutical industry
- Understand the approval process and regulatory requirements for drug products

Course Content:

UNIT-I **10 Hours**

Pilot plant scale up techniques: General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology

UNIT-II **10 Hours**

Technology development and transfer: WHO guidelines for Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk management, Transfer from R & D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues

UNIT-III **10 Hours**

Regulatory affairs: Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals

Regulatory requirements for drug approval: Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.

UNIT-IV **08 Hours**

Quality management systems: Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP

UNIT-V **07 Hours**

Indian Regulatory Requirements: Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.

Recommended Books: (Latest Editions)

1. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http,//en.wikipedia.org/wiki/Regulatory_ Affairs.
2. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php
3. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
4. Regulatory Affairs brought bylearning plus, inc. available at http.//www.cgmp.com/ra.htm.

BP 703T. PHARMACY PRACTICE (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- know various drug distribution methods in a hospital
- appreciate the pharmacy stores management and inventory control
- monitor drug therapy of patient through medication chart review and clinical review
- obtain medication history interview and counsel the patients
- identify drug related problems
- detect and assess adverse drug reactions
- interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
- know pharmaceutical care services
- do patient counseling in community pharmacy;
- Appreciate the concept of Rational drug therapy.

Unit I: **10 Hours**

a) Hospital and it's organization

Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.

b) Hospital pharmacy and its organization

Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.

c) Adverse drug reaction

Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting

drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.

d) Community Pharmacy

Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.

Unit II: 10 Hours

a) Drug distribution system in a hospital

Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.

b) Hospital formulary

Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.

c) Therapeutic drug monitoring

Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.

d) Medication adherence

Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.

e) Patient medication history interview

Need for the patient medication history interview, medication interview forms.

f) Community pharmacy management

Financial, materials, staff, and infrastructure requirements.

Unit III: 10 Hours

a) Pharmacy and therapeutic committee

Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation.

b) Drug information services

Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information.

Patient counseling

Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist

c) Education and training program in the hospital

Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education.

d) Prescribed medication order and communication skills

Prescribed medication order- interpretation and legal requirements, and Communication skills- communication with prescribers and patients.

Unit IV **8 Hours**

a) Budget preparation and implementation

Budget preparation and implementation

b) Clinical Pharmacy

Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care.

Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern.

c) Over the counter (OTC) sales

Introduction and sale of over the counter, and Rational use of common over the counter medications.

Unit V **7 Hours**

a) Drug store management and inventory control

Organisation of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure

b) Investigational use of drugs

Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.

c) Interpretation of Clinical Laboratory Tests

Blood chemistry, hematology, and urinalysis

Recommended Books (Latest Edition):

1. Merchant S.H. and Dr. J.S.Quadry. *A textbook of hospital pharmacy*, 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001.
2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. *A textbook of Clinical Pharmacy Practice- essential concepts and skills,* 1st ed. Chennai: Orient Longman Private Limited; 2004.
3. William E. Hassan. *Hospital pharmacy*, 5th ed. Philadelphia: Lea & Febiger; 1986.
4. Tipnis Bajaj. *Hospital Pharmacy*, 1st ed. Maharashtra: Career Publications; 2008.
5. Scott LT. *Basic skills in interpreting laboratory data*, 4thed. American Society of Health System Pharmacists Inc; 2009.
6. Parmar N.S. *Health Education and Community Pharmacy,* 18th ed. India: CBS Publishers & Distributers; 2008.

Journals:

1. Therapeutic drug monitoring. ISSN: 0163-4356
2. Journal of pharmacy practice. ISSN : 0974-8326
3. American journal of health system pharmacy. ISSN: 1535-2900 (online)
4. Pharmacy times (Monthly magazine)

BP 704T: NOVEL DRUG DELIVERY SYSTEMS (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- To understand various approaches for development of novel drug delivery systems.
- To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

Course content:

Unit-I **10 Hours**

Controlled drug delivery systems: Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates.Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations

Polymers: Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.

Unit-II **10 Hours**

Microencapsulation: Definition, advantages and disadvantages, microspheres

/microcapsules, microparticles, methods of microencapsulation, applications

Mucosal Drug Delivery system: Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems

Implantable Drug Delivery Systems: Introduction, advantages and disadvantages, concept of implantsand osmotic pump

Unit-III **10 Hours**

Transdermal Drug Delivery Systems: Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches

Gastroretentive drug delivery systems: Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications

Nasopulmonary drug delivery system: Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers

Unit-IV **08 Hours**

Targeted drug Delivery: Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications

Unit-V **07 Hours**

Ocular Drug Delivery Systems: Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts

Intrauterine Drug Delivery Systems: Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications

Recommended Books: (Latest Editions)

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.

Journals

1. Indian Journal of Pharmaceutical Sciences (IPA)
2. Indian Drugs (IDMA)
3. Journal of Controlled Release (Elsevier Sciences)
4. Drug Development and Industrial Pharmacy (Marcel & Decker)
5. International Journal of Pharmaceutics (Elsevier Sciences)

SEMESTER VIII

BP801T. BIOSTATISITCS AND RESEARCH METHODOLOGY (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)
- Know the various statistical techniques to solve statistical problems
- Appreciate statistical techniques in solving the problems.

Course content:

Unit-I **10 Hours**

Introduction: Statistics, Biostatistics, Frequency distribution

Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples
Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems

Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples

Unit-II **10 Hours**

Regression: Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by, Multiple regression, standard error of regression– Pharmaceutical Examples
Probability: Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties - problems
Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples
Parametric test: t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference

Unit-III **10 Hours**

Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test

Introduction to Research: Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism

Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph
Designing the methodology: Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

Unit-IV **8 Hours**

Blocking and confounding system for Two-level factorials
Regression modeling: Hypothesis testing in Simple and Multiple regressionmodels
Introduction to Practical components of Industrial and Clinical Trials Problems: Statistical Analysis Using Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach

Unit-V **7Hours**

Design and Analysis of experiments:

Factorial Design: Definition, 2^2, 2^3design. Advantage of factorial design
Response Surface methodology: Central composite design, Historical design, Optimization Techniques

Recommended Books (Latest edition):

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork.
2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
3. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam,
4. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery

BP 802T SOCIAL AND PREVENTIVE PHARMACY

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Acquire high consciousness/realization of current issuesrelated to health and pharmaceutical problems within the country and worldwide.
- Have a critical way of thinking based on current healthcare development.
- Evaluate alternative ways of solving problems related tohealth and pharmaceutical issues

Course content:

Unit I: **10 Hours**

Concept of health and disease: Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick.

Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.

Sociology and health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health

Hygiene and health: personal hygiene and health care; avoidable habits

Unit II: **10 Hours**

Preventive medicine: General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse

Unit III: **10 Hours**

National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.

Unit IV: **08 Hours**

National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program

Unit V: **07 Hours**

Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.

Recommended Books (Latest edition)*:*

1. Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2nd Edition, 2010, ISBN: 9789380704104, JAYPEE Publications
2. Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indranil, 4th Edition, 2013, ISBN: 9789350901878, JAYPEE Publications
3. Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6th Edition, 2014, ISBN: 9789351522331, JAYPEE Publications
4. Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2nd Edition, 2012, ISBN: 9789350250440, JAYPEE Publications
5. Park Textbook of Preventive and Social Medicine, K Park, 21st Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS.
6. Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad

Recommended Journals:

1. Research in Social and Administrative Pharmacy, Elsevier, Ireland

BP803ET. PHARMA MARKETING MANAGEMENT (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to marketing concepts and techniques and their applications in the pharmaceutical industry.

Unit I **10 Hours**

Marketing:

Definition, general concepts and scope of marketing; Distinction between marketing & selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behavior.

Pharmaceutical market:

Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and socio-psychological characteristics of the consumer; market segmentation& targeting.Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist.Analyzing the Market;Role of market research.

Unit II **10 Hours**

Product decision:

Classification, product line and product mix decisions, product life cycle, product portfolio analysis; product positioning; New product decisions; Product branding, packaging and labeling decisions, Product management in pharmaceutical industry.

Unit III **10 Hours**

Promotion:

Methods, determinants of promotional mix, promotional budget; An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition, public relations, online promotional techniques for OTC Products.

Unit IV **10 Hours**

Pharmaceutical marketing channels:

Designing channel, channel members, selecting the appropriate channel, conflict in channels, physical distribution management: Strategic importance, tasks in physical distribution management.

Professional sales representative (PSR):

Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR.

Unit V **10 Hours**

Pricing:

Meaning, importance, objectives, determinants of price; pricing methods and strategies, issues in price management in pharmaceutical industry. An overview of DPCO (Drug Price Control Order)and NPPA (National Pharmaceutical Pricing Authority).

Emerging concepts in marketing:

Vertical & Horizontal Marketing; Rural Marketing; Consumerism; Industrial Marketing; Global Marketing.

Recommended Books: (Latest Editions)

1. Philip Kotler and Kevin Lane Keller: Marketing Management, Prentice Hall of India, New Delhi
2. Walker, Boyd and Larreche : Marketing Strategy- Planning and Implementation, Tata MC GrawHill, New Delhi.
3. Dhruv Grewal and Michael Levy: Marketing, Tata MC Graw Hill
4. Arun Kumar and N Menakshi: Marketing Management, Vikas Publishing, India
5. Rajan Saxena: Marketing Management; Tata MC Graw-Hill (India Edition)
6. Ramaswamy, U.S & Nanakamari, S: Marketing Managemnt:Global Perspective, IndianContext,Macmilan India, New Delhi.
7. Shanker, Ravi: Service Marketing, Excell Books, New Delhi
8. Subba Rao Changanti, Pharmaceutical Marketing in India (GIFT – Excel series) Excel Publications.

BP804 ET: PHARMACEUTICAL REGULATORY SCIENCE (Theory)

45Hours

Course Outcomes: At the end of the course, students will be able to:

- Know about the process of drug discovery and development
- Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
- Know the regulatory approval process and their registration in Indian and international markets

Course content:

Unit I **10Hours**

New Drug Discovery and development

Stages of drug discovery, Drug development process, pre-clinical studies, non-clinical activities, clinical studies, Innovator and generics, Concept of generics, Generic drug product development.

Unit II **10Hours**

Regulatory Approval Process

Approval processes and timelines involved in Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA). Changes to an approved NDA / ANDA.

Regulatory authorities and agencies

Overview of regulatory authorities of India, United States, European Union, Australia, Japan, Canada (Organization structure and types of applications)

Unit III **10Hours**

Registration of Indian drug product in overseas market

Procedure for export of pharmaceutical products, Technical documentation, Drug Master Files (DMF), Common Technical Document (CTD), electronic Common Technical Document (eCTD), ASEAN Common Technical Document (ACTD)research.

Unit IV **08Hours**

Clinical trials

Developing clinical trial protocols, Institutional Review Board / Independent Ethics committee - formation and working procedures, Informed consent process and procedures, GCP obligations of Investigators, sponsors & Monitors, Managing and Monitoring clinical trials, Pharmacovigilance - safety monitoring in clinical trials

Unit V **07Hours**

Regulatory Concepts

Basic terminology, guidance, guidelines, regulations, Laws and Acts, Orange book, Federal Register, Code of Federal Regulatory, Purple book

Recommended books (Latest edition):

1. Drug Regulatory Affairs by Sachin Itkar, Dr. N.S. Vyawahare, Nirali Prakashan.
2. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P. Martin, Drugs and the Pharmaceutical Sciences,Vol.185. Informa Health care Publishers.
3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5th edition, Drugs and the Pharmaceutical Sciences,Vol.190.
4. Guidebook for drug regulatory submissions / Sandy Weinberg. By John Wiley & Sons. Inc.
5. FDA Regulatory Affairs: a guide for prescription drugs, medical devices, and biologics /edited by Douglas J. Pisano, David Mantus.
6. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143
7. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams
8. Principles and Practices of Clinical Research, Second Edition Edited by John I. Gallin and Frederick P. Ognibene
9. Drugs: From Discovery to Approval, Second Edition By Rick Ng

BP 805T: PHARMACOVIGILANCE (Theory)

45 hours

Course Outcomes: At the end of the course, students will be able to *(know, do, and appreciate):*

- Why drug safety monitoring is important?
- History and development of pharmacovigilance
- National and international scenario of pharmacovigilance
- Dictionaries, coding and terminologies used in pharmacovigilance
- Detection of new adverse drug reactions and their assessment
- International standards for classification of diseases and drugs
- Adverse drug reaction reporting systems and communication in pharmacovigilance
- Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
- Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
- Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
- ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
- CIOMS requirements for ADR reporting
- Writing case narratives of adverse events and their quality.

Course Content

Unit I **10 Hours**

Introduction to Pharmacovigilance

- History and development of Pharmacovigilance
- Importance of safety monitoring of Medicine
- WHO international drug monitoring programme
- Pharmacovigilance Program of India(PvPI)

Introduction to adverse drug reactions

- Definitions and classification of ADRs
- Detection and reporting
- Methods in Causality assessment
- Severity and seriousness assessment
- Predictability and preventability assessment
- Management of adverse drug reactions

Basic terminologies used in pharmacovigilance

- Terminologies of adverse medication related events
- Regulatory terminologies

Unit II **10 hours**

Drug and disease classification

- Anatomical, therapeutic and chemical classification of drugs
- International classification of diseases
- Daily defined doses
- International Non proprietary Names for drugs

Drug dictionaries and coding in pharmacovigilance

- WHO adverse reaction terminologies
- MedDRA and Standardised MedDRA queries
- WHO drug dictionary
- Eudravigilance medicinal product dictionary

Information resources in pharmacovigilance

- Basic drug information resources
- Specialised resources for ADRs

Establishing pharmacovigilance programme

- Establishing in a hospital
- Establishment & operation of drug safety department in industry
- Contract Research Organisations (CROs)
- Establishing a national programme

Unit III **10 Hours**

Vaccine safety surveillance

- Vaccine Pharmacovigilance
- Vaccination failure
- Adverse events following immunization

Pharmacovigilance methods

- Passive surveillance – Spontaneous reports and case series
- Stimulated reporting
- Active surveillance – Sentinel sites, drug event monitoring and registries
- Comparative observational studies – Cross sectional study, case control study and cohort study
- Targeted clinical investigations

Communication in pharmacovigilance

- Effective communication in Pharmacovigilance
- Communication in Drug Safety Crisis management
- Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media

Unit IV **8 Hours**

Safety data generation

- Pre clinical phase
- Clinical phase
- Post approval phase (PMS)

ICH Guidelines for Pharmacovigilance

- Organization and objectives of ICH
- Expedited reporting
- Individual case safety reports
- Periodic safety update reports
- Post approval expedited reporting
- Pharmacovigilance planning
- Good clinical practice in pharmacovigilance studies

Unit V **7 hours**

Pharmacogenomics of adverse drug reactions

- Genetics related ADR with example focusing PK parameters.

Drug safety evaluation in special population

- Paediatrics
- Pregnancy and lactation
- Geriatrics

CIOMS

- CIOMS Working Groups
- CIOMS Form

CDSCO (India) and Pharmacovigilance

- D&C Act and Schedule Y
- Differences in Indian and global pharmacovigilance requirements

Recommended Books (Latest edition):

1. Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers.
2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers.
3. Mann's Pharmacovigilance:Elizabeth B. Andrews, Nicholas, Wiley Publishers.
4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.
5. An Introduction to Pharmacovigilance: Patrick Waller,Wiley Publishers.
6. Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert,Jones& Bartlett Publishers.
7. Textbook of Pharmacoepidemiolog edited by Brian L. Strom, Stephen E Kimmel,

Sean Hennessy,Wiley Publishers.
8. A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills:G. Parthasarathi, Karin NyfortHansen,Milap C. Nahata
9. National Formulary of India
10. Text Book of Medicine by Yashpal Munjal
11. Text book of Pharmacovigilance: concept and practice by GP Mohanta and PK Manna
12. http://www.whoumc.org/DynPage.aspx?id=105825&mn1=7347&mn2=7259&mn3=7297
13. http://www.ich.org/
14. http://www.cioms.ch/
15. http://cdsco.nic.in/
16. http://www.who.int/vaccine_safety/en/
17. http://www.ipc.gov.in/PvPI/pv_home.html

BP 806 ET. QUALITY CONTROL AND STANDARDIZATION OF HERBALS (Theory)

Course Outcomes: At the end of the course, students will be able to:

- know WHO guidelines for quality control of herbal drugs
- know Quality assurance in herbal drug industry
- know the regulatory approval process and their registration in Indian and international markets
- appreciate EU and ICH guidelines for quality control of herbal drugs

Unit I **10 hours**

Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms

WHO guidelines for quality control of herbal drugs.

Evaluation of commercial crude drugs intended for use

Unit II **10 hours**

Quality assurance in herbal drug industry of cGMP, GAP, GMP and GLP in traditional system of medicine.

WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines

WHO Guidelines on GACP for Medicinal Plants.

Unit III **10 hours**

EU and ICH guidelines for quality control of herbal drugs.

Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines

Unit IV **08 hours**

Stability testing of herbal medicines. Application of various chromatographic techniques in standardization of herbal products.

Preparation of documents for new drug application and export registration

GMP requirements and Drugs & Cosmetics Act provisions.

Unit V **07 hours**

Regulatory requirements for herbal medicines.

WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems

Comparison of various Herbal Pharmacopoeias.

Role of chemical and biological markers in standardization of herbal products

Recommended Books: (Latest Editions

1. Pharmacognosy by Trease and Evans
2. Pharmacognosy by Kokate, Purohit and Gokhale
3. Rangari, V.D., Text book of Pharmacognosy and Phytochemistry Vol. I , Carrier Pub., 2006.
4. Aggrawal, S.S., Herbal Drug Technology. Universities Press, 2002.
5. EMEA. Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products,
6. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.
7. Shinde M.V., Dhalwal K., Potdar K., Mahadik K. Application of quality control principles to herbal drugs. International Journal of Phytomedicine 1(2009); p. 4-8.
8. WHO. Quality Control Methods for Medicinal Plant Materials, World Health Organization, Geneva, 1998. WHO. Guidelines for the Appropriate Use of Herbal Medicines. WHO Regional Publications, Western Pacific Series No 3, WHO Regional office for the Western Pacific, Manila, 1998.
9. WHO. The International Pharmacopeia, Vol. 2: Quality Specifications, 3rd edn. World Health Organization, Geneva, 1981.
10. WHO. Quality Control Methods for Medicinal Plant Materials. World Health Organization, Geneva, 1999.
11. WHO. WHO Global Atlas of Traditional, Complementary and Alternative Medicine. 2 vol. set. Vol. 1 contains text and Vol. 2, maps. World Health Organization, Geneva, 2005.
12. WHO. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. World Health Organization, Geneva, 2004.

BP 807 ET. COMPUTER AIDED DRUG DESIGN (Theory)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Design and discovery of lead molecules
- The role of drug design in drug discovery process
- The concept of QSAR and docking
- Various strategies to develop new drug like molecules.
- The design of new drug molecules using molecular modeling software

Course Content:

UNIT-I **10 Hours**

Introduction to Drug Discovery and Development

Stages of drug discovery and development

Lead discovery and Analog Based Drug Design

Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation.

Analog Based Drug Design: Bioisosterism, Classification, Bioisosteric replacement. Any three case studies

UNIT-II **10 Hours**

Quantitative Structure Activity Relationship (QSAR)

SAR versus QSAR, History and development of QSAR, Types of physicochemical parameters, experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammet's substituent constant and Tafts steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA.

UNIT-III **10 Hours**

Molecular Modeling and virtual screening techniques

Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening,

Molecular docking: Rigid docking, flexible docking, manual docking, Docking based screening. *De novo* drug design.

UNIT-IV **08 Hours**

Informatics & Methods in drug design

Introduction to Bioinformatics, chemoinformatics. ADME databases, chemical, biochemical and pharmaceutical databases.

UNIT-V **07 Hours**

Molecular Modeling: Introduction to molecular mechanics and quantum mechanics.Energy Minimization methods and Conformational Analysis, global conformational minima determination.

Recommended Books (Latest Editions)

1. Robert GCK, ed., "Drug Action at the Molecular Level" University Prak Press Baltimore.
2. Martin YC. "Quantitative Drug Design" Dekker, New York.
3. Delgado JN, Remers WA eds "Wilson & Gisvolds's Text Book of Organic Medicinal & Pharmaceutical Chemistry" Lippincott, New York.
4. Foye WO "Principles of Medicinal chemistry 'Lea & Febiger.
5. Koro lkovas A, Burckhalter JH. "Essentials of Medicinal Chemistry" Wiley Interscience.
6. Wolf ME, ed "The Basis of Medicinal Chemistry, Burger's Medicinal Chemistry" John Wiley & Sons, New York.
7. Patrick Graham, L., An Introduction to Medicinal Chemistry, Oxford University Press.
8. Smith HJ, Williams H, eds, "Introduction to the principles of Drug Design" Wright Boston.
9. Silverman R.B. "The organic Chemistry of Drug Design and Drug Action" Academic Press New York.

BP808ET: CELL AND MOLECULAR BIOLOGY (Elective subject)

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Summarize cell and molecular biology history.
- Summarize cellular functioning and composition.
- Describe the chemical foundations of cell biology.
- Summarize the DNA properties of cell biology.
- Describe protein structure and function.
- Describe cellular membrane structure and function.
- Describe basic molecular genetic mechanisms.
- Summarize the Cell Cycle

Course content:

Unit I **10Hours**

a) Cell and Molecular Biology: Definitions theory and basics and Applications.
b) Cell and Molecular Biology: History and Summation.
c) Properties of cells and cell membrane.
d) Prokaryotic versus Eukaryotic
e) Cellular Reproduction
f) Chemical Foundations – an Introduction and Reactions (Types)

Unit II **10 Hours**

a) DNA and the Flow of Molecular Information
b) DNA Functioning
c) DNA and RNA
d) Types of RNA
e) Transcription and Translation

Unit III **10 Hours**

a) Proteins: Defined **and** Amino Acids
b) Protein Structure
c) Regularities in Protein Pathways
d) Cellular Processes
e) Positive Control and significance of Protein Synthesis

Unit IV **08 Hours**

a) Science of Genetics
b) Transgenics and Genomic Analysis
c) Cell Cycle analysis
d) Mitosis and Meiosis
e) Cellular Activities and Checkpoints

Unit V **07 Hours**

a) Cell Signals: Introduction
b) Receptors for Cell Signals
c) Signaling Pathways: Overview
d) Misregulation of Signaling Pathways
e) Protein-Kinases: Functioning

Recommended Books (latest edition):

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. Edward: Fundamentals of Microbiology.
10. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
11. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company
12. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
13. RA Goldshy et. al., : Kuby Immunology.

BP809ET. COSMETIC SCIENCE(Theory)

Course Outcomes: At the end of the course, students will be able to cosmeceutical products, their formulation along with the principles of Cosmetic Evaluation.

UNIT I **10Hours**

Classification of cosmetic and cosmeceutical products

Definition of cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs

Cosmetic excipients: Surfactants, rheology modifiers, humectants, emollients, preservatives. Classification and application

Skin: Basic structure and function of skin.

Hair: Basic structure of hair. Hair growth cycle.

Oral Cavity: Common problem associated with teeth and gums**.**

UNIT II **10 Hours**

Principles of formulation and building blocks of skin care products:

Face wash,

Moisturizing cream, Cold Cream, Vanishing cream and their advantages and disadvantages.Application of these products in formulation of cosmecuticals.

Antiperspants & deodorants- Actives & mechanism of action.

Principles of formulation and building blocks of Hair care products:

Conditioning shampoo, Hair conditioner,anti-dandruff shampoo.

Hair oils.

Chemistry and formulation of Para-phylene diamine based hair dye.

Principles of formulation and building blocks of oral care products:

Toothpaste for bleeding gums, sensitive teeth. Teeth whitening, Mouthwash.

UNIT III **10 Hours**

Sun protection, Classification of Sunscreens and SPF.

Role of herbs in cosmetics:

Skin Care: Aloe and turmeric

Hair care: Henna and amla.

Oral care: Neem and clove

Analytical cosmetics: BIS specification and analytical methods for shampoo, skin-cream and toothpaste**.**

UNIT IV **08 Hours**.

Principles of Cosmetic Evaluation:Principles of sebumeter, corneometer. Measurement of TEWL, Skin Color, Hair tensile strength, Hair combing properties

Soaps,and syndet bars. Evolution and skin benfits UNIT V 07 Hours

Oily and dry skin, causes leading to dry skin, skin moisturisation. Basic understanding of the terms Comedogenic, dermatitis.

Cosmetic problems associated with Hair and scalp: Dandruff, Hair fall causes

Cosmetic problems associated with skin: blemishes, wrinkles, acne, prickly heat and body odor.

Antiperspirants and Deodorants- Actives and mechanism of action

References

1) Harry's Cosmeticology, Wilkinson, Moore, Seventh Edition, George Godwin.
2) Cosmetics – Formulations, Manufacturing and Quality Control, P.P. Sharma, 4th Edition, Vandana Publications Pvt. Ltd., Delhi.
3) Text book of cosmelicology by Sanju Nanda & Roop K. Khar, Tata Publishers.

BP810 ET. PHARMACOLOGICAL SCREENING METHODS

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- Appreciate the applications of various commonly used laboratory animals.
- Appreciate and demonstrate the various screening methods used in preclinical research
- Appreciate and demonstrate the importance of biostatistics and researchmethodology
- Design and execute a research hypothesis independently

Unit –I	**08 Hours**
Laboratory Animals: Study of CPCSEA and OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals, Common lab animals: Description and applications of different species and strains of animals. Popular transgenic and mutant animals. Techniques for collection of blood and common routes of drug administration in laboratory animals, Techniques of blood collection and euthanasia.	
Unit –II	**10 Hours**
Preclinical screening models a. Introduction: Dose selection, calculation and conversions, preparation of drug solution/suspensions, grouping of animals and importance of sham negative and positive control groups. Rationale for selection of animal species and sex for the study. **b. Study of screening animal models for** Diuretics, nootropics, anti-Parkinson's,antiasthmatics, **Preclinical screening models:** for CNS activity- analgesic, antipyretic,anti-inflammatory, general anaesthetics, sedative and hypnotics, antipsychotic, antidepressant, antiepileptic, antiparkinsonism, alzheimer's disease	

Unit –III **Preclinical screening models:** for ANS activity, sympathomimetics, sympatholytics, parasympathomimetics, parasympatholytics, skeletal muscle relaxants, drugs acting on eye, local anaethetics	
Unit –IV **Preclinical screening models:** for CVS activity- antihypertensives, diuretics, antiarrhythmic, antidyslepidemic, anti aggregatory, coagulants, and anticoagulants Preclinical screening models for other important drugs like antiulcer, antidiabetic, anticancer and antiasthmatics.	
Research methodology and Bio-statistics Selection of research topic, review of literature, research hypothesis and study design Pre-clinical data analysis and interpretation using Students 't' test and One-way ANOVA. Graphical representation of data	**05 Hours**

Recommended Books (latest edition):

1. Fundamentals of experimental Pharmacology-by M.N.Ghosh
2. Hand book of Experimental Pharmacology-S.K.Kulakarni
3. CPCSEA guidelines for laboratory animal facility.
4. Drug discovery and Evaluation by VogelH.G.
5. Drug Screening Methods by Suresh Kumar Gupta and S. K. Gupta
6. Introduction to biostatistics and research methods by PSS Sundar Rao and J Richard

BP 811 ET. ADVANCED INSTRUMENTATION TECHNIQUES

45 Hours

Course Outcomes: At the end of the course, students will be able to:

- understand the advanced instruments used and its applications in drug analysis
- understand the chromatographic separation and analysis of drugs.
- understand the calibration of various analytical instruments
- know analysis of drugs using various analytical instruments.

Course Content:

UNIT-I **10 Hours**

Nuclear Magnetic Resonance spectroscopy

Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications

Mass Spectrometry- Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications

UNIT-II **10 Hours**

Thermal Methods of Analysis: Principles, instrumentation and applications of ThermogravimetricAnalysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC)

X-Ray Diffraction Methods: Origin of X-rays, basic aspects of crystals, X-ray

Crystallography, rotating crystal technique, single crystal diffraction,powder diffraction, structural elucidation and applications.

UNIT-III **10 Hours**

Calibration and validation-as per ICH and USFDA guidelines

Calibration of following Instruments

Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer, Fluorimeter, Flame Photometer, HPLC and GC

UNIT-IV **08 Hours**

Radio immune assay: Importance, various components, Principle, different methods, Limitation and Applications of Radio immuno assay

Extraction techniques:General principle and procedure involved in the solid phase extraction and liquid-liquid extraction

UNIT-V **07 Hours**

Hyphenated techniques-LC-MS/MS, GC-MS/MS, HPTLC-MS.

Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

BP 812 ET. DIETARY SUPPLEMENTS AND NUTRACEUTICALS

No. of hours :3 **Tutorial:1** **Credit point:4**

Course Outcomes: At the end of the course, students will be able to:

- Understand the need of supplements by the different group of people to maintain healthy life.
- Understand the outcome of deficiencies in dietary supplements.
- Appreciate the components in dietary supplements and the application.
- Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

UNIT I **07 hours**

a. Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc.
b. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community.
c. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds

UNIT II **15 hours**

Phytochemicals as nutraceuticals: Occurrence and characteristic features (chemical nature medicinal benefits) of following

a) Carotenoids- α and β-Carotene, Lycopene, Xanthophylls, leutin
b) Sulfides: Diallyl sulfides, Allyl trisulfide.
c) Polyphenolics: Reservetrol
d) Flavonoids- Rutin , Naringin, Quercitin, Anthocyanidins, catechins, Flavones
e) Prebiotics / Probiotics.: Fructo oligosaccharides, Lacto bacillum
f) Phyto estrogens : Isoflavones, daidzein, Geebustin, lignans
g) Tocopherols
h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like.

UNIT III **07 hours**

a) Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids.

b) Dietary fibres and complex carbohydrates as functional food ingredients..

UNIT IV **10 hours**

a) Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing.

b) Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, α- Lipoic acid, melatonin
Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole.

c) Functional foods for chronic disease prevention

UNIT V **06 hours**

a) Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals.

b) Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods.

c) Pharmacopoeial Specifications for dietary supplements and nutraceuticals.

References:

1. Dietetics by Sri Lakshmi
2. Role of dietary fibres and neutraceuticals in preventing diseases by K.T Agusti and P.Faizal: BSPunblication.
3. Advanced Nutritional Therapies by Cooper. K.A., (1996).
4. The Food Pharmacy by Jean Carper, Simon & Schuster, UK Ltd., (1988).
5. Prescription for Nutritional Healing by James F.Balch and Phyllis A.Balch 2nd Edn., Avery Publishing Group, NY (1997).
6. G. Gibson and C.williams Editors *2000 Functional foods* Woodhead Publ.Co.London.
7. Goldberg, I. *Functional Foods*. 1994. Chapman and Hall, New York.
8. Labuza, T.P. 2000 Functional Foods and Dietary Supplements: Safety, Good Manufacturing Practice (GMPs) and Shelf Life Testing in *Essentials of Functional Foods* M.K. Sachmidl and T.P. Labuza eds. Aspen Press.
9. Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition)
10. Shils, ME, Olson, JA, Shike, M. 1994 *Modern Nutrition in Health and Disease*. Eighth edition. Lea and Febiger

Semester VIII – Elective course on Pharmaceutical Product Development No of Hours: 3 Tutorial:1 Credit points:4

Course Outcomes: At the end of the course, students will be able to manufacturing and quality control testing of different types of dosage forms.

Unit-I **10 Hours**

Introduction to pharmaceutical product development, objectives, regulations related to preformulation, formulation development, stability assessment, manufacturing and quality control testing of different types of dosage forms

Unit-II **10 Hours**

An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories

i. Solvents and solubilizers
ii. Cyclodextrins and their applications
iii. Non - ionic surfactants and their applications
iv. Polyethylene glycols and sorbitols
v. Suspending and emulsifying agents
vi. Semi solid excipients

Unit-III **10 Hours**

An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories

i. Tablet and capsule excipients
ii. Directly compressible vehicles
iii. Coat materials
iv. Excipients in parenteral and aerosols products
v. Excipients for formulation of NDDS

Selection and application of excipients in pharmaceutical formulations with specific industrial applications

Unit-IV **08 Hours**

Optimization techniques in pharmaceutical product development. A study of various optimization techniques for pharmaceutical product development with specific examples. Optimization by factorial designs and their applications. A study of QbD and its application in pharmaceutical product development.

Unit-V **07 Hours**

Selection and quality control testing of packaging materials for pharmaceutical product development- regulatory considerations.

Recommended Books (Latest editions)

1. Pharmaceutical Statistics Practical and Clinical Applications by Stanford Bolton, CharlesBon; Marcel Dekker Inc.
2. Encyclopedia of Pharmaceutical Technology, edited by James swarbrick, Third Edition,Informa Healthcare publishers.
3. Pharmaceutical Dosage Forms, Tablets, Volume II, edited by Herbert A. Lieberman andLeon Lachman; Marcel Dekker, Inc.
4. The Theory and Practice of Industrial Pharmacy, Fourth Edition, edited by Roop kKhar, S P Vyas, Farhan J Ahmad, Gaurav K Jain; CBS Publishers and Distributors Pvt.Ltd. 2013.
5. Martin's Physical Pharmacy and Pharmaceutical Sciences, Fifth Edition, edited by Patrick J. Sinko, BI Publications Pvt. Ltd.
6. Targeted and Controlled Drug Delivery, Novel Carrier Systems by S. P. Vyas and R. K.Khar, CBS Publishers and Distributors Pvt. Ltd, First Edition 2012.
7. Pharmaceutical Dosage Forms and Drug Delivery Systems, Loyd V. Allen Jr., Nicholas B.Popovich, Howard C. Ansel, 9th Ed. 40
8. Aulton's Pharmaceutics – The Design and Manufacture of Medicines, Michael E. Aulton,3rd Ed.
9. Remington – The Science and Practice of Pharmacy, 20th Ed.
10. Pharmaceutical Dosage Forms – Tablets Vol 1 to 3, A. Liberman, Leon Lachman andJoseph B. Schwartz
11. Pharmaceutical Dosage Forms – Disperse Systems Vol 1 to 3, H.A. Liberman, Martin, M.R and Gilbert S. Banker.
12. Pharmaceutical Dosage Forms – Parenteral Medication Vol 1 & 2, Kenneth E. Avis andH.A. Libermann.
13. Advanced Review Articles related to the topics.

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SCHOOL OF PHARMACY

SCHEME FOR (D. PHARMA)

D. Pharma			Semester			I
SN	**Course Code**	**Course Name**	**Periods**			**Credits**
			L	**T**	**P**	
1	DP 201	Pharmaceutics-II	3	0	0	3
2	DP202	Pharmaceutical Chemistry-II	4	0	0	4
3	DP 203	Pharmacology and Toxicology	3	0	0	3
4	DP 204	Pharmaceutical Jurisprudence	2	0	0	2
5	DP 205	Drug Store and Business Management	3	0	0	3
6	DP 206	Hospital and Clinical Pharmacy	3	0	0	3
7						
	DP 251	Pharmaceutics-II Practical	0	0	4	3
	DP 252	Pharmaceutical Chemistry-II Practical	0	0	3	2
	DP 253	Pharmacology Practical	0	0	2	1
	DP 256	Hospital and Clinical Pharmacy Practical	0	0	2	1
		Total credits	**18**	**0**	**11**	**25**

S. No.	SUBJECT CODE	SUBJECT NAME	L-T-P	Credits
1	DP 201	Pharmaceutics-II	3-0-0	3
2	DP202	Pharmaceutical Chemistry-II	4-0-0	4
3	DP 203	Pharmacology and Toxicology	3-0-0	3
4	DP 204	Pharmaceutical Jurisprudence	2-0-0	2
5	DP 205	Drug Store and Business Management	3-0-0	3
6	DP 206	Hospital and Clinical Pharmacy	3-0-0	3
S. No.	**SUBJECT CODE**	**SUBJECT NAME**		
1	DP 251	Pharmaceutics-II Practical	0-0-4	3
2	DP 252	Pharmaceutical Chemistry-II Practical	0-0-3	2
3	DP 253	Pharmacology Practical	0-0-2	1
4	DP 256	Hospital and Clinical Pharmacy Practical	0-0-2	1
		Total credits	**18-0-11**	**25**

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S NO	SUBJECT CODE	SUBJECT NAME	L-T-P	Credits
1	DP 101	Pharmaceutics-I	3-0-0	3
2	DP102	Pharmaceutical Chemistry	3-0-0	3
3	DP 103	Pharmacognosy	3-0-0	3
4	DP 104	Biochemistry and Clinical Pathology	3-0-0	3
5	DP 105	Human Anatomy and Physiology	3-0-0	3
6	DP 106	Health Education and Community Pharmacy	3-0-0	3
7	PD 191A	Hobby Club	0-0-2	1
S NO	**SUBJECT CODE**	**SUBJECT NAME**		
1	DP 151	Pharmaceutics-I Practical	0-0-4	3
2	DP 152	Pharmaceutical Chemistry Practical	0-0-3	2
3	DP 153	Pharmacognosy Practical	0-0-3	2
4	DP 154	Biochemistry and Clinical Pathology Practical	0-0-2	1
5	DP 155	Human Anatomy and Physiology Practical	0-0-2	1
		Total Credits	**12-0-16**	**28**

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S. No.	SUBJECT CODE	SUBJECT NAME	L-T-P	Credits
1	DP 201	Pharmaceutics-II	3-0-0	3
2	DP202	Pharmaceutical Chemistry-II	4-0-0	4
3	DP 203	Pharmacology and Toxicology	3-0-0	3
4	DP 204	Pharmaceutical Jurisprudence	2-0-0	2
5	DP 205	Drug Store and Business Management	3-0-0	3
6	DP 206	Hospital and Clinical Pharmacy	3-0-0	3
7	PD151	Basics of computer fundamentals	2-0-0	2
S. No.	**SUBJECT CODE**	**SUBJECT NAME**		
1	DP 251	Pharmaceutics-II Practical	0-0-4	3
2	DP 252	Pharmaceutical Chemistry-II Practical	0-0-3	2
3	DP 253	Pharmacology Practical	0-0-2	1
4	DP 256	Hospital and Clinical Pharmacy Practical	0-0-2	1
		Total Credits	**20-0-11**	**27**

SYLLABUS (as per PCI Education Regulations

1991) DIPLOMA IN PHARMACY (PART-I)

DP 101 **PHARMACEUTICS-I**

Theory (75 hours)

Course Outcomes: At the end of the course, students will be able to:

- Know the history of profession of pharmacy
- Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
- To understand the material handling techniques.
- To perform various processes involved in pharmaceutical manufacturing process.
- To appreciate and comprehend significance of plant lay out design for optimum use of resources.

1. Introduction of different dosage forms. Their classification with examples-their relative applications. Familiarization with new drug delivery systems.

2. Introduction to Pharmacopoeias with special reference to the Indian Pharmacopoeia.

3. Metrology: Systems of weights and measures. Calculations including conversion from one to another system. Percentage calculations and adjustments of products. Use of alligation method in calculations, isotonic solutions.

4. Packing of Pharmaceuticals: Desirable features of a container, types of containers. Study of glass and plastics as materials for containers and rubber as material for closures-their merits and demerits. Introduction to aerosol packaging.

5. Size reduction Objectives, and factors affecting size reduction, methods of size reductionâ€“Study of Hammer mill, Ball mill, Fluid Energy Mill and Disintegrator.

6. Size separation: “Size separation by sifting. Official Standard for powders. Sedimentation methods of size separation. Construction and working of cyclone separator.

7. Mixing and Homogenisation: “Liquid mixing and powder mixing, Mixing of semisolids, Study of Silverson Mixer“Homogeniser, Planetary Mixer; Agitated powder mixer; Triple Roller Mill; Propeller Mixer, Colloid Mill and Hand Homogeniser. Double cone mixer.

8. Clarification and Filtration-Theory of filtration, Filter media; Filter aids and selection of filters. Study of the following filtration equipments, "Filter Press, Sintered Filters, Filter Candles, Metafilter

9. Extraction and Galenicals

(a) Study of percolation and maceration and their modification, continuous hot extractionâ€"Applications in the preparation of tinctures and extracts.

(b) Introduction to Ayurvedic dosage forms.

10. Heat processes Evaporation: Definition Factors affecting evaporation-Study of evaporating still and Evaporating Pan.

11. Distillation: "Simple distillation and Fractional distillation; Steam distillation and vacuum distillation. Study of vacuum still, preparation of Purified Water I.P. and water for injection I.P. Construction and working of the still used for the same.

12. Introduction to drying processes: "Study of Tray Dryers: Fluidized Bed Dryer, Vacuum Dryer and Freeze Dryer.

13. Sterilization: Concept of sterilization and its differences from disinfection-Thermal resistance of microorganisms. Detailed study of the following sterilization process.

(i) Sterilization with moist heat,

(ii) Dry heat sterilization,

(iii) Sterilization by radiation,

(iv) Sterilization by filtration and

(v) Gaseous sterilization.

Aseptic techniques. Application of sterilization processes in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipment.

14. Processing of Tablets-Definition; Different types of compressed tablets and their properties. Processes involved in the production of tablets; Tablets excipients; Defects in tablets. Evaluation of Tablets; Physical Standards including Disintegration and Dissolution. Tablet coatingâ€"sugar coating; film coating, enteric coating and microencapsulation (Tablet coating may be dealt in an elementary manner.)

15. Processing of Capsules: Hard and soft gelatin capsules; different sizes capsules; filling of capsules; handling and storage of capsules, Special applications of capsules.

16. Study of immunological products like sera vaccines, toxoids & their preparations.

DP 151	**PRACTICAL** (100 hours)		
Preparation (minimum number stated against each) of the following categories illustrating different techniques involved.			
1.	Aromatic waters		3
2.	Solutions		4
3.	Spirits		2
4.	Tinctures		4
5.	Extracts		2
6.	Creams		2
7.	Cosmetic preparations		3
8.	Capsules		2
9.	Tablets		2
10.	Preparations involving sterilization		2
11.	Ophthalmic preparations		2
12.	Preparations involving aseptic techniques		2

Books Recommended : (Latest editions)

1.Remington's Pharmaceutical

Sciences. 2.The Extra

Pharmacopoeia-Martindale.

DP 102 **PHARMACEUTICAL CHEMISTRY**

Theory (75 hours)

Course Outcomes: At the end of the course, students will be able to:

- know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
- understand the medicinal and pharmaceutical importance of inorganic compounds

1. General discussion on the following inorganic compounds including important physical and chemical properties, medicinal and Pharmaceutical uses, storage conditions and chemical incompatibility.

(A) Acids, bases and buffers Boric acid*, Hydrochloric acid, strong ammonium hydroxide, Calcium hydroxide, Sodium hydroxide and official buffers.

(B) Antioxidants: Hypophosphorous acid, Sulphur dioxide, Sodium bisulphite, Sodium metabisulphite, Sodium thiosulphate, Nitrogen and Sodium Nitrite.

(C) Gastrointestinal agents--

(i) Acidifying agents Dilute hydrochloric acid.

(ii) Antacids-Sodium bicarbonate, Aluminium hydroxide gel, Aluminium Phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium oxide, Combinations of antacid preparations.

(iii) Protectives and Adsorbents-Bismuth subcarbonate and Kaolin.

(iv) Saline Cathartics-Sodium potassium tartrate and Magnesium sulphate.

(D) Topical Agents-

(i) Protectives-Talc, Zinc Oxide, Calamine, Zinc stearate, Titanium dioxide, Silicone polymers.

(ii) Antimicrobials and Astringents: Hydrogen peroxide*, Potassium permanganate, Chlorinated lime, Iodine, Solutions of Iodine, Povidone-iodine, Boric acid, Borax. Silver nitrate, Mild silver protein, Mercury, Yellow mercuric oxide, Ammoniated mercury.

(iii) Sulphur and its compounds: Sublimed sulphur precipitated sulphur, selenium sulphide.

(iv) Astringents:-Alum and Zinc Sulphate.

(E) Dental Products: Sodium Fluride, Stannous Flouride, Calcium carbonate, Sodium

(F) metaphosphate, Dicalcium phosphate, Strontium chloride, Zinc chloride.

(G) Inhalants: Oxygen, Carbon dioxide, Nitrous oxide.

(H) Respiratory stimulants: Ammonium Carbonate.

(I) Expectorants and Emetics: Ammonium chloride , *Potassium iodide, Antimony potassium tartrate.

(J) Antidotes-Sodium nitrate.

2. Major Intra and Extracellular electrolytes-

(A) Electrolytes used for replacement therapy-Sodium chloride and its preparations, Potassium chloride and its preparations.

(B) Physiological acid-base balance and electrolytes used-Sodium acetate, Potassium acetate, Sodium bicarbonate injection, Sodium citrate, Potassium citrate, Sodium lactate injection, Ammonium chloride and its injection.

(C) Combination of oral electrolyte powders and solutions.

3. Inorganic Official compounds of Iron, Iodine, and, Calcium Ferrous Sulfate and Calcium gluconate.

4. Radio pharmaceuticals and Contrast media-Radio activity-Alpha, Beta and Gamma Radiations, Biological effects of radiations, Measurement of radio activity, G. M. Counter Radio isotopes their uses, storage and precautions with special reference to the official preparations.

Radio opaque Contrast media: Barium sulfate.

5. Quality control of Drugs and Pharmaceuticals-Importance of quality control, significant errors, methods used for quality control, sources of impurities in Pharmaceuticals, Limit tests for Arsenic, chloride, sulphate, Iron and Heavy metals.

6. Identification tests for cations and anions as per Indian Pharmacopoeia.

DP 152 **PRACTICAL (75 hours)**

1. Identification tests for inorganic compounds particularly drugs and pharmaceuticals.

2. Limit test for chloride, sulfate, Arsenic, Iron and Heavy metals.

3. Assay of inorganic Pharmaceuticals involving each of the following methods of compounds marked with (*) under theory.

a. Acid-Base titrations (at least 3)

b. Redox titrations (One each of Permanganometry and iodimetry)

c. Precipitation titrations (at least 2)

d. Complexometric titrations (Calcium and Magnesium)

Book recommended (Latest editions)

Indian Pharmacopoeia.

DP103 PHARMACOGNOSY

Theory (75 hours)

Course Outcomes: At the end of the course, students will be able to:

- to know the techniques in the cultivation and production of crude drugs
- to know the crude drugs, their uses and chemical nature
- know the evaluation techniques for the herbal drugs
- to carry out the microscopic and morphological evaluation of crude drugs

1. Definition, history and scope of Pharmacognosy including indigenous system of medicine.

2. Various systems of classification of drugs of natural origin.

3. Adulteration and drug evaluation; significance of Pharmacopoeial standards.

4. Brief outline of occurrence, distribution, outline of isolation, identification tests, therapeutic effects and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.

5. Occurrence, distribution, organoleptic evaluation, chemical constituents including tests wherever applicable and therapeutic efficacy of following categories of drugs.

(a) Laxatives: Aloes, Rhuburb, Castor oil, Ispaghula, Senna.

(b) Cardiotonics-Digitalis, Arjuna.

® Carminatives & G.I. regulators-Umbelliferous fruits, Coriander, Fennel, Ajowan, Cardamom Ginger, Black pepper, Asafoetida, Nutmeg, Cinnamon, Clove.

(d) Astringentsâ€“Catechu.

(e) Drugs acting on nervous system-Hyoscyamus, Belladonna, Aconite, Ashwagandha, Ephedra, Opium, Cannabis, Nux vomica.

(f) Antihypertensives-Rauwolfia.

(g) Antitussives-Vasaka, Tolu balsam, Tulsi.

(h) Antirheumatics-Guggul, Colchicum.

(i) Antitumour-Vinca.

(j) Antileprotics-Chaulmoogra Oil.

(k) –Pterocarpus, Gymnema, Sylvestro.

(l) Diureticsâ€“Gokhru, Punarrnava.

(m) Antidysentrics-Ipecacuanha

(n) Antiseptics and disinfectants Benzoin, Myrrh. Nim, curcuma.

(o) Antimalarials: Cinchona.

(p) Oxytocics-Ergot.

(q) Vitamines-Shark liver Oil and Amla.

® Enzymes-Papaya, Diastase, Yeast.

(s) Perfumes and flavouring agents-Peppermint Oil, Lemon Oil, Orange Oil, Lemon grass Oil, Sandalwood.

(t) Pharmaceutical aids-Honey, Arachis Oil, Starch, Kaolin, Pectin, Olive oil, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatin.

(u) Miscellaneous-Liquorice, Garlic, Picrorhiza, Dioscorea, Linseed, Shatavari, Shankhapusphi, Pyrethrum, Tobacco.

6. Collection and preparation of crude drug for the market as exemplified by Ergot, opium, Rauwolfia, Digitalis, Senna.

7. Study of source, preparation and identification of fibres used in sutures and surgical dressingsâ€"cotton, silk, wool and regenerated fibre.

8. Gross anatomical studies of Senna, Datura, Cinnamon, Cinchona, Fennel, Clove, Ginger, Nux vomica & Ipecacuanha.

DP153 **PRACTICAL (75 hours)**

1. Identification of drug by morphological characters.

2. Physical and chemical tests for evaluation of drugs wherever applicable.

3. Gross anatomical studies (t.s) of the following drugs: Senna, Datura, Cinnamon, Cinchona, Coriander, Fennel, Clove, Ginger, Nuxvomica, Ipecacuanha.

4. Identification of fibres and surgical dressings.

DP104 BIOCHEMISTRY AND CLINICAL PATHOLOGY

Theory (50 hours)

Course Outcomes: At the end of the course, students will be able to:

- Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
- Understand the metabolism of nutrient molecules in physiological and pathological conditions.

1. Introduction to biochemistry.

2. Brief chemistry and role of proteins, polypeptides and amino acids, classification, Qualitative tests, Biological value, Deficiency diseases.

3. Brief chemistry and role of Carbohydrates, Classification, qualitative tests, Diseases related to carbohydrate metabolism.

4. Brief chemistry and role of Lipids, Classification, qualitative tests. Diseases related to lipids metabolism.

5. Brief chemistry and role of Vitamins and Coenzymes.

6. Role of minerals and water in life processes.

7. Enzymes : Brief concept of enzymic action. Factors affecting it. Therapeutic and pharmaceutical importance.

8. Brief concept of normal and abnormal metabolism of proteins, carbohydrates and lipids.

9. Introduction to pathology of blood and urine.

(a) Lymphocytes and Platelets, their role in health and disease.

(b) Erythrocytes Abnormal cells and their significance.

(c) Abnormal constituents of urine and their significance in diseases.

DP 154 **PRACTICAL (75 hours)**

1. Detection and identification of Proteins, Amino acids, Carbohydrates and lipids.

2. Analysis of normal and abnormal constituents of Blood and Urine (Glucose, Urea, Creatine, creatinine, cholesterol, alkaline phosphatase, acid phosphatase, Bilirubin, SGPT, SGOT, Calcium,Diastase, Lipase).

3. Examination of sputum and faeces (microscopic and staining).

4. Practice in injecting drugs by intramuscular, subcutaneous and intravenous routes. Withdrawal of blood samples.

DP105 **HUMAN ANATOMY AND PHYSIOLOGY**

THEORY (75 hours)

Course Outcomes: At the end of the course, students will be able to:

- Explain the gross morphology, structure and functions of various organs of the human body.
- Describe the various homeostatic mechanisms and their imbalances.
- Identify the various tissues and organs of different systems of human body.
- Perform the various experiments related to special senses and nervous system.
- Appreciate coordinated working pattern of different organs of each system

1. Scope of Anatomy and Physiology.

Definition of various terms used in Anatomy

2. Structure of cell, function of its components with special reference to mitochondria and microsomes.

3. Elementary tissues of the body. i.e epithelial tissue, muscular tissue, connective tissue and nervous tissue.

4. Structure and function of skeleton. Classification of joints and their function, Joint disorder.

5. Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood.

6. Name and functions of lymph glands.

7. Structure and functions of various parts of the heart. Arterial and venous systems with special reference to the names and positions of main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders.

8. Various parts of respiratory system and their functions. Physiology of respiration.

9. Various parts of urinary system and their functions, structure and functions of kidney. Physiology of Urine formation. Pathophysiology of renal diseases and oedema.

10. Structure of skeletal muscle. Physiology of muscle contraction, Names, position, attachments and functions of various skeletal muscles. Physiology of neuromuscular junction.

11. Various parts of central nervous system, brain and its parts, functions and reflex action. Anatomy and Physiology of autonomic nervous system.

12. Elementary knowledge of structure and functions of the organs of taste, smell, ear, eye

13. and skin. Physiology of pain.

14. Digestive system; names of the various parts of digestive system and their functions. Structure and functions of liver, physiology of digestion and absorption.

15. Endocrine glands and Hormones. Locations of the glands, their hormones and functions. Pituitary, thyroid, Adrenal and Pancreas.

16. Reproductive system -Physiology and Anatomy of Reproductive system.

DP155 **PRACTICAL (50 hours)**

1. Study of the human skeleton.

2. Study with the help of charts and models of the following systems and organs:

(a) Digestive system.

(b) Respiratory system.

(c) Cardiovascular system.

(d) Urinary system.

(e) Reproductive system.

(f) Nervous system.

(g) Eye.

(h) Ear.

3. Microscopic examination of epithelial tissue, cardiac muscle, smooth muscle, skeletal muscle. Connective tissue and nervous tissues.

4. Examination of blood films for TLC, DLC and malarial parasite.

5. Determination of clotting time of blood, erythrocyte sedimentation rate and Hemoglobin value.

6. Recording of body temperature, pulse, heart rate, blood pressure and ECG.

DP 106 HEALTH EDUCATION AND COMMUNITY PHARMACY

Theory (50 hours)

Course Outcomes: At the end of the course, students will be able to:

- Create the awareness about family planning among learners.
- Develop an attitude of concern for the physical health, mental health and social health
- Impart basic knowledge about the environment and its allied problems.
- Motivate learner to participate in environment protection and environment improvement.
- Acquire skills to help the concerned individuals in identifying and solving environmental problems.
- Understand methods of identification, cultivation and preservation of various microorganisms

1. Concept of health: Definition of physical health, mental health, social health, spiritual health determinants of health, indicators of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.

2. Nutrition and health: Classification of foods requirements, disease induced due to deficiency of proteins, Vitamins and minerals-treatment and prevention.

3. Demography and family planning: Demography cycle, fertility, family planning, contraceptive methods, behavioural methods, natural family planning method, chemical method, mechanical methods, hormonal contraceptives, population problem of India.

4. First aid: Emergency treatment in shock, snake-bite, burns poisoning, heart disease, fractures and resuscitation methods. Elements of minor surgery and dressings.

5. Environment and health-Sources of water supply, water pollution, purification of water, health and air, noise light-solid waste disposal and control-medical entomology, arthropod borne diseases and their control, rodents, animals and diseases.

6. Fundamental principles of microbiology classification of microbes, isolation, staining techniques of organisms of common diseases.

7. Communicable diseases, Causative agents, modes of transmission and prevention.

(a) Respiratory infections, Chicken pox, measles. Influenza, diphtheria, whooping cough and tuberculosis.

(b) Intestinal infections: Poliomyelitis. Hepatitis. Cholera. Typhoid, Food poisoning, Hookworm infection.

(c) Arthropod borne infections-plague, Malaria, Filariasis.

(d) Surface infections-Rabies, Trachoma, Tetanus, Leprosy.

(e) Sexually transmitted diseases ---Syphilis. Gonorrhoea. AIDS.

8. Non-communicable diseases-Causative agents, prevention, care and control; Cancer, Diabetes, Blindness, Cardiovascular diseases.

9. Epidemiology, Its scope, methods, uses, dynamics of disease transmission, immunity and immunization: Immunological products and their dose schedule. Principles of disease control and prevention, hospital acquired infection, prevention and control. Disinfection, types of disinfection, disinfection procedures, for faeces, urine, sputum, room linen, dead-bodies, instruments.

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choose to know

SCHOOL OF PHARMACY

DP201 **PHARMACEUTICS II**

Theory (75 hours)

Course Outcomes: At the end of the course, students will be able to:

- Know the history of profession of pharmacy
- Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
- Understand the professional way of handling the prescription
- Preparation of various conventional dosage forms

1. Dispensing Pharmacy:

(i) Prescriptions-Reading and understanding of prescription; Latin terms commonly used (Detailed study is not necessary), Modern methods of prescribing, adoption of metric system. Calculations involved in dispensing.

(ii) Incompatibilities in Prescriptions-Study of various types of incompatibilities-physical, chemical and therapeutic.

(iii) Posology: Dose and Dosage of drugs, Factors influencing dose, Calculations of doses on the basis of age, sex and surface area. Veterinary doses.

2. Dispensed Medications:

(Note: A detailed study of the following dispensed medication is necessary. Methods of preparation with theoretical and practical aspects, use of appropriate containers and closures. Special labelling requirements and storage conditions should be high-lighted).

(i) Powders-Types of powders-Advantages and disadvantages of powders, Granules, Cachets and Tablet triturates. Preparation of different types of powders encountered in prescriptions. Weighing methods, possible errors in weighing, minimum weighable amounts and weighing of material below the minimum weighable amount, geometric dilution and proper usage and care of dispensing balance.

(ii) Liquid Oral Dosage Forms:

(a). Monophasicâ€“Theoretical aspects including commonly used vehicles, essential adjuvant like stabilizers, colourants and flavours, with examples.

Review of the following monophasic liquids with details of formulation and practical methods.

Liquids for internal administration	Liquids for external administration or used on mucus membranes.
Mixtures and concentrates	Gargles
Syrups	Mouth washes Throat- paints Douches
Elixirs	Ear Drops Nasal drops & Sprays Liniments Lotions.

(b) Biphasic Liquid Dosage Forms:

(i) Suspension (elementary study) Suspensions containing diffusible solids and liquids and their preparations.

Study of the adjuvants used like thickening agents, wetting agents, their necessity and quantity to be incorporated.

Suspensions of precipitate forming liquids like, tinctures, their preparations and stability. Suspensions produced by chemical reaction. An introduction to flocculated, non-flocculated suspension system.

(ii) Emulsions-Types of emulsions, identification of emulsion system, formulation of emulsions, selection of emulsifying agents. Instabilities in emulsions. Preservation of emulsions.

(iii) Semi-Solid Dosage Forms:

(a) Ointmentsâ€"Types of ointments, classification and selection of dermatological vehicles. Preparation and stability of ointments by the following processes:

(i) Trituration (ii) Fusion (iii) Chemical reaction (iv) Emulsification.

(b) Pastes--- Difference between ointments and pastes, bases of pastes. Preparation of pastes and their preservation.

(c) Jellies-An introduction to the different types of jellies and their preparation.

(d) An elementary study of poultice.

(e) Suppositories and pessaries-Their relative merits and demerits, types of suppositories, suppository bases, classification, properties, Preparation and packing of suppositories. Use of suppositories for drug absorption.

(iv) Dental and Cosmetic Preparations:

Introduction to Dentrifices, Facial cosmetics, Deodorants, Antiperspirants, Shampoos, Hair dressing and Hair removers.

(v) Sterile Dosage Forms:

(a) Parenteral dosage formsâ€"Definitions, General requirements for parenteral dosage forms. Types of parenteral formulations, vehicles, adjuvants, processing, personnel, facilities and Quality control. Preparation of Intravenous fluids and admixtures-Total parenteral nutrition, Dialysis fluids.

(b) Sterility testing, Particulate matter monitoring-Faulty seal packaging.

(c) Ophthalmic Products-Study of essential characteristics of different ophthalmic preparations. Formulation additives, special precautions in handling and storage of ophthalmic products.

DP251 PHARMACEUTICS II PRACTICAL (100 hours)

Dispensing of at least 100 products covering a wide range of preparations such as mixtures, emulsions, lotions, liniments, E.N.T, preparations, ointments, suppositories, powders, incompatible prescriptions etc.

Books recommended :(Latest editions)

1. Indian Pharmacopoeia.
2. British Pharmacopoeia.
3. National Formularies (N.F.I, B.N.F)
4. Remington's Pharmaceutical Sciences.
5. Martindale Extra Pharmacopoeia.

DP202 **PHARMACEUTICAL CHEMISTY II**

Theory (100 hours)

Course Outcomes: At the end of the course, students will be able to:

- understand the chemistry of drugs with respect to their pharmacological activity
- understand the important physical, chemical properties and therapeutic value of drugs
- know
- know the stability and storage conditions of different type of Pharmaceutical formulations.
- write the chemical synthesis of some drugs

1. Introduction to the nomenclature of organic chemical systems with particular reference to heterocyclic system containing up to 3 rings.

2. The Chemistry of following Pharmaceutical organic compounds, covering their nomenclature, chemical structure, uses and the important Physical and Chemical properties (Chemical structure of only those compounds marked with asterisk (*).

The stability and storage conditions and the different type of Pharmaceutical formulations of these drugs and their popular brand names.

Antiseptics and Disinfectants-Proflavine, * Benzalkoniumchloride, Cetrimide, Chlorocresol*, Chloroxylene, Formaldehyde solution, Hexachlorophene, Liquified phenol, Nitrofurantoin.

Sulfonamides-Sulfadiazine, Sulfaguanidine*, Phthalysulfathiazole, Succinylsulfathiazole, Sulfadimethoxine, Sulfamethoxypridazine, Sulfamethoxazole, co-trimoxazole, Sulfacetamide*.

Antileprotic Drugs-Clofazimine, Thiambutosine, Dapsone*, Solapsone.

Anti-tubercular Drugs-Isoniazid*, PAS*, Streptomycin, Rifampicin, Ethambutol*, Thiacetazone, Ethionamide, Cycloserine, Pyrazinamide*.

Antiamoebic and Anthelmintic Drugs- Emetine, Metronidazole*, Halogenated hydroxyquinolines, diloxanidefuroate, Paramomycin Piperazine*, Mebendazole, D.E.C*,.

Antibiotics-Benzyl Penicillin*, Phenoxy methyl Penicillin*, Benzathine Penicillin Ampicillin*, Cloxacillin, Carbenicillin, Gentamicin, Neomycin , Erythromycin , Tetracycline, Cephalexin, Cephaloridine , Cephalothin, Griseofulvin , Chloramphenicol.

Antifungal agents-Undecylenic acid, Tolnaftate, Nystatin, Amphotericin, Hamycin.

Antimalarial Drugs-Chloroquine*, Amodiaquine, Primaquine, Proguanil, Pyrimethamine*, Quinine, Trimethoprim.

Tranquilizers-Chlorpromazine*, Prochlorperazine, TrifluoPerazine, Thiothixene, Haloperidol*, Triperidol, Oxypertine, Chlordiazepoxide, Diazepam*, Lorazepam, Meprobamate.

Hypnoticsâ€"Phenobarbitone*, Butobarbitone, Cyclobarbitone, Nitrazepam, Glutethimide*, Methyprylone, Paraldehyde, Triclofos sodium.

General Anaesthetics-Halothane*, Cyclopropane*, Diethyl ether*, Methohexital sodium, Thiopental sodium, Trichloroethyelene.

Antidepressant Drugsâ€"Amitriptyline, Nortryptyline, Imipramine *, Phenelzine,

Tranylcypromine. Analeptics-Theophylline, Caffeine*,Coramine*,

Dextroamphetamine.

Adrenergic Drugs-Adrenaline*, Noradrenaline, Isoprenaline*, Phenylephrine Salbutamol, Terbutaline, Ephedrine
*, Pseudoephedrine.
Adrenergic Antagoinst-Tolazoline, Propranolol*, Practolol.

Cholinergic Drugs-Neostigmine*,Pyridostigmine, Pralidoxime, Pilocarpine, Physostigmine*.

Cholinergic Antagonists-Atropine*, Hysocine, Homatropine, Propantheline*, Benztrophine, Tropicamide, Biperiden.*

Diuretic Drugs-Furosemide*,Chlorothiazide, Hydrochlorothaizide*, Benzthiazide, Urea*,Mannitol *, Ethacrynic Acid.

Cardiovascular Drugs-Ethyl nitrite*, Glyceryl trinitrate, Alpha methyl dopa, Guanethidine, Clofibrate,

Quinidine. Hypoglycemic Agents-Insulin, Chlorpropamide*, Tolbutamide, Glibenclamide, Phenformin

*, Metformin.

Coagulants and Anti-Coagulants-Heparin, Thrombin, Menadione*, Bishydroxycoumarin,

Warfarin Sodium. Local Anaesthetics-Lignocaine*, Procaine*, Benzocaine.

Histamine and Antiâ€"histaminic Agents-Histamine, Diphenhydramine*, Promethazine, Cyproheptadine, Mepyramine, Pheniramine, Chlorpheniramine*.

Analgesics and Anti-pyreticsâ€“Morphin, Pethidine*, Codeine, Methadone, Aspirin*, Paracetamol*, Analgin, Dextropropoxyphene, Pentazocine.

Non-steroidal anti-inflammatory Agents-Indomethacin*, phenylbutazone*, Oxyphenbutazone, Ibuprofen, Thyroxine and Antithyroids-Thyroxine*, Methimazole, Methylthiouracil, Propylthiouracil.

Diagnostic Agents-Iopanoic Acid, Propyliodone, Sulfobromophthalein. Sodium indigotindisulfonate, Indigo Carmine, Evans blue, Congo Red, Fluorescein Sodium .

*Anticonvulsants, cardiac glycosides, Antiarrhythmic antihypertensives & vitamins.

Steroidal Drugs-Betamethazone, Cortisone, Hydrocortisone, prednisolone, Progesterone, Testosterone, Oestradiol, Nandrolone.

Anti- Neoplastic Drugs-Actinomycins, Azathioprine, Busulphan, Chlorambucil, Cisplatin cyclophosphamide, Daunorubicin hydrochloride, Fluorouracil, Mercaptopurine, Methotrexate, Mytomycin.

Books Recommended :(Latest editions)

1. Pharmocopoeia of India.
2. British Pharmaceutical Codex.
3. Martindale The Extra Pharmacopoeia.

DP252 PHARMACEUTICAL CHEMISTY II PRACTICAL (75 hours)

1. Systematic qualitative testing of organic drugs involving Solubility determination, melting point and boiling point, detection of elements and functional groups (10 compounds).
2. Official identification test for certain groups of drugs included in the I.P like barbiturates, sulfonamides, phenothiazine, Antibiotic etc (8 compounds).
3. Preparation of three simple organic preparations.

DP203 PHARMACOLOGY & TOXICOLOGY Theory (75 hours)

Course Outcomes: At the end of the course, students will be able to:

- Understand the pharmacological actions of different categories of drugs
- Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
- Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
- Observe the effect of drugs on animals by simulated experiments
- Appreciate correlation of pharmacology with other bio medical sciences

1. Introduction to Pharmacology, scope of Pharmacology.

2. Routes of administration of drugs, their advantages and disadvantages.

3. Various processes of absorption of drugs and the factors affecting them, Metabolism, distribution and excretion of drugs.

4. General mechanism of drugs action and the factors which modify drug action.

5. Pharmacological classification of drugs. The discussion of drugs should emphasise the

following aspect: (i)Drugs acting on the Central Nervous System:

(a) General anaesthetics, adjunction to anaesthesia, intravenuous anasesthetics.

(b) Analgesic antipyretics and non-steroidal anti-inflammatory drugs, Narcotic analgesics, Antirheumatic and antigout remedies, Sedatives and Hypnotics, Psychopharmacological agents, anti convulsants, analeptics.

(c) Centrally acting muscle relaxants and anti parkinsonism agents

(ii) Local anaesthetics.

(iii) Drug acting on autonomic nervous system.

(a) Cholinergic drug, Anticholinergic drugs, anti cholinesterase drugs.

(b) Adrenergic drugs and adrenergic recepter blockers.

(c) Neurones blockers and ganglion blockers.

(d) Neuromuscular blockers, drugs used in myasthenia gravis.

(iv) Drugs acting on eye, mydriatics, drugs used in glaucoma.

(v) Drugs acting on respiratory system-Respiratory stimulants, Bronchodilators, Nasal decongestants, Expectorants and Antitussive agents.

(vi) Antacids, Physiological role of histamine and serotonin, Histamine and Antihistamines, Prostaglandins.

(vii) Cardio Vascular drugs, Cardiotonics, Antiarrhythmic agents, Antianginal agents, Antihypertensive agents, Peripheral Vasodilators and drugs used in atherosclerosis.

(viii) Drugs acting on the blood and blood forming organs. Haematinics, Coagulants and anti Coagulants, Haemostatics, Blood substitutes and plasma expanders.

(ix) Drugs affecting renal function-Diuretics and antidiuretics.

(x) Hormones and hormone antagonists-hypoglycemic agents, Antithyroid drugs, sex hormones and oral contraceptives, corticosteroids.

(xi) Drugs acting on digestive system-Carminatives, digestants Bitters, Antacids and drugs used in Peptic ulcer, purgatives, and laxatives, Antidiarrhoeals, Emetics, Antiemetics, Anti-spasmodics.

Chemotherapy of microbial disease ;Urinary antiseptics, Sulphonamides, Penicillins, Streptomycin, Tetracylines and other antibiotics, Antitubercular agents, Antifungal agents, antiviral drugs, antileprotic drugs.

6. Chemotherapy of protozoal diseases Anthelmintic drugs.

7. Chemotherapy of cancer.

8. Disinfectants and antiseptics.

A detailed study of the action of drugs on each organ is not necessary.

DP253 **PHARMACOLOGY PRACTICAL (50 hours)**

The first six of the following experiments will be done by the students while the remaining will be demonstrated by the teacher.

1. Effect of K+, Ca++, acetylcholine and adrenaline on frog's heart.
2. Effect of acetylcholine on rectus abdominis muscle of Frog and guinea pig ileum.
3. Effect on spasmogens and relaxants on rabbits intestine.
4. Effect of local anaesthetics on rabbit cornea.
5. Effect of mydriatics and miotics on rabbits eye.
6. To study the action of strychnine on frog.
7. Effect of digitalis on frog's heart.
8. Effect of hypnotics in mice.
9. Effect of convulsants and anticonvulsant in mice or rats.
10. Test for pyrogen.
11. Taming and hypnosis potentiating effect of chlorpromazine in mice/rats.
12. Effect of diphenhydramine in experimentally produced asthma in guinea pigs.

DP204

PHARMACEUTICAL JURISPRUDENCE Theory (50 hours)

Course Outcomes: At the end of the course, students will be able to:

- The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
- Various Indian pharmaceutical Acts and Laws
- The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
- The code of ethics during the pharmaceutical practice

1. Origin and nature of Pharmaceutical legislation in India, its scope and objectives. Evolution of the "Concept of Pharmacy" as an integral part of the Health Care System.

2. Principles and significance of Professional Ethics. Critical study of the code of Pharmaceutical Ethics drafted by Pharmacy Council of India.
3. Pharmacy Act, 1948-The General study of the Pharmacy Act with special reference to Education Regulations, working of State and Central Councils, constitution of these councils and functions, Registration procedures under the Act.

4. The Drugs and Cosmetics Act, 1940â€"General study of the Drugs and Cosmetics Act and the Rules thereunder. Definitions and salient features related to retail and wholesale distribution of drugs. The powers of Inspectors, the sampling procedures and the procedure and formalities in obtaining licences under the rule. Facilities to be provided for running a Pharmacy effectively. General study of the Schedules with special reference of schedules C, C1, F, G, J, H, P and X and salient features of labelling and storage condition of drugs.

5. The Drug and Magic Remedies (Objectionable Advertisement) Act, 1945-General study of the Act Objectives, special reference to be laid on Advertisements. Magic remedies and objectionable and permitted advertisements- disease which cannot be claimed to be cured.

6. Narcotic Drugs and Psychotropic Substances Act, 1985-A brief study of the act with special reference to its objectives, offences and punishment.

7. Brief introduction to the study of the following acts.

1. Latest Drugs (Price Control) Order in force.

2. Poisons Act 1919 (as amended to date)

3. Medicinal and Toilet Preparations (Excise Duties) Act, 1995 (as amended to date)

4. Medical Termination of Pregnancy Act, 1971 (as amended to date)

BOOKS RECOMMENDED (Latest edition)

Bare Acts of the said laws published by Government.

DP205 DRUG STORE AND BUSINESS MANAGEMENT Theory (75 hours)

Course Outcomes: At the end of the course, students will be able to:

- know various functions and subdivision of commerce
- Know to about inventory Control
- accounting concepts and conventions

Part-I Commerce (50 hours)

1. Introduction-Trade, Industry and Commerce, Functions and subdivision of Commerce, Introduction of Elements of Economics and Management.

2. Forms of Business Organisations.

3. Channels of Distribution.

4. Drug House Management-Selection of Site, Space Lay-out and legal requirements.

Importance and objectives of Purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto.

Codification, handling of drug stores and other hospital supplies.

5. Inventory Control-objects and importance, modern techniques like ABC, VED analysis, the lead time, inventory carrying cost, safety stock, minimum and maximum stock levels, economic order quantity, scrap and surplus disposal.

6. Sales Promotion, Market Research, Salesmanship, qualities of a salesman, Advertising and Window Display.

7. Recruitment, training, evaluation and compensation of the pharmacist.

8 Banking and Finance Service and functions of the bank, Finance Planning and sources of finance.

Part-II Accountancy (25 hours)

1. Introduction to the accounting concepts and conventions, Double entry Book keeping, Different kinds of accounts.
2. Cash Book.
3. General Leger and Trial Balance.
4. Profit and Loss Account and Balance Sheet.
5. Simple technique of analysing financial statements.

Introduction to Budgetting.

Books Recommended (Latest edition)

Remington's Pharmaceutical Sciences.

DP206 HOSPITAL AND CLINICAL PHARMACY Theory (75 hours)

Course Outcomes: At the end of the course, students will be able to:

- know various drug distribution methods in a hospital
- appreciate the pharmacy stores management and inventory control
- monitor drug therapy of patient through medication chart review and clinical review
- obtain medication history interview and counsel the patients
- identify drug related problems
- detect and assess adverse drug reactions
- interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
- know pharmaceutical care services
- do patient counseling in community pharmacy;
- appreciate the concept of Rational drug therapy.

Part-I :Hospital Pharmacy:

1. Hospitals Definition, Function, Classifications based on various criteria, organisation, Management and Health delivery system inIndia.

2. Hospital Pharmacy:

(a) Definition

(b) Functions and objectives of Hospital Pharmaceutical services.

(c) Location, Layout, Flow chart of material and men.

(d) Personnel and facilities requirements including equipments based on individual and basic needs.

(e) Requirements and abilities required for Hospital pharmacists.

3. Drug Distribution system in Hospitals:

(a) Out-patient services

(b) In-patient services-(a) types of services (b) detailed discussion of unit Dose system, Floor ward stock system, Satellite pharmacy services, Central sterile services, Bed Side Pharmacy.

4. Manufacturing:

(a) Economical considerations, estimation of demand.

(b) Sterile manufacture-large and small volume parenterals, facilities, requirements, layout production planning, man-power requirements.

(c) Non-sterile manufacture-Liquid orals, externals-bulk concentrates.

(d) Procurement of stores and testing of raw materials.

5. Nomenclature and uses of surgical instruments and Hospital Equipments and health accessories.

6. P.T.C (Pharmacy Therapeutic Committee), Hospital Formulary System and their organisation, functioning, composition.

7. Drug Information service and Drug Information Bulletin.

8. Surgical dressing like cotton, gauze, bandages and adhesive tapes including their pharmacopoeial tests for quality. Other hospital supply e.g I.V sets B.G sets, Ryals tubes, Catheters, Syringes etc.

9. Application of computer in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital and retail pharmacy establishments.

Part-II : Clinical Pharmacy.

1. Introduction to Clinical Pharmacy Practice-Definition, scope.

2. Modern dispensing aspects-Pharmacists and Patient counselling and advice for the use of common drugs, medication history.

3. Common daily terminology used in the Practice of Medicine.

4. Disease, manifestation and pathophysiology including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardiovascular diseases, Epilepsy, Diabetes, Peptic Ulcer, Hypertension.

5. Physiological parameters with their significance .

6. Drug Interactions:

(a) Definition and introduction.

(b) Mechanism of Drug Interaction.

(c) Drug-drug interaction with reference to analgesics, diuretics, cardiovascular drugs, Gastro-intestinal agents, Vitamins and Hypoglycemic agents.

(d) Drug-food interaction.

7. Adverse Drug Reactions.:

(a) Definition and Significance.

(b) Drug-induced diseases and Teratogenicity.

8. Drugs in Clinical Toxicity-Introduction, general treatment of poisoning, systematic antidotes. Treatment of insecticide poisoning, heavy metal poison, Narcotic drugs, Barbiturate, Organophosphours poisons.

9. Drug dependences, Drug abuse, addictive drugs and their treatment, complications.

10. Bioâ€“availability of drugs, including factors affecting it.

Books recommended (Latest editions)

1. Remington's Pharmaceutical Sciences.

2. Martindale The Extra Pharmacopoeia

DP256 HOSPITAL AND CLINICAL PHARMACY PRACTICAL (50 hours)

1. Preparation of transfusion fluids.
2. Testing of raw materials used in (1).
3. Evaluation of surgical dressings.
4. Sterilization of surgical instruments, glass ware and other hospital supplies.
5. Handling and use of data processing equipments.

SCHEME FOR B. ARCH.

B. ARCH.			Semester			I
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC-101	Principal of Architecture-I	2	0	0	2
2	ARC-102	History of Architecture – I	2	0	0	2
3	ARC-103	Architectural Psychology	2	0	0	2
4	CEA-101	Environmental Science and Ecology	2	0	0	2
5	CEA-102	Structures in Architecture – I	2	0	0	2
PRACTICAL						
1	ARC-154	Basic Design and Visual Arts – I	1	0	4	3
2	ARC-155	Architectural Drawing and Graphics – I	1	0	4	3
3	ARC-156	Building Material & Construction – I	1	0	4	3
4	ARC-157	Model Making Workshop – I	1	0	2	2
5	ARC-158	Computer Application in Architecture – I	1	0	2	2
6	PDP-101	Induction & Nurturing Hobbies	0	0	2	1
		TOTAL	**15**	**0**	**18**	**24**

B. ARCH.			Semester			II
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC-110	Principles of Architecture - II	2	0	0	2
2	ARC-111	History of Architecture – II	2	0	0	2
3	ARC-112	Building Materials and Processes - II	2	0	0	2
4	CEA-102	Structures in Architecture - I	2	0	0	2
PRACTICAL						
1	ARC-164	Basic Design and Visual Arts - II	1	0	4	3
2	ARC-165	Architectural Drawing and Graphics - II	1	0	4	3
3	ARC-166	Building Construction Technology - II	1	0	4	3
4	ARC-167	Model Making Workshop - II	1	0	2	2
5	ARC-168	Computer Application in Architecture - II	1	0	2	2
6	PDP-102	People Connect	0	0	2	1
		TOTAL	**13**	**0**	**18**	**22**

SCHEME FOR B. ARCH.

B. ARCH.			Semester			III
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC-201	History of Architecture-III	2	0	0	2
2	ARC-203	Building Sciences	2	0	0	2
3	ARC-204	Building Services-I	2	0	0	2
4	CEA-211	Structures in Architecture-III	2	0	0	2
PRACTICAL						
1	ARC-255	Architectural Design-I	2	0	6	5
2	ARC-256	Building Material & Construction III	1	0	4	3
3	ARC-257	Computer Applications in Architecture-III	1	0	2	2
4	CEA -260	Surveying	0	0	4	2
5	PDP-201	Personality Development & Grooming	0	0	2	1
		TOTAL	**12**	**0**	**18**	**21**

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SCHOOL OF ARCHITECTURE

B. ARCH.			Semester			IV
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC-210	History of Architecture – IV	0	0	4	2
2	ARC-214	Building Services – II	0	0	4	2
3	ARC-215	Estimation & Costing - I	0	0	2	1
4	ARC-216	Building Structure IV	0	0	2	1
PRACTICAL						
1	ARC-268	Computer Application in Architecture – IV	0	0	2	1
2	ARC-269	Architectural Graphics III	0	0	2	1
3	ARC-271	Architectural Design – IV	0	0	12	6
4	ARC-272	Building Construction –IV	0	0	6	3
5	ARC-280	Winter Internship – I				
6	PDP-202	Life Skills	0	0	2	1
		TOTAL	**0**	**0**	**36**	**18**

SCHEME FOR B. ARCH.

B. ARCH.			Semester			V
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC -306	Building Structures -V	0	0	2	1
2	ARC-303	Building Services-III	0	0	2	1
3	ARC -304	Estimation & Costing-II	0	0	2	1
4	ARC -305	Theory of Design	0	0	2	1
5	ARC-358	Architectural Design-V	0	0	18	9
6	ARC-359	Building Construction-V	0	0	6	3
7	ARC-357	Computer Application in Architecture-V	0	0	4	2
8	ARC 360	Summer Internship –III				
		TOTAL	**0**	**0**	**36**	**18**

B. ARCH.			Semester			VI
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC-314	Human Values	0	0	2	1
2	ARC-315	Building Economics	0	0	2	1
3	ARC-368	Computer Application in Architecture VI	0	0	4	2
4	ARC-369	Research/dissertation	0	0	2	1
5	ARC-370	Architectural Design-VI	0	0	20	10
6	ARC-371	Building Construction VI	0	0	4	2
7	ARC-372	Building Structures-VI	0	0	2	1
8	ARC-380	Winter Internship-II				1
		TOTAL	**0**	**0**	**36**	**18**

SCHEME FOR B. ARCH.

B. ARCH.			Semester			VII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC-406	Environmental Studies	0	0	2	1
2	ARC-407	Project Management	0	0	2	1
3	ARC-408	Product Design (Elective-1)	0	0	4	2
	ARC-409	Art Appreciation (Elective-1)	0	0	4	
4	ARC-410	Low Cost Architecture (Elective 2)	0	0	4	2
	ARC-411	Architectural Journalism(Elective 2)	0	0	4	
5	ARC-459	Resesarch /Dissertation	0	0	4	2
6	ARC-460	Architectural Design VII	0	0	16	8
7	ARC-461	Building Construction VII	0	0	4	2
		TOTAL	**0**	**0**	**44**	**18**

B. ARCH.			Semester			VIII
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC-480	Professional Office Training				22
		TOTAL				22

SCHEME FOR B. ARCH.

B. ARCH.			Semester			IX
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC-502	Professional Practice –I	0	0	4	2
2	ARC-503	Disaster Mitigation & Management (Elective 3)	0	0	4	2
	ARC-504	Sustainable Cities & Energy Complianvce (Elective 3)	0	0	4	
3	ARC-505	Transport Planning (Elective 4)	0	0	4	2
	ARC-506	Urban & Regional Planning (Elective 4)	0	0	4	
4	ARC-557	Architectural Design IX	0	0	24	12
		TOTAL	**0**	**0**	**44**	**18**

B. ARCH.			Semester			X
SN	Course Code	Course Name	Periods			Credits
			L	T	P	
1	ARC-515	Professional Practice –II	0	0	4	2
2	ARC-565	Thesis	0	0	44	22
		TOTAL			48	24

Program Outcomes (PO's)

PROGRAMME OUTCOMES are skill sets and attributes which all students will acquire during the program and will be competent in.

Architecture Graduates will be able to:

1. Architectural knowledge: Interpreted the knowledge of Design parameters, mathematical analysis, construction technology, architectural fundamentals and latest development in various field for the solution of complex architectural design problems.
2. Problem analysis: Identify, formulate, review research literature and analysis of complex architectural problems reaching substantiated conclusions using first principles of basic design, users comfort concerns, climate oriented solutions, and architectural services.
3. Design/development of solutions: Design solutions for complex architectural problems and design system components or processes that meet the specified user and environmental needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental issues.
4. Conduct investigations of complex problems: Integerate research-based knowledge and research methods including experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern analytical tools and simulation of complex architectural activities with an understanding of the limitations.
6. The architect and society: Evaluate contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional architectural practice.
7. Environment and sustainability: Elaborate the impact of the professional architectural solutions in societal and environmental contexts, demonstrate the knowledge and need for sustainable development.
8. Ethics: Integrate ethical principles and commitment to professional ethics, responsibilities and norms of the architectural practice.
9. Individual and team work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
10. Communication: Communicate effectively on complex architectural activities with the architectural and allied community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
11. Project management and finance: Synthesize knowledge and understanding of the architectural and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Life-long learning: Relate to the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of environmental, social, economic, and technological changes.

Syllabus

Semester-I

Course code	Subject Name	L	T	P	Credits
ARC-101	PRINCIPLES OF ARCHITECTURE - I	2	0	0	2

Course Objectives:

- To introduce the student to the world of architecture and establish the key elements involved in the creation of aesthetically appealing and practically appropriate architecture.
- The subject is designed to provide an insight into the principles and processes that underpin the discipline of architecture.
- It is aimed to teach students the key practical and theoretical influences that inform architectural practice enabling students to understand and analyse architecture.

UNIT-1: **[6]**

INTRODUCTION TO ARCHITECTURE: Description of architecture; architecture compared to visual and temporal arts; architecture and science and technology; Architecture and social science; the work of an architect compared to that of an artist, technologist and a designer/craftsman, scope of architecture; definition and concepts of architecture.

UNIT-2: **[4]**

ARCHITECTURE AS AN OCCUPATION: Types of architectural projects, career opportunities in the field of architecture, role, responsibilities and duties of an architect in a building project.

UNIT-3: **[10]**

ELEMENTS OF DESIGN –

FUNCTIONAL Study of functional, aesthetic and structural components of architecture: parameters of design; anthropometrics; human activity and the use of spaces; spaces – their relation, interaction and information in a structure.

AESTHETIC: Elements and principles of visual composition, forms; functions of spaces and their flexibility; natural forms and shapes and their relation in designing; problems related to the understanding of the elements of architectural design; concepts of space and form and their perception; ordering principles.

STRUCTURAL: Elements of structure; elements of construction and their thoughtful use to enhance designs;

UNIT-4: **[4]**

ANALYSIS OF BUILDINGS: Analysis of architectural buildings through literature reviews and case studies, based on the functional, aesthetic and structural parameters.

UNIT-5: **[4]**

DESIGN PROCESS: Integration of aesthetics and function; understanding of formative ideas, organization concepts, spatial characteristics; massing and circulation in design analysis

TEXT BOOKS/REFERENCE BOOKS:

1. Snyder, J and Catanese, A, "Introduction to Architecture", McGraw-Hill, 1979
2. Farrelly, Lorraine, "The Fundamentals of Architecture", Ava Publishing, 2007
3. Voordt and Wegen, "Architecture in Use", Architectural Press, 2005
4. Smithies, K.W., "Principles of Design in Architecture", Van Nostrand Reinhold Co, 1981
5. Roger H. Clark and Michael Pause, "Precedents in Architecture", Van Nostrand Reinhold Co, 1996

Course outcomes:	
1.	Awareness of basic aspects and expectations of the career as an architect , exact notes and data on role and responsibility
2.	Students know about the initial process of designing , understanding and application of ideas and calculation basics for a design
3.	Selection of various famous buildings with their specific data and complete study for better understanding of pre existing architectural marvels.

Course code	Course title	L	T	P	Credits
ARC-102	HISTORY OF ARCHITECTURE - I	2	0	0	2

Course Objectives:

- History of Architecture provides the connection, context, and roots central for the identity of who we were, who we are, and who we might be. Since architecture is a coherent chain of events, styles, tendencies, beliefs and techniques,
- Studying history of architecture enables the student to gain a direct understanding of how and why architecture is made today, and clues to how architecture can be tomorrow.

UNIT-1: **[4]**

INTRODUCTION TO ANCIENT WORLD ARCHITECTURE: Art and culture of pre-historic man; stone henge; a brief outline of the Neolithic revolution and its impact on built forms– brief study of a few ancient settlements – Jericho, Catal Huyuk, Hassuna, Koln-Lindenthal & Skara Brae.

UNIT-2: **[4]**

ART AND ARCHITECTURE OF EGYPT: Evolution of Egyptian architecture- factors affecting development; spatial planning and characteristic features; tombs- mastabas, pyramids; temples; sphinx, obelisks etc.

UNIT-3: **[4]**

ART AND ARCHITECTURE OF MESOPOTAMIA: Factors affecting the development of art and architecture of Mesopotamia; spatial planning and characteristic features of the architecture of Sumerian, Babylonian, Assyrian and Persian periods; Ziggurats etc

UNIT-4: **[6]**

ART AND ARCHITECTURE OF GREECE & ROME: Evolution of Greek architecture- factors affecting development; characteristic features of Aegean and Helladic architecture; Hellanic and Hellenistic periods; Greek classic orders; agora and other important public buildings/ spaces. Evolution of Roman architecture- factors affecting development; characteristic features Roman classic orders; forums; basilicas; coliseum and other important public buildings/ spaces.

UNIT-5: **[10]**

EARLY CHRISTIAN ARCHITECTURE , ROMANESQUE AND GOTHIC ARCHITECTURE: Factors affecting evolution and development of early Christian and Byzantine, characteristic features basilican church and centralized church typology Factors affecting evolution and development of Romanesque and Gothic architecture, characteristic features and typical examples, spatial planning,

construction and other features- rib and panel vaulting etc; church and the precinct, cathedrals, monastic establishments, parish churches; elements of special attributes .English and French church planning; secular architecture- manor houses, castles; town planning principles.

TEXT BOOKS/REFERENCE BOOKS:

1. Cruickshank, D., Fletcher, B., Saint A., "Banister Fletcher's - A History of Architecture", Architectural Press, 1996.
2. Risebero, Bill, " The Story of Western Architecture", MIT Press, 2001
3. Ching Francis D.K., Jarzombek, Mark M., Prakash, Vikramaditya, "A Global History of Architecture", Wiley, 2006.
4. Hiraskar, G.K., "The Great Ages of World Architecture (with Introduction to Landscape Architecture)", Dhanpat Rai Publications (P) Ltd, 2009

Course outcomes:	
1.	This central thought of the civilization has permeated the students in various related fields such as religion, arts, science, literature, social and economic setup, which in turn were instrumental to the evolution of architecture specific to the area
2.	Prehistoric age and Early Civilizations, attempts at sensitizing the students to view architecture as one of the many products of the civilization.

Course code	Course title	L	T	P	Credits
ARC-103	ARCHITECTURAL PSYCHOLOGY	2	0	0	2

Course Objectives:

- This course is aimed at helping the student understand the built environment by providing a look at architecture within the framework of human sciences:
- Human psychology and society influence and inform architecture and how in turn architecture affects our lives.
- Students develop critical observation skills and investigate buildings as manifestations of religious, social, and personal values.

UNIT-1: **[8]**

ENVIRONMENTAL PSYCHOLOGY &PERCEPTION: Relation to architecture and planning; meaning of environment; measurement of environmental stimuli from psychological aspect; behavioral effects of environmental conditions: physical - noise, temperature and air pollution; social- overcrowding and isolation; extra ordinary- catastrophe. spatial perception: perception of distance, size and movement; meaning of colour and form; depth perception; visual illusions in architecture; spatial thinking- social and cultural influences on environmental perception.

UNIT-2: **[6]**

TERRITORIAL BEHAVIOUR AND PERSONAL SPACE: Concept of personal space and territoriality, individual and situational as determinants of personal space; consequences of too much or too little of personal space; personal space and environmental space as implications for design aspects; adaptation to environment - behavioral aspects of adaptation to familiar and unfamiliar environment; spatial experience; living requirements and satisfaction, etc.

UNIT-3: **[6]**

ARCHITECTURAL PSYCHOLOGY & PSYCHOLOGICAL AESTHETICS: Psychological effects of various architectural means: line, form, space, textures, colour, light, scale etc; case studies. Measurement of communication through art and architecture; signs and symbols in architecture; determination of pleasantness and unpleasantness as psychological factors in environmental design.

UNIT-4: **[6]**

ENVIRONMENTAL SETTINGS: Nature and effects of home, work, educational or institutional (e.g. nursing home, hospital, prison, etc.) environments as they affect human health and cognitive functioning; restorative effects of natural environments

UNIT-5: **[2]**

LOCAL IDENTITY: Concept of local identity, globalization and identity, maintaining a distinct identity in a globalised world etc.

Course outcomes:	
1.	Detail study of spaces, behavior, environmental aspects etc
2.	Understanding of environmental settings and its impacts on human health, functioning and restorative effects.
3.	Theory and understanding on local identity , globalization in architectural terms.

TEXT BOOK: Parmar, V. S., "Design Fundamentals in Architecture", Somaiya Publications Pvt. Ltd., 1973.

REFERENCE BOOKS

1. Bell, P.A., Greene, T.C., Fisher, J.D., & Baum, A. "Environmental Psychology", 5th edition, Harcourt, Inc.: Fort Worth, TX, 2001.

2. Gallagher, W., "The Power of Place", Harper Perennial, New York, 1994.

3. Rapoport, Amos, "House Form and Culture", Prentice Hall, 1969.

4. Broadbent, Geoffrey. "Design in Architecture: Architecture and the Human Sciences", John Wiley and Sons, 1973.

Course code	Course title	L	T	P	Credits
CEA -101	ENVIRONMENTAL SCIENCE AND ECOLOGY	2	0	0	2

Course Objectives:

- Environmental Studies is a multidisciplinary area, the issues of which everyone should know.
- The aim of the course is to make everyone aware of environmental issues like continuing problems of pollution, loss of forest, solid waste disposal, and degradation of environment. Issues like economic productivity and national security, global warming, the depletion of ozone layer and loss of biodiversity are other serious concerns before mankind.

UNIT-1: **[6]**

ENVIRONMENTAL STUDIES & ECOSYSTEMS: Basic definitions related to environment; scope, vis-à-vis environmental science and environmental engineering; causes of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principles involved in environmental education, environmental awareness, environmental ethics, environmental organization and their involvement. Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids; characteristic features, structure and function of the following ecosystem - forest ecosystem, grassland ecosystem desert ecosystem and aquatic ecosystems.

UNIT-2: **[6]**

NATURAL RESOURCES: Renewable and non-renewable resources; forest resources, over-exploitation, and deforestation / afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non-renewable energy sources, solar energy, wind energy, hydro energy, biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification

UNIT-3: **[4]**

BIODIVERSITY AND ITS CONSERVATION: Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT-4: **[6]**

ENVIRONMENTAL POLLUTION& SOCIAL ISSUES: Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, solid waste management, e-waste management; disaster management – floods, earthquake, cyclone and landslides. Water conservation, rain water harvesting, watershed management; climate change, global warming, acid rain, ozone layer depletion; Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act.

UNIT-5: **[6]**

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, population explosion – family welfare programmes ; role of information technology in environment and human health; case studies, Chipko movement, Saradar Sarovar dam, mining and quarrying in Udaipur, salinity and water logging in Punjab, Haryana and Rajasthan, Bhopal gas tragedy, Chernobyl nuclear disaster, arsenic pollution in ground water

TEXT BOOKS/REFERENCE BOOKS:

1. Agarwal, K. C., "Environmental Biology", Nidi Publ. Ltd., 2001
2. Brunner R. C., "Hazardous Waste Incineration", McGraw Hill, 1989.
3. Cunningham, W.P., Cooper, T.H. Gorhani, E. and Hepworth, M.T., "Environmental Encyclopedia", Jaico Publ. House, 2001.
4. Kaushik, Anubha, and Kaushik, C.P., "Perspectives in Environmental Studies", New Age International Publishers, 2004

Course outcomes:	
1.	Modern Science of Climatology in the context of climate and weather as determinants of Design and Form of Habitat and Landscape throughout the ages at the Macro and Micro levels.
2.	Students have knowledge and application to building design as per the environment.
3.	Detail knowledge on environmental pollution types, causes and various measures to prevent them.

Course code	Course title	L	T	P	Credits
CEA-102	STRUCTURES IN ARCHITECTURE - I	2	0	0	2

Course Objectives:

- To introduce the basic concept of structures and enable the students to analyse, understand the fundamentals and working of various parts of different structural systems

UNIT-1: **[8]**

ELEMENTS OF STATICS: Law of Parallelogram of Forces, Resolution of Forces, Law of Triangular of forces, Polygon of forces, Theorem of Resolved parts, Resultant of a Number of Concurrent Coplanar forces, Moment of a Force.

UNIT-2: **[8]**

SIMPLE STRESSES AND STRAINS: Elasticity, Stress, Strain, Types of Stresses, Elastic Limit, Hooke's Law, Modulus of Elasticity, Stresses in Composite Bars, Primary or Linear Strain, Poisson's ratio, Shear Stress, Principal stresses and strains

UNIT-3: **[4]**

SHEAR FORCE AND BENDING MOMENT: Beams, Shear Force and Bending Moment, Moment of Resistance, SF and BM diagrams for simple cases

UNIT-4: **[4]**

CENTER OF GRAVITY AND MOMENT OF INERTIA: Definitions, Methods of Finding CoG of Simple Figures, Center of Parallel Forces, Important Theorems, Section Modulus, Calculation of MI by first Principal and its application, MI of composite sections

UNIT-5: **[4]**

TYPES OF LOADS: Concepts and definitions of dead load, imposed load, seismic load, wind load and snow load as per IS 875-1987 (Part I-V) and IS 1893-2002

TEXT BOOKS/REFERENCE BOOKS:

1. Engineering Mechanics and Strength of Materials; R.K. Bansal
2. Strength of Materials; R.S. Khurmi
3. Applied Mechanics and Strength of Materials; R.S. Khurmi
4. Civil Engineering Handbook; P.N. Khanna

Course outcomes:	
1.	This course is to provide the students with basic concept of mathematical principles, leading to primarily an easy understanding of various topics under "STRUCTURE
2.	The course also provides basic clues to mathematical models and research techniques in the field of architecture.

Course code	Course title	L	T	P	Credits
ARC-154	BASIC DESIGN & VISUAL ARTS - I	1	0	4	3

Course Objectives:

- The course Basic design is aimed at imparting a good base in design through thoughtful designing of simple two dimensional and three dimensional compositions. Also, the Visual Arts component intends to acquaint the students with various drawing principles and artistic techniques; how to sketch and draw at all stages of the design process.

COURSE CONTENT:- **[70]**

PART-I: BASIC DESIGN

1. To study the elements of visual composition.
2. To study the principles of visual composition.
3. To study the Ordering principles.
4. To study the colour wheel, colour schemes and its application on architectural forms and spaces; principles of harmony and contrast and degree of chromatism.
5. To study textures and textures schemes.
6. To study and demonstrate the application of basic design in architecture: Adopt compositions, murals and sculptures for semi recreational and semi functional architectural spaces.

PART-II: VISUAL ARTS

1. To study the basic elements of free hand sketching.
2. To learn the various sketching techniques and mediums in pencil and ink.
3. To learn how to build a sketch - composing a view, establishing structure, scale, layering tonal values, adding details; achieving spatial depth in drawings; sighting techniques.
4. Free hand Sketching of furniture pieces, parts of building in relation with human scale and proportions.
5. Free hand Sketching of architectural elements and landscapes.

TEXT BOOKS/REFERENCE BOOKS:

1.Ching, Francis D. K., "Architecture: Form, Space, and Order", Wiley and Sons, 2007.

2.Wallschlaeger, C and Snyder, S.B., "Basic Visual Concepts and Principles for Artists, Architects and Designers", McGraw Hill, 1992.

3.Laseau, P, "Graphic Thinking For Architects and Designers", John Wiley and Sons, 2001

4.Ching, Francis D. K., "Drawing: A Creative Process", Wiley and Sons,1989

5.Farrelly Lorraine, "Basic Architecture 01: Representational Techniques", Ava Publishing, 2008.

6.Evans, Ray, "Drawing and Painting Architecture", Van Nostrand Reinhold Company, 1983.

Course outcomes:	
1.	The most initial stage of designing this exercise teach compositions, colors contrast and various design elements and other fundamentals of designing.
2.	Application of design principles in two dimensional and three dimensional compositions.

Course code	Course title	L	T	P	Credits
ARC-155	ARCHITECTURAL DRAWING & GRAPHICS - I	1	0	4	3

Course Objectives:

- Architectural drawing and graphics is the primary medium for development and communicating design concepts.
- The students are trained to develop imaginative and three dimensional spatial capabilities and acquire the skill of reading plans, sections and elevations and understanding the the drawing conventions and symbols used in them

COURSE CONTENT:- **[70]**

1. To understand and learn about the various drafting tools required in architectural drafting - pencils, grades of graphite leads, technical pens etc.
2. To study the various drafting techniques, line quality etc.
3. To learn about the drafting procedure and exercises on architectural letterings.
4. To construct architectural scales and apply them to real object and drawings (Plain scale, diagonal scale, comparative scales).
5. To introduce the principles of orthographic projections and prepare drawings on orthographic projection of simple regular two dimension shapes.
6. To prepare drawings on orthographic projection of complex solids, hollow object and sections.
7. To study the principles and techniques of axonometric, oblique and isometric views and construct three dimensional views of basic and complex geometrical shapes.
8. To study the interpenetration of solids.
9. To study the development of surfaces.
10. To study the sections of solids.

TEXT BOOKS/REFERENCE BOOKS:

1. Bhatt, N.D., "Engineering Drawing: Plane and Solid Geometry", Charotar Publishing House,
2. Leslie, Martin C., "Architectural Graphics", Macmillan Pub Co, 1970.
3. Parkinson, A.C., "A First Year Engg. Drawing", Sir Issac Pitman and Sons.
4. Black, Earl D., "Engineering and Technical Drawing", Van Nostrand Reinhold Co., 1972.
5. Ching, Francis D. K., "Architectural Graphics", Van Nostrand Reinhold, 2003.

Course outcomes:	
1.	Students shall be familiarized with a range of techniques of expression beginning with manual drawing

Course code	Course title	L	T	P	Credits
ARC-156	BUILDING MATERIAL & CONSTRUCTION -I	1	0	4	3

Course Objectives:
➢ To give an introduction to building elements and expose the student to the process of building construction

COURSE CONTENT:- **[70]**

1. To introduce the various terminologies used in brick masonry works.
2. To study and prepare drawings of bonds in brick masonry; bonds in columns, corners and junctions, jointing and pointing; buttresses; sills; jambs; corbels; copings;
3. To study and prepare drawings of cavity walls and reinforced brickwork.
4. To study the various tools used in brick masonry works
5. To study the defects in brick masonry: cracking in brick walls etc; supervising brick masonry works.
6. To study and prepare drawings on various stone masonry works: Rubble masonry, Ashlar masonry etc.
7. To study the type of walling and joints, dressing of stone surfaces; coping; supervising stone masonry works.
8. To study various types of composite masonry.
9. To demonstrate various quality test of bricks, stones and timber.
10. To study and prepare drawings on simple foundation for masonry load bearing walls and piers.

11. **CLAY AND CLAY MATERIALS:** Bricks, terracotta, tiles etc; Bricks: types of bricks; study of properties of constituent components, manufacturing process, quality test of bricks.
12. **RURAL AND TRADITIONAL MATERIALS (Mud & Stone):** Mud: mud as a building material; soil stabilization: need for soil stabilization, stabilized soil blocks; rural materials: bamboo, casuarina, coconut, palm, hay, coir – properties and uses;
13. **Types of stones**; study of properties of constituent components; methods of quarrying of stones; properties and uses of principal building stones.
14. **LIME, CEMENT AND CEMENT PRODUCTS:** Lime: uses and properties; preparation of lime mortar; functions and requirements of a good mortar; mix properties for various works; **Concrete**: study of properties of constituent components, manufacturing process, quality tests of cement, lime, sand, aggregates, concrete and mortar.

TEXT BOOKS/REFERENCE BOOKS:

1.Rangwala, S. C., "Engineering Materials (Material Science)", Charotar Publishing House, 2007.

2.Rangwala, S. C., "Building Construction", Charotar Publishing House, 2007

3.McKay, W.B., "Building Construction Volume I, II, III and IV", Longmans, 1955

4.Ching, Francis D. K. and Adams, Cassandra, "Building Construction Illustrated", Wiley and Sons,

5.Barry, R**,** "The Construction of Buildings", the English Language Book Society and Crosby Lockwood, 1976

6.Chudley, Roy, "Construction Technology", Longman, 2005

Course outcomes:	
1.	Students explore the process of building construction, the components of buildings and the materials, skill and equipment used in shaping them.
2.	Introduction to building construction. Walls, brick works and joints and composite masonry are covered

Course code	Course title	L	T	P	Credits
ARC-157	MODEL MAKING WORKSHOP - I	1	0	2	2

Course Objectives:
➢ Modeling allows an architect to explore an idea in a three dimensional form, allowing communication of the idea in an accessible way.

COURSE CONTENT:- **[42]**

1. To introduce the carpentry tools, processes, joints and wood working machines.
2. To prepare simple three dimensional objects like cubes pyramids etc.
3. To create complex three dimensional forms for models using carpentry methods.
4. To demonstrate the use of carpentry tools in making joints such as dovetail joint, mortise and tenon joint, lap joint, butt joint etc to be used for making furniture.
5. To demonstrate fixing of plywood, blockboards, commercial boards etc.
6. To study the application of plywood, blockboards, commercial boards etc. in furniture.
7. To introduce the various welding equipments, processes and its applications.
8. To introduce to metallic sections, joinery tools, joinery processes and working with them.
9. To prepare joints (Lap and butt) by metal arc welding.
10. To learn and use various painting methods-brush, spray, hot spray etc.

TEXT BOOKS/REFERENCE BOOKS:

1. Raghuwanshi, B.S., "A Course in Workshop Technology - Vol. I and II", Dhanpat Rai and Co, 2001.
2. Hazra and Chaudhary, "Workshop Technology - Vol. I and II", Asian Book Comp, 1998.

Course outcomes:	
1.	Along with introduction to carpentry tools, fixing, and preparation of joints in detail and understanding.

Course code	Course title	L	T	P	Credits
ARC-158	COMPUTER APPLICATIONS IN ARCHITECTURE - I	1	0	2	2

Course Objectives:
➢ This course will enable the students to understand the basics of computer and to know the basics of MSOffice, enabling the student prepare simple and interactive presentations using computers.

COURSE CONTENT:- **[42]**

1. To introduce and study about the basics of computer hardware and software components; computer terminology.
2. To introduce and study about windows and its applications.
3. To learn the concepts of Internet, server types, connectivity; applications of internet- using e-mail, browsing etc.
4. To understand the concepts of e-commerce.
5. To study in detail Microsoft Word; To Create a document with all formatting effects.
6. Exercises on document preparation using MS Word
7. Create a document with tables, labels in MS word and to create a document to send mails using mail merge option.
8. To learn about the concept of spreadsheet/ worksheets, charts, formulas, functions etc using MS Excel.
9. To Create an Excel File to analyze the student‟s performance. Create a chart for the above data to depict it diagrammatically.
10. Create Excel sheet to use built-in-function.
11. To prepare slide shows and presentations using MS PowerPoint;

12. To create architectural presentations using computers: communicating information, presentation sequence, symbols, lettering and presentation formats etc.
13. To Create a Power Point presentation with varying animation effects with timer.

TEXT BOOKS/REFERENCE BOOKS:

1. Wallace, Wang, "Office 2010 for Dummies", Wiley, 2010
2. Rajaraman, V., "Fundamentals of Computer", Prentice Hall, 2004
3. Icon, Alexis and Leon, Mathew, "Internet for Everyone" Leon Techworld, 1997
4. Press, Barry and Press, Marcia, "Teach Yourself all about Computers", IDG Books India, 20
5. Mansfield, R., "The Compact Guide to Microsoft Office", BPB Publishers,1994

Course outcomes:	
1.	Introduction to basic software and hardware, and detail understanding of Microsoft power point presentations

SEMESTER II

Course code	Course title	L	T	P	Credits
ARC-110	PRINCIPLES OF ARCHITECTURE-II	2	0	0	2

Course Objectives:

- To introduce the student to the world of architecture and establish the key elements involved in the creation of aesthetically appealing and practically appropriate architecture.
- The subject is designed to provide an insight into the principles and processes that underpin the discipline of architecture.
- It is aimed to teach students the key practical and theoretical influences that inform architectural practice enabling students to understand and analyze architecture.

UNIT-1: **[6]**

FACTORS INFLUENCING ARCHITECTURE: Climate, topography, materials, economics, socio-cultural and technological influences etc

UNIT-2: **[4]**

ARCHITECTS & THEIR THEORIES ON ARCHITECTURE THROUGH THE AGES: Brief introduction to the styles propagated by architects from antiquity to modernism. Philosophy of architecture as propagated by some leading architects; study of selected writings and buildings.

UNIT-3: **[6]**

ARCHITECTURE CRITICISM: Introduction and need for architecture criticism in the academy of architects; criticism in day - to - day transaction, architecture criticism a societal perspective; types and characteristics, crux of normative criticism, interpretive criticism, description criticism, peer criticism.

UNIT-4: **[4]**

VERNACULAR AND RURAL ARCHITECTURE: Introduction to vernacular and rural architecture and its characteristics; rural environment and its architectural considerations; study of exemplary cases.

UNIT-5: **[8]**

CASE STUDIES & ANALYSIS OF BUILDINGS: Case studies of some old and new classical architectural projects from India and aboard with special focus on the above mentioned points. Analysis of architectural projects of various scales and types based on the above mentioned points.

TEXT BOOKS/REFERENCE BOOKS:

1. Snyder,J and Catanese, A, “Introduction to Architecture”, McGraw-Hill, 1979

2. Farrelly, Lorraine, “The Fundamentals of Architecture”, Ava Publishing, 2007

3. Voordt and Wegen, “Architecture in Use”, Architectural Press, 2005

4. Smithies, K.W., “Principles of Design in Architecture”, Van Nostrand Reinhold Co, 1981

5. Roger H. Clark and Michael Pause, “Precedents in Architecture”, Van Nostrand Reinhold Co, 1996

6. Pevsner Nikolaus, "Canons of Criticism", Penguin, Harmonds worth, 1971

Course outcomes:	
1.	This principal of architecture curriculum along with introduction to factors influencing will provide detail on vernacular, rural, and lastly a case study which covers the related issues.

Course code	Course title	L	T	P	Credits
ARC-111	HISTORY OF ARCHITECTURE-II	2	0	0	2

Course Objectives:

- History of Architecture provides the connection, context, and roots central for the identity of who we were, who we are, and who we might be. Since architecture is a coherent chain of events, styles, tendencies, beliefs and techniques,
- Studying history of architecture enables the student to gain a direct understanding of how and why architecture is made today, and clues to how architecture can be tomorrow.

UNIT-1: **[4]**

ANCIENT ARCHITECTURE: Early Indian architecture up to 3rd century A.D; Indus valley civilization; study of Mohenjodaro and Harrapan architecture and planning; Vedic architecture of India; Vastu purush mandala and other canons of Hindu architecture.

UNIT-2: **[8]**

INDIAN TEMPLE ARCHITECTURE & INDO-ARYAN TEMPLE ARCHITECTURE: Temples: spatial arrangements, construction, ornamentation; elements of special attributes: columns, shikharas; temple complex etc Characteristic features and typical examples of Indo-Aryan temple architecture- temples of Orissa, Kashmir, M.P, Gujarat.

UNIT-3: **[6]**

CENTRAL HINDU TEMPLE ARCHITECTURE & DRAVIDIAN ARCHITECTURE: Early chalukyan architecture, the Rashtrakuta style and the Hoysala architecture – salient features and typical examples. Characteristic features and typical examples of Pallava, Pandava, Chola, Vijayanagar and Madura styles.

UNIT-4: **[6]**

BUDDHIST ARCHITECTURE IN INDIA: Development and characteristic features; stupas; Buddhist order- Ashoka pillars; Chaityas; rock cut architecture; Viharas etc.

UNIT-5: **[4]**

JAIN ARCHITECTURE IN INDIA: Development and characteristic features; Jain temple architecture etc.

TEXT BOOKS/REFERENCE BOOKS:

1. Grover, S. K., "Buddhist and Hindu Architecture in India", CBS, 2008.
2. Thapar, B., "Introduction to Indian Architecture", Periplus Editions, 2005.
3. Surendra S.,Indian Architecture:Hindu, Buddhist and Jain"Ajanta Offset and Packaging Ltd.,
4. Maheshwari and Garg, "Ancient Indian Architecture", CBS, 2003.

Course outcomes:	
1.	Ancient architecture, focusing on Indian architecture it covers in depth of Hindu, Buddhist and jain architecture
2.	The emphasis of the discussions is on the nature and essence of the architectural product, related as far as possible to history of the process of their conceptualization, and process of construction. Use of the concepts of Style/ Typology/Morphology in histories of architecture

Course code	Course title	L	T	P	Credits
ARC-112	SOCIOLOGY IN ARCHITECTURE	2	0	0	2

Course Objectives:

- To examines how architectural forms both influence and react to socio-cultural phenomena.
- To inform architecture students in all phases of the design process, including the pre-design and programming, design, construction, and post-construction phases.

UNIT-1: **[4]**

INTRODUCTION TO SOCIOLOGY: Man and his social and physical environment; social groups and social structure; utility and relation with architecture;

UNIT-2: **[6]**

CULTURE ,SOCIETY & INDIAN COMMUNITIES: Meaning of culture and society, influence of socio-cultural patterns on architecture, case studies. Rural and urban communities; their social structures and problems; cultural heritage; rituals and community gathering etc.

UNIT-3: **[8]**

URBANIZATION & COMPARISON OF URBANIZATION: Trend and characteristics; dynamics of urban growth and social change; urban attitude, value and behavior; patterns of urbanization in India; migration studies; problems arising out of urbanization etc. Comparison of urbanization in underdeveloped countries with that in the west – salient features and characteristics

UNIT-4: **[4]**

SOCIAL ASPECT OF PHYSICAL ENVIRONMENT: Its implications and limitations in buildings; neighborhood planning; slum improvements and city fabric.

UNIT-5: **[4]**

COMMUNITY PARTICIPATION: Significance of public opinion and participation

Note: Assignments would be in the form of case studies comprising the sociological study of communities with their habitat and built environment

TEXT BOOK

Madan, G. R., “Indian Social Problems: Vol - 1 and 2”, Allied Publishers Pvt Ltd, 2003.

REFERENCE BOOKS

1. Rapoport, Amos, “House Form and Culture”, Prentice Hall, 1969
2. Broadbent, Geoffrey. “Design in Architecture: Architecture and the Human Sciences”, John Wiley and Sons, 1973
3. Prakasa Rao, VLS, “Urbanisation in India”, Concept Publishing Company, New Delhi, 1983.

4. Desai A.R., "Rural Sociology", Popular Prakashan, Bombay, 1984.
5. Smelsa, "Sociology", Prentice Hall, New Jersey, 1981.

Course outcomes:	
1.	Students familiarize with basic concepts/ theories of sociology/ psychology as relevant to architecture.
2.	Develop a language and vocabulary for discussions/ analysis on the sociological/ psychologicaldimensions of architecture

Course code	Course title	L	T	P	Credits
CEA-103	STRUCTURES IN ARCHITECTURE - II	2	0	0	2

Course Objectives:

- To introduce the basic concept of structures and enable the students to analyze, understand the fundamentals and working of various parts of different structural systems

UNIT-1: **[4]**

BENDING STRESSES IN BEAM: Introduction, Theory of Simple bending, assumptions in the theory, illustrative examples.

UNIT-2: **[4]**

DEFLECTION OF BEAMS: Deflection in simply supported beams and cantilever beams; double integration method and area moment method, illustrative examples.

UNIT-3: **[6]**

ANALYSIS OF STRESS: Introduction, principal stresses and principal planes, maximum shear stress, circular diagram for stresses, Mohr's circle, illustrative examples.

UNIT-4: **[8]**

SHEAR FORCE AND BENDING MOMENT: Types of supports, relationship between bending moment, shear force and load; shear force and bending moment diagrams in case of simply supported beams and cantilevers with distributed and point loads; simply supported beams with overhangs, moments applied to cantilevers and beams, illustrative examples.

UNIT-5: **[6]**

COLUMNS: Introduction, modes of failure, elastic instability, Euler's theory, End conditions and effective length, radius of gyration, slenderness ratio, strut and column, long column under eccentric loading, , illustrative examples.

TEXT BOOKS/REFERENCE BOOKS:

1. Khurmi, R.S., "Theory of Structures", S. Chand and Company, New Delhi, 2005
2. Khurmi, R.S. "Strength of Materials", S. Chand and Company, New Delhi, 2010
3. Punmia, B.C., "Strength of Materials and Mechanics of Structure", Standard Publishers and Distributors, 1971

Course outcomes:	
1.	Students have a feel for structural principles as they relate to a building design
2.	Enable to make an informed choice regarding the most appropriate structural system for the building
3.	Develop a reasonable understanding of its operational and economic implications.

Course code	Course title	L	T	P	Credits
ARC-164	BASIC DESIGN AND VISUAL ARTS - II	1	0	4	3

Course Objectives:

- The course Basic design is aimed at imparting a good base in design through thoughtful designing of simple two dimensional and three dimensional compositions.
- Visual Arts component intends to acquaint the students with various drawing principles and artistic techniques; how to sketch and draw at all stages of the design process

COURSE CONTENT:- **[70]**

PART-I: BASIC DESIGN

1. To study various linear forms for outdoor and indoor architectural spaces.
2. To study planer forms and explore the adoptability of these sculptures to architectural functions.
3. To Study solids and voids: creation of abstract and semi abstract symbolic sculptural forms and spaces.
4. To study the Transformation of forms - dimensional transformation, subtractive, additive forms, organization of additive forms.
5. To study the Articulation of forms- analytical study of the sculptural building forms and its critical appraisal of visual character.
6. To study architectural spaces: Elements defining spaces; factors affecting qualities of architectural spaces; spatial relationships and spatial organizations; movement through space.
7. To study and demonstrate the application of basic design in architecture: Adopt compositions, murals and sculptures for semi recreational and semi functional architectural spaces.

SUGGESTED STUDIO EXCERCISES:

Integration of construction and building material

Gate design, Bus stop, Kiosk, Mother dairy, Guard room, ATM room, Exhibition stalls, Milk booths.

PART-II: VISUAL ARTS

1. To study the effects and techniques of creating tonal values – hatching, cross hatching, scribbling, stippling; visual texture and grain.
2. To study the interaction of light with objects and surfaces; shade and shadows; modeling form.
3. To demonstrate the use of tonal values in architectural drawings.

4. To understand the application of free hand sketching in the design process: conceptual sketches, analytical sketches, observational sketches, contour drawings; parti diagrams; serial views; travel sketching; diagramming.
5. To study the importance of context in architectural drawings: importance of context in views and drawings; elements of context – drawing human figures; furniture and furnishings; vehicles; landscape elements.

TEXT BOOKS/REFERENCE BOOKS:

1. Ching, Francis D. K., "Architecture: Form, Space, and Order", Wiley and Sons, 2007.
2. Wallschlaeger, C and Snyder, S.B., "Basic Visual Concepts and Principles for Artists, Architects and Designers", McGraw Hill, 1992.
3. Laseau, P, "Graphic Thinking For Architects and Designers", John Wiley and Sons, 2001
4. Ching, Francis D. K., "Drawing: A Creative Process", Wiley and Sons,1989
5. Farrelly Lorraine,"Basic Architecture 01:Representational Techniques",Ava Publishing,
6. Ching, Francis D. K., "Architectural Graphics", Van Nostrand Reinhold, 2003

Course outcomes:	
1.	Students develop analytical and critical skills for looking at art and architecture.
2.	Students know the fundamental principles of architecture and architectural design,
3.	Understanding of Ideas, Concept, Form, Function and Meaning with respect to architecture

Course code	Course title	L	T	P	Credits
ARC-165	ARCHITECTURAL DRAWING & GRAPHICS -II	1	0	4	3

Course Objectives:

- Architectural drawing and graphics is the primary medium for development and communicating design concepts.
- Through this course the students are trained to develop imaginative and three dimensional spatial capabilities and acquire the skill of reading plans, sections and elevations .
- Understanding the drawing conventions and symbols used in them.

COURSE CONTENT:- **[70]**

1. To study the basic terms, principles, types and techniques of geometrical perspective drawing; linear perspectives: one, two and three point perspective.
2. To prepare perspective by measuring point method, angular and parallel perspective.
3. To prepare drawings on the presentation of interior and exterior views in one point perspective and section perspectives.
4. To prepare drawings using two point perspectives for simple objects, inclined planes, cylindrical objects, arches and other circular forms etc.
5. To introduce the basic principles of sciography and its application to the field of architecture.
6. To prepare drawings demonstrating sciography of two dimensional objects in plan and elevation.
7. To prepare drawings demonstrating sciography of three dimensional objects in plan, elevation and views (Isometric and perspective).
8. To study the various graphics codes and symbols used in architectural drawings: graphic conventions for scale, orientation, materials, line thicknesses and line types, symbols representing doors and windows, staircases, centerlines, property lines etc.
9. To study the different types of plans used in architectural drawings: site plan, location plan, floor plans, roof/ terrace plan, reflected ceiling plan; sections - design and construction; elevations.
10. To introduce the various types of architectural drawings – feasibility study drawings; conceptual drawings; presentation drawings; working drawings; specialized drawings.

TEXT BOOKS/REFERENCE BOOKS:

1. Gill, Robert W., "Basic Perspective", Thames and Hudson, 1974
2. Malik, Shankar, "Perspective and Sciography", Allied Publishers, 1994
3. Leslie, Martin C., "Architectural Graphics", Macmillan Pub Co, 1970
4. Ching, Francis D. K., "Architectural Graphics", Van Nostrand Reinhold, 2003

Course outcomes:	
1.	Students can learn the Graphic representation of concepts and design principles of two dimensional and three dimensional composition.
2.	Learning principles of development of lateral surfaces of solids, applying them to work out and drawing developed surfaces of simple geometric solids

Course code	Course title	L	T	P	Credits
ARC-166	BUILDING MATERIAL & CONSTRUCTION - II	1	0	4	3

Course Objectives:

- To give an introduction to building elements and expose the student to the process of building construction.

COURSE CONTENT:- **[70]**

1. To study and prepare drawings on various types of joinery used in carpentry.
2. To study various types of wooden doors: ledged, braced and battened, paneled, glazed, flush, sliding doors, revolving; doors with and without fanlight etc;
3. To study various types of wooden windows: fixed, side and top hung, casement, pivoted, louvered, bay, dormer, ventilators and fanlights etc.
4. To study and prepare drawings of the various types of metal (pressed steel and z-section) doors and windows.
5. To study methods of mosquito proofing of doors and windows.
6. To study and prepare drawings of the various fixtures and fastenings commonly used in doors and windows.
7. To introduce the various terminology of arches.
8. To prepare drawings on the various type of arches.
9. To study the procedure of centering of arches.
10. To study and prepare drawings on the types of lintels and sunshades.
11. **TIMBER:** Study of properties of timber, uses, seasoning process, quality tests; types of timber and defects in timber; protection from termites; techniques of preserving and finishing of timber; plywood, particle boards, block boards, PVC, laminates etc.
12. **GLASS:** Types of glass (plate, tinted, heat absorbing etc; structural glass bricks and glass crete; fiber glass and glass wool etc; properties, varieties and uses.

Note: Sessional will be in the form of reports, drawings and models. There shall be regular visits to construction sites.

TEXT BOOKS/REFERENCE BOOKS:

1. McKay, W.B., "Building Construction Volume I, II, III and IV", Longmans, 1955
2. Ching, Francis D. K. and Adams, Cassandra, "Building Construction Illustrated", Wiley and Sons, 2000

3. Barry, R, "The Construction of Buildings", The English Language Book Society and Crosby Lockwood, 1976
4. Chudley, Roy, "Construction Technology", Longman, 2005
5. Arora, S.P. and Bindra, S.P., "The Text book of Building Construction", Dhanpat Rai Publications, 2009.

Course outcomes:	
1.	Awareness about the role of Wood in Building Industry.
2.	Know about different typology of Doors , Windows and their fixing Details

Course code	Course title	L	T	P	Credits
ARC-167	MODEL MAKING WORKSHOP - II	1	0	2	2

Course Objectives:
➢ Modeling allows an architect to explore an idea in a three dimensional form, allowing communication of the idea in an accessible way.

COURSE CONTENT:- **[42]**

1. To introduce the various materials used in architectural model making.
2. To introduce the various techniques of model making.
3. To model with paper, card board, mount board, thermocol, styrofoam, softwood, acrylic sheets and wire.
4. To study the development of simple and composite form, experiments on three dimensional forms such as cubes, pyramids, tetrahedron and forms to understand the spaces conceived by them.
5. To create organic forms by using clay, plaster of paris, metal scrap, jute fiber etc. for study of forms.
6. To study about murals.
7. To introduce and make various types of architectural models – concept models; development models etc.
8. To introduce the concept of illuminated models.
9. To work on sectional models.
10. To study and make presentation models using various materials etc.

Note: Students are required to prepare block models of groups of buildings including roads and landscaped open spaces and detailed models of buildings from given set of drawings.

TEXT BOOKS/REFERENCE BOOKS:

1. Morris, M., "Architecture and the Miniature: Models", John Wiley and Sons, 2000

2. Sutherland, Martha, " Model Making: A Basic Guide", W.W. Norton and Co, 1999

3. Mills, Criss B., "Designing with Models : A Studio Guide to Making and Using Architectural Models", Thomson and Wadsworth, 2000

Course outcomes:	
1.	Basic skills for preparing architectural models and art project while in calculating value for good craftsmanship.

Course code	Course title	L	T	P	Credits
ARC-168	COMPUTER APPLICATION IN ARCHITECTURE- II	1	0	2	2

Course Objectives:

- The objective of introducing this course is to promote computer knowledge and applications in architecture.
- This course will familiarize the students to the concepts CAD and will enable them to present Computer Aided Architectural Drawings in both 2D & 3D.

COURSE CONTENT:- **[42]**

1. To introduce to the basics of CAD and the fundamentals of 2D drafting.

2. To introduce different 2D object drawing methods, editing objects and modifying their associated properties.

3. Exercises on text annotation and dimensioning, defining text and dimension styles.

4. To learn about the concept of blocks and object grouping; styles and organizing objects in layers.

5. To create and customize hatch patterns; introduction to symbol libraries.

6. To study drawing unit association, scaling, associating limits

7. To introduce the different View management techniques, Concept of UCS and Icon management

8. To introduce the concept of model space and organize drawings in custom layouts.

9. Exercises on the use of templates.

10. To learn about the database concepts, attributes and scripts, concepts of OLE

11. To learn about importing/ exporting files to and from CAD.

12. To learn printing and plotting using CAD.

13. To introduce Auto LISP.

14. To introduce the different types of 3D modeling techniques- Solid creation; Editing; Creating complex solids; Boolean operations on solids.

15. Exercises on shading – Rendering, Material mapping, Environment attributes

TEXT BOOKS/REFERENCE BOOKS:

1. Kyles, Shannon R., "AutoCAD Workbook for Architects and Engineers", Wiley-Blackwell, 2008.

2. Saka, Tuna, "AutoCAD for architecture", Prentice Hall, 2002

Course outcomes:	
1.	Basic drawing and editing commands for 2D drawings, application of Auto CAD commands.
2.	Advanced 3D drawings using Auto CAD, Use of layers and blocks exercise on simple working drawings

SEMESTER-III

Course code	Course title	L	T	P	Credits
ARC-201	HISTORY OF ARCHITECTURE III	2	0	0	2

Course Objectives:

- History of Architecture provides the connection, context, and roots central for the identity of who we were, who we are, and who we might be.
- Since architecture is a coherent chain of events, styles, tendencies, beliefs and techniques, studying history of architecture enables the student to gain a direct understanding of how and why architecture is made today, and clues to how architecture can be tomorrow.
- To introduce architectural vocabulary and provide an understanding of various architectural styles and their salient features.

UNIT-1: **[6]**

INDO-ISLAMIC ARCHITECTURE:

Introduction to Islamic culture in India, salient features of Islam, Islamic culture compared to other religions - Muslim invasion of India; socio-political influence;Building types: mosques, tombs; architectural character: spatial arrangements, structural system, constructional features, surface ornamentations, fenestration details; elements of special attributes: arch, dome etc.

UNIT-2: **[6]**

ISLAMIC ARCHITECTURE – IMPERIAL STYLE, PROVINCIAL STYLES & MUGHAL ARCHITECTURE:

Influences on Islamic Architecture - evolution of the Islamic Arch, salient features of an Indian mosque; development of the Imperial style by the kings of the Slave dynasty and the provincial styles in different regions – typical examples and characteristic features.

Development of the Mughal style under the different rulers - Babur, Humayun, Akbar, Jahangir, Shahjahan, Aurangazeb; typical examples and salient features.

UNIT-3: **[6]**

ARCHITECTURE IN COLONIAL INDIA:

Styles and trends of architecture brought by Britishers to India and their evolution; characteristics of British colonial architecture; monumental buildings of the colonial period; architectural character of Indo-Saracenic and classical revival; Later colonial period: Contribution of Edwin Lutyens & Herbert Baker to the layout and architecture of New Delhi.

UNIT-4: **[4]**

THE TREND IN INDIAN ARCHITECTURE AFTER 1970:

Principles and works of Balakrishna Doshi, Charles Correa, Anant Raje, Raj Rewal and Laurie Baker with suitable examples.

UNIT-5: **[6]**

RENAISSANCE & POST RENAISSANCE ARCHITECTURE:

Birth of Renaissance and its impact on architectural style revivalism and synthesis of classical features; Churches, Palazzo, villa: spatial planning, construction and other architectural features; town planning principles; French and British Renaissance; High Renaissance and Mannerism.

Baroque architecture; works of Brunelleschi, Alberti, Bramante, Michelangelo, Palladio & Bernini, Inigo Jones; Arts and crafts and Art Nouveau movements and their impact on architecture; principles and works of Horta, Guimard, Macintosh and Antonio Gaudi.

Note: An educational tour/ study tour to the places of architectural interest / building appraisal shall be organized as per the programme. The documentation shall be done in the form of photographs / slides and sketches presented in form of a seminar and written report immediately after the tour / building appraisal.

TEXT BOOKS/REFERENCE BOOKS:

1. Brown, Percy, "Indian Architecture (Islamic period)", DB Taraporevala Sons & Co, Mumbai, 1983.
2. Hambly, Gavin, “Cities Of Mughal India”, Ubs Publisher's Distributors, 1968

3.Grover,S, “The Architecture of India (Islamic)”, Vikas Publishing House Pvt. Ltd., New Delhi, 1981.

4.Michell, G. “Architecture of the Islamic World (its history and social meaning)”, Thames and Hudson, London, 1978.

5.Hillenbrand, Robert, “Islamic Architecture, Form, Function and Meaning”, Edinburgh University Press,

6. Nath, R., “History of Mughal Architecture”, Abhinav Publicaitons, New Delhi, 1985

Course outcomes:	
1.	Students will also know about the design variables, construction techniques materials and craftsmanship used in the historical buildings of this great country.
2.	The students will develop the ability to sketch plans, sections, elevations and other architectural details of heritage buildings in India.

Course code	Course title	L	T	P	Credits
ARC-204	BUILDING SERVICE- I (Water supply & Drainage System)	2	0	0	2

Course Objectives:
➢ It is imperative that architects and all those who are concerned with the construction of buildings have a knowledge and appreciation of the subject.

UNIT-1: **[6]**

WATER SUPPLY AT CITY AND BUILDING LEVEL: Demand of water for various purposes as per BIS standards, per capita demand , DETECTION OF leakage and wastage of water and its preventive measures; sources and method of water supply - BRIEF OF catchment areas, reservoirs, and their location; system of water supply-Continuous, intermittent, their advantages and disadvantages; water purification systems, control systems, supply for a neighborhood and town. Tapping of water; storage and distribution of water in premises; boosting water, gravity and pressure distribution by storage tanks of individual buildings; service connections, types and sizes of pipes, piping network, materials, joinery, water supply fixture and installations, installation of network both open and concealed; water supply for multi storied buildings.

UNIT-2: **[4]**

HOT WATER SUPPLY: Direct and indirect systems of hot water supply, their components and equipment's used for the same; insulation of piping work and safety devices; solar heating.

UNIT-3: **[6]**

SITE DRAINAGE AND SANITATION SYSTEMS: Site planning from drainage point of view; storm water drains, details of construction OF DRAINS, water entrances, gully Trapes, open drains, gradients, rainfall maintenance; storm water and roof drainage systems and their installations; underground drainage systems with application of ventilation, self cleansing velocity, laying of drains to required gradients and testing of drains. Study of sanitary fittings with reference to use, materials and functions; traps and their uses, classification of traps as per use and shape; pipes and piping systems, various types of vent and anti-siphonage systems, jointing and installations; disposal of sewage within the premises using septic tanks, inspection chambers, effluent treatment plants, their function and layouts; sewage and sewage treatment plants; connection of house sewers to municipal sewers, ventilation of sewers;

UNIT-4: **[6]**

SOLID WASTE DISPOSAL: Collection, treatment and disposal of organic and inorganic waste, urban solid waste treatment systems, traditional methods, garbage chutes, sanitary landfills, vermicomposting, incineration, pyrolysis-advantages and limitations etc; garbage disposal in multi –storied buildings, dry and wet treatment; treatment of industrial refuse; refuse and pollution problems

UNIT-5: **[6]**

DESIGNING PLUMBING AND SANITARY LAYOUTS: Designing of toilet blocks in residential buildings, showing both Indian and European W.Cs and in public buildings; preparation of working drawings showing complete details of fittings and plumbing required for water supply and drainage; with all required calculations.

Note: Assignments can be in form of compiling required information from site visits, market surveys and other sources.

TEXT BOOKS/REFERENCE BOOKS:

- Rangwala, S.C., "Water Supply and Sanitary Engineering", Charotar publishing house.
- Shah, Charanjit, "Water Supply and Sanitary Engineering", Galgotia publishers.
- Wise, A.F.E., &Swaffield, J.A., "Water Sanitary Services for Buildings", Longman Scientific and Technical, Harlow, 1995.
- Greeno, Roger, "Building Services Technology and Design", Longman Scientific and Technical, Harlow, 1997.
- Chatterjee, A.K., "Water Supply and Sanitary Engineering", Khanna publishers, New Delhi, 1986.
- "Hand Book on Water Supply and Drainage (with special emphasis on plumbing)", Bureau of Indian standards, New Delhi .

Course outcomes:	
1.	Knowledge of environmental support systems as they apply to human habitat, with special reference
2.	Students have thorough understanding on water supply and waste water management, in residential unit, small campus, commercial buildings.
3.	Students are aware of best practices for Solid waste management

Course code	Course title	L	T	P	Credits
ARC-203	BUILDING SCIENCES	2	0	0	2

Course Objectives:

- Architecture and climate have always been linked in a pattern of mutual influence. In its role as a provider of shelter, architecture intentionally modifies the climate of an immediate area – and traditionally, its design has been shaped by the stresses and opportunities inherent in the regional climate.

UNIT-1: **[4]**

CLIMATE &THERMAL COMFORT: Introduction to climate as a factor of human shelter, comfort and environment; its classification as global, macro and micro climate; elements of climate; thermal balance of the human body, thermal comfort indices: effective temperature, CET, comfort zone & calculation of overheated & under heated periods

UNIT-2: **[6]**

PRINCIPLES OF THERMAL DESIGN IN BUILDINGS: Thermal quantities: heat flow rate, conductivity (k–value) & resistivity, conductance through a multi-layered body, surface conductance, transmittance: calculation of U- value**,** convection , radiation , concept of sol-air temperature & solar gain factor; exercises in heat loss & heat gain in building assuming steady state assumption (thermal balance equation); periodic heat flow in building: time lag & decrement factor & its application in selection of appropriate materials for walls & roof; effect of insulation & cavity on time lag & its practical use

UNIT-3: **[6]**

VENTILATION & DAYLIGHTING: Functions of ventilation stack effect due to the thermal forces, wind velocity: wind rose diagram, wind pressure; air movement through building and around buildings; factors affecting indoor air flow, wind shadow etc.; The nature of light**,** its transmission, reflection, coloured light, the munsell system; photometric quantities, illumination, day lighting prediction, the daylight design graph

UNIT-4: **[6]**

SOLAR GEOMETRY & USE OF SOLAR ENERGY: Study of solar control with references to solar charts, sun path diagrams; methods of calculating and designing of shading devices; introduction to concepts of solar energy utilization in heating water such as Flat Plate collectors; introduction to use of solar energy in lighting in buildings such as Photovoltaic cells; solar passive strategies-Principals of natural light and natural ventilation.

UNIT-5: **[6]**

DESIGN FOR CLIMATIC TYPES& GREEN BUILDING CONCEPTS: Study of analysis of climatic zones in India along with data analysis; design strategies for Indian climate zones - building design & lay out planning consideration; study of climatic zones along with traditional dwelling units; study measurement and analysis of micro climatic elements and its use for a Designer; Introduction to the concepts of green buildings and energy conscious architecture; introduction to ECBC rules, Energy audit and Green buildings rating eg. TERI Griha, LEED etc.

NOTE: Assignments can be in the form of:

1. Exercises on achieving the required indoor temperature by varying the components of composite materials according to the U values.

2. Exercises on design of small buildings for various climates

TEXT BOOKS/REFERENCE BOOKS:

1.Koenigsberger & Ingersol, "Manual of Tropical Housing and Building: Climatic Design", Universities Press,

2.Evans, M., "Housing, Climate and Comfort", Architectural Press, 1980

3.Arvind Krishan et al, "Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings", Tata McGraw Hill, 1999.

4.Givoni, B., "Man, Climate and Architecture", Elsevier Publishing Company Limited, 1969.

5.Watson & Labs, "Climatic Design", Mcgraw Hill, NewYork, 1983.

Course code	Course title	L	T	P	Credits
CEA-211	STRUCTURES IN ARCHITECTURE III	2	0	0	2

Course Objectives:

- To introduce the basic concept of steel structures and enable the students to analyze, understand the fundamentals and working of various parts of these structural systems.

UNIT-1: **[6]**

MODULE 1: STEEL STRUCTURES: Types of steel structures, Framed and Shell structures, Properties of Indian standard rolled steel section; useof IS 800 and steel tables; permissible stresses in tension, compression and shear.

UNIT-2: **[4]**

MODULE 2: CONNECTIONS: Welded and riveted connections–types of failure; design ofwelded and riveted connections for members subjected to axial forces

UNIT-3: **[6]**

MODULE 3: TENSION AND COMPRESSION MEMBERS: Steel structures –Tension and compression members; design of single angle and double angle sections in tension; design of compression members; slenderness ratio; design of simple and compound sections; design of lacings and battens.

UNIT-4: **[6]**

MODULE 4: BEAMS: Principal Stresses, allowable stresses, General specifications, Designof laterally supported beams.

UNIT-5: **[6]**

MODULE 5: STEEL ROOF TRUSSES: Types of roof trusses–Selection of trussesaccording to the span; estimation of gravity loads and wind loads; use of BIS and book SP-38 in analyzing and design of trusses, gusseted plate connections.

TEXT BOOKS/REFERENCE BOOKS:

1.Ramachandra .S, "Design of Steel Structures Vol. I", Standard publication, New Delhi, 1992
2.Arya .A.S and Ajamani .J.L, "Design of Steel Strctures", Nem Chand and Bros, Roorkee, 1999
3.Design of Steel Structures by S.Ramamruthan
4.Vazirani .V.N, and Ratwani .M.M, "Steel structures", Khanna Publications, New Delhi, 1995
5.Duggal, "Design of Steel structures", Tata McGraw Hill Company, New Delhi, 2000
6.Dayaratnam .P, "Design of Steel Structures", Wheelers Publishing Company Co. Ltd, 1990
7."Handbook of Typified Designs for Structures with steel roof trusses, SP 38 1987", BIS, New Delhi,1987

Course outcomes:	
1.	Development of the basic understanding of the forces & its effects in simple building structural systems in Steel
2.	Knowledge about the structural behaviour of various roof configurations & built form is also gathered.

Course code	Course title	L	T	P	Credits
ARC-255	ARCHITECTURAL DESIGN- I	2	0	6	5

Course Objectives:
➢ To introduce the students to the various approaches to design process and to impart understanding of a range of design parameters related to site conditions, social aspects, user groups along with functional and aesthetic aspects

COURSE CONTENT:- **[112]**

IMPORTANCE OF LITERATURE AND CASE STUDIES IN THE DESIGN PROCESS:

Study of a given space through elementary measured drawings, sketching and photography. At least one project to study, analyze and compare private residential typologies and/or a small building of public use with respect to the spaces, their inter-relation, scale, ambience, technology and material for construction etc. e.g. Havelis, apartments, bungalows, row houses etc Synthesis of observations of case studies in design of an architectural form with a specific function

CLIMATE RESPONSIVE ARCHITECTURE

Design of a simple building for public activity incorporating elements of thermal comfort, ventilation, day lighting and design for various climatic types e.g. moderate, hot & humid, cold & hot climate considering the social and physical environment and methods of construction like timber construction emerging out of the traditional way of life of the people of the given place. This introduction to other role players in the architectural processes i.e. the client and the user. E.g. Architect House, Resort, Post Office, Bank etc.

Course outcomes:	
1.	The students will endeavour to acquire an understanding of the determinants of the built form such as social imperatives, environmental concern and craft of building.
2.	The student develops the ability to successfully design independent residential buildings in urban areas with concepts that respond to personal preference & taste, family lifestyle, culture & site conditions.
3.	Derivation of concepts and strategies will then lead to deliberate responses in the shape of a specific design proposal with the help of organizational and communicative skills.

Course code	Course title	L	T	P	Credits
ARC-256	BUILDING MATERIAL & CONSTRUCTION -III	1	0	4	3

Course Objectives:

- To give an introduction to building elements and expose the student to the process of building construction

COURSE CONTENT:- **[70]**

1. To introduce the various terminology of staircases.
2. To study and prepare drawings of various types of timber staircases- single, double (Dog legged and open well) and Triple flight stairways in stone and timber.
3. To design handrail and balusters using different materials and study the various methods of fixing them.
4. To prepare drawings on details of joints in timber staircases.
5. To prepare drawings on the different types of timber floors- Single, double and framed floors with joints between joist with wall plate.
6. To prepare drawings on the different types of timber floors- Single, double and framed floors with joist with beam and sub beam with main beam.
7. To study strutting of joists.
8. To study various terminologies and prepare drawings on the classifications of timber roofs.
9. Study of timber trusses: King post and queen post trusses with details of joints.
10. To prepare drawings on Built-up and Composite roof truss.
11. Study of different sheet roof covering material viz. asbestos cement, galvanised iron, aluminium, asphaltic, fibreglass reinforced plastic, polycarbonate and other, along with fixing details.
12. To prepare drawings on the detail of eaves projection with soft boarding and alternative detail of gutter at eaves etc.
13. To study the different types of partitions and their properties.
14. To prepare drawings on Joinery details and constructional techniques involved in timber partitions, single and double skinned partitions, partially glazed partitions.
15. **MATERIALS FOR FLOORING AND ROOFING :** Different flooring & paving materials and types that are cast-in-situ viz. Mud flooring, Brick flooring, Indian Patent Stone finish, Terrazzo flooring, red oxide flooring etc. and readymade tiles available in market viz. natural stone tiles / slabs, plain & mosaic cement tiles / blocks, ceramic tiles, vitrified tiles and other modern materials, including the process of providing or laying the flooring or pavement; floor finishes of various materials viz. carpet, linoleum, rubber, PVC etc. : Roofing of Mangalore tile, pan tiles, slate, corrugated asbestos sheet etc.
16. **DAMP PROOFING, WATER PROOFING AND MISCELLANEOUS:** Hot applied and cold applied; emulsified asphalt, bentonite clay, butyl rubber, silicones, vinyls, epoxy resins and metallic water proofing materials, their properties and uses; water proofing membranes such as rag, asbestos, glass felt, plastic and synthetic rubber- vinyl, butyl rubber, neoprene, polyvinyl chilnide; prefabricated membranes sheet lead, asphalt their properties and uses. Anti termite treatment to

foundations, masonry and wood work; sound insulating materials- gypsum; recent advances in building materials.

Note: Sessionals will be in the form of reports, drawings and models. There shall be regular visits to construction sites.

TEXT BOOKS/REFERENCE BOOKS:

1. Rangwala, S. C., "Building Construction", Charotar Publishing House, 2007
2. McKay, W.B., "Building Construction Volume I, II, III and IV", Longmans, 1955
3. Ching, Francis D. K. and Adams, Cassandra, "Building Construction Illustrated", Wiley and Sons, 2000
4. Barry, R**,** "The Construction of Buildings", The English Language Book Society and Crosby Lockwood, 1976
5. Chudley, Roy, "Construction Technology", Longman, 2005

Course outcomes:	
1.	Students will examine the critical role of materials and methods for the design and construction of buildings
2.	Students will get exposed to rural and traditional materials and their construction techniques.
3.	They learn to represent the different building components, Staircases, damp proofing & water proofing in various applications through relevant drawings.

Course code	Course title	L	T	P	Credits
ARC-257	COMPUTER APPLICATIONS IN ARCHITECTURE -III	1	0	2	2

Course Objectives:

- Communicating design concepts and project status to clients, regulators, and colleagues can be challenging.
- This course will enable the students to understand the basics of Photoshop, the professional image-editing standard
- Permitting the student groundbreaking new creative options to realize their vision and an unprecedented level of customization to streamline their workflow.

COURSE CONTENT:- **[42]**

1.To study the basics of Adobe Photoshop; Selection, Slice, Painting tools
2. To scan an image into Photoshop CS3; check the scan quality and resolution; crop the image to final size and orientation.
3. To adjust the brightness, contrast and tonal range of the image; sharpen the overall focus of the image etc
4. To learn working with Layers and use layers to create a logo or collage for a PowerPoint presentation.
5. Exercises on Basic and Advanced Retouching: - Color manipulations, - levels, curves, patch tool, cropping, special color effects: black and white, sepia, grainy
6. Exercises on designing simple Web Pages by using Slice Tool.
7. Exercises involving the designing of Logos by using Texts and Paints professionally.
8. To transfer CAD drawings into Photoshop while preserving graphic scale.
9. To enhance drawings using patterns, strokes, color overlays, fill layers, inner and drop shadows, clipping groups, adjustment layers etc
10. Exercises on rendering plans, elevation and sections using Photoshop
11. To render elements from 3ds Max as layers in Photoshop and learn how to create realistic auto-blending color-matched skies, greenery, trees etc
12. Exercises on rendering 3D views using Photoshop.
13. Presentation techniques for portfolio, design sheets etc using Photoshop

TEXT BOOKS/REFERENCE BOOKS:

1. Galer, M. & Andrews, P., "Photoshop CS3 Essential Skills", Elsevier, 2007
2. Sondermann, H., "Photoshop in Architectural Graphics", Springer, 2009
3. Alten, "Adobe Photoshop CS3: Classroom in a Book", Peachpit Press, 2007

Course outcomes:	
1.	Exposure to CAD and Photoshop will help students to produce their operation and critical parameters.
2.	Presentations for large gatherings, corporate clients-using CAD drawings, pictures, 3D images, text etc

Course code	Course title	L	T	P	Credits
CEA-260	SURVEYING	0	0	4	2

Course Objectives:
➢ This course intends to make the student familiar with locating the object positions in horizontal and vertical plane with desired accuracy as needed for architectural profession and to prepare and interpret survey drawings.

COURSE CONTENT:- **[56]**

1. Standardization of pace length; to estimate horizontal distance by pacing; study of metric chain and long distance measurement by a chain.
2. Exercises on direct and indirect ranging.
3. Chain survey of given area
4. Study of prismatic and surveyor's compass
5. Chain and compass surveying
6. To carry out fly leveling for establishment of a benchmark.
7. To carry out profile leveling for a proposed road and its cross section.
8. To carry out contour survey by square method.
9. To study plane table and its accessories and carry out plane table survey by radiation, intersection and by transversing methods.
10. To solve two and three point problems.
11. To find out Tacheometric constants of Dumpy level/ Theodolite.
12. To find out horizontal and vertical angle by Theodolite.
13. To carry out transversing by Theodolite
14. To practice Transiting, elongation of line, taking bearing and marking north direction on ground.

TEXT BOOKS/REFERENCE BOOKS:

1. Basak, "Surveying and Levelling", Tata McGraw-Hill, 2004
2. Rangwala, "Surveying and Levelling", Charotar Publishing House Pvt. Ltd., 2005
3. Punmia et al, "Surveying - Volume 1 & 2", Firewall Media, 2005

Course outcomes:	
1.	Knowledge of interpretation and preparation of contour maps
2.	Site modeling with total station. Exercises in setting out of building works

SEMESTER-IV

Module 16 ARMO 2006		**M16: Vernacular**
Contacts Hours		**50 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-271	Architectural Design-IV	15
ARC-210	History of Architecture-IV	10
ARC-214	Building Services-III	40

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Analyze concepts of vernacular architecture in different regions of India	K4 in Cognitive domain	Rubric/Viva
2	Apply basic principles of acoustics in built environment	K3 in Cognitive domain	Rubric/Viva
3	Display professional commitment to ethical practice on every day basis	A5 in Affective domain	Rubric/Viva
4	Make scale models of various styles of vernacular architecture in groups	P5 in psychomotor domain	Rubric/Viva
5	Illustrate basic application of vernacular architecture in contemporary scenario	K3 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1. Building services/acoustics as prerequisite
2. Human Values and professional ethics
3. Vernacular architecture in India-Sheets models and analysis

Project: Analysis of Vernacular Architecture of a Unique Climatic Zone in India

ARC-271 Architectural Design-IV

Elements of Vernacular Architecture- locality, context, water, light ventilation, wind, temperature, availability of material, skills and construction techniques. Study and analysis of vernacular architecture of various regions and climatic zones in India on the basis of given parameters.
Study of vernacular architecture, emerging out of the traditional way of life of the people in a given climatic context and region . Understanding how the social and physical environment, climate of the place, materials and methods of construction impact vernacular architecture.
Works of laurie baker etc.

ARC-210 History of Architecture-IV

History of Indian Vernacular Architecture – Documentaries etc.

ARC-214 Building Services III

Architectural Acoustic

Introduction to the study of acoustics – nature of sound, basic terminology – frequency, pitch, tone, sound pressure, sound intensity, decibel scale, loudness, threshold of audibility and pain, masking, sound and distance – inverse square law. Behavior of sound in enclosed spaces. Absorption of sound, sound absorption coefficient, reverberation, reverberation time calculation, use of Sabine's and Eyring's formulae, sound absorbents, porous materials, panel or membrane absorbers and cavity or Holmboltz resonators, role of functional absorbers. Absorption coefficients of indigenous acoustical materials, use of IS code 2526-1963.

Material- Internal finishing and details.

Books: Aishwarya Tipnis, Vernacular Traditions: contemporary architecture, The Energy and Resources Institute (TERI), 01-Jan-2012

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 17 ARMO 2007		**M17: Steel**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-271	Architectural Design-IV	10
ARC-272	Building Construction-IV	20
ARC-216	Building Structures-IV	35
ARC-268	Computer Application in Architecture-IV	25

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Analyze structural design of steel buildings	K4 in Cognitive domain	Rubric/Viva
2	Apply basic concepts of steel as a construction material	K3 in Cognitive domain	Rubric/Viva
3	Design an abstract (conceptual) form using steel as a building material	K6 in Cognitive domain	Rubric/Viva
4	Illustrate steel construction details	K3 in Cognitive domain	Rubric/Viva
5	Make a scale 3 dimensional model with steel	P5 in psychomotor domain	Rubric/Viva

COURSE OBJECTIVES

1.Create an Abstract form using steel as a material – innovative 3D form
2. All the construction details to be designed in steel –cladding, foundation, anchor, counterweights
3. Apply a function to the abstract form in human scale
4. Result in terms of model with humans and constructing details in steel, INSDAG brief

Project: Steel Abstract form(Library, Auditorium)

Sheets / Drawing in one of the methods below
Deliverables- Design based and Report on Pre- fabrication/ Pre- casting theories.

ARC-271 Architectural Design-IV
Design in Steel, Case studies of steel buildings, IS Codes of steel construction

ARC-272 Building Construction-IV

Unit 1: Structural Steel Works
Typical metal joinery - Mechanical (riveted & bolted), Soldering and Brazing and welding.
Detailing of structural steel work – Beam to Column joint, Beam to Beam joint, Column Splice, Column Base, Roof Truss to Column joint. IS codes for steel members

Unit 2: Doors & Windows (Metals)
Mild steel L and Z section Pressed steel section. Steel windows, their types, various sections and elements used in construction / fabrication. Relevant IS Codes for steel doors & windows.

Unit 3: Shutters(OperationalMechanisms)
Complete understanding of operational mechanism (automatic and manual) of variety of Rolling shutters and Collapsible shutters.

Unit 4-Industrial Construction
Structural Steel Works: Portal Frame Construction, north-light truss and lattice girder roof with various roof coverings.

ARC-216 Building Structures-IV

Introduction of Steel structures. Types and grades of steels and types of steel members. Introduction of IS Code: 800. Steel structure components and joints. Safety measures for steel elements. How the structural assembly of steel structures differs for other structures. Applications of bolts, welds, steel plates

ARC-268 Computer Application in Architecture-III
Unit I- Mastering in Revit Architecture
Introduction, Modifying the view, Common tasks, System options, File locations, Spelling options, Settings,

Unit-2 Building the Model and Modify
Walls, Doors, Windows, Components, Architectural columns, Roofs, Ceilings, Floors, Openings, Model text, Model lines, Compound structure, Sloped surfaces, Stairs, Ramps, Railings, Adding and modify curtain wall. Attaching wall to roof, Modifying the entry deck, Modifying the roofs.

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 18 ARMO 2008		**M18: Decoding Patterns**
Contacts Hours		**216 (6 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-271	Architectural Design-IV	35
ARC-272	Building Construction-IV	40
ARC-216	Building Structures-IV	65
ARC-210	History of Architecture-IV	45
ARC-269	Architectural Graphics-III	100

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Analyze patterns in built form and nature	K4 in Cognitive domain	Rubric/Viva
2	Illustrate architectural history from Vedic to Dravidian period	K3 in Cognitive domain	Rubric/Viva
3	Organize and plan a study trip	A4 in Affective domain	Rubric/Viva
4	Create an art installation based on patterns (art thesis)	K6 in Cognitive domain	Rubric/Viva
5	Illustrate construction details related to non-ferrous metals, GRC , UPVC, Plastics rubbers and asbestos	K3 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1. Understanding patterns from city core to a room
2. Relation of space and form in different scales
3. Art thesis- report on the process of deriving the art form, inspiration, creativity, installation process etc. 2D patterns and explanation, study of architectural pattern, deriving a 3D pattern, 3D Art Installation
4. Study Tour on Climate responsive architecture

Project: Art Thesis/Mural
Issue/context based design study (deep dive studios)

ARC-271 Architectural Design-IV
Study of Hierarchy
In interiors, in building, in street in neighborhood. FiLVre ground, site analysis, site inventory.Study of the built environment and to develop a basic understanding of spaceandform.Looking at the immediate built environment and understanding its fundamentalcomponents and their impact on the surroundings. Analysis of Architects work and deciphering pattern in their work
Drawing techniques and methods.
Deep dive studios
Systems approach/ scientific approach to introduce significance of theoretical and philosophical dimensions in architecture.
• Objective knowledge vs. Subjective Ideas,
• Distinction of & relationship between Science and Philosophy
• Rational process and Empirical process
• Rules, Formulas, Principles and Theories.
• Accuracy vs. Indeterminacy in Design
• Analytic approach vs. Mimetic approach
• Old Architectural treatises in Europe and India

Study tour
City Core
ARC-272 Building Construction-IV
Building materials- Rubber, GRC, Ferro-cement, UPVC, Non-Ferrous Metals, Plastics, Asbestos, water proofing materials

ARC-210 History of Architecture-IV

Unit-I: Indus Valley Civilization and Vedic Period
Characteristic features of town planning and architecture of Indus Valley Civilization; City of Harappa, Mohanjodaro and Lothal, layout of domestic units & public facilities, building materials and construction technologies used.
The Vedic civilization; Layouts of Aryan Village, type of dwellings and building materials.
Unit-II: Jain & Buddhist Architecture
Evolution of Jain & Buddhist Architecture; Development by Ashoka, Hinayan & Mahayan styles of Buddhist architecture, Stupas, Monolithic Pillars, Rock cut architecture (Chaityas & Viharas), Monestries, Rock edicts, Gandhar style.
Unit-III: Evolution of Temple Architecture
Beginning of Hindu Temple Architecture under the LVptas and Chalukyas.
Architectural features of buildings/temples, construction technology, building materials of Chalukyan style; Early Chalukyan Architecture, Later Chalukyan Architecture. Evolution at Badami, Aihole and Pattadakal, examples such as Ladh Khan, Durga, MaleLVti, Papanath Temple.
Unit-IV: Developments in Temple Architecture
Architectural features of buildings/temples, construction technology, building materials of Indo Aryan Style; Orissa Style – Kalinga Style, Khajuraho Style, LVjrat & Rajasthan Style.
Dravidian Style; Pallava Style, Chola Style, Pandya Style, Vijayanagar Style.
Late Pandya Style or Madura Style.

ARC-269 Architectural Graphics-III

Unit 1 History of Indian Art Lectures on outline History of Indian Art, from earliest times to Mauryan Period. LVpta Period to Mughal Period, Company Style (British Period).

Renaissance in Indian art i.e. 19th century, Post-independence art of India. Contemporary arts and artist in India, Works of Abanindra Nath Tagore, Nand Lal Bose, Jamini Roy, Amrita Sher Gill, M.F. Hussain, Satish LVjral and S.H.Raza

Unit 2
Design of various objects. Designing of gate, grill, railing, jaali, in suitable materials.

ARC-216 Building Structures-IV

Principals of Steel Structure Design
Members under combined stresses: Beams and Columns

Book: Timeless way of Building and Pattern lanLVage by Christopher Alexander

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 19 ARMO 2009		**M19: Climate Responsive Architecture**
Contacts Hours		**216 (6 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-271	Architectural Design-IV	40
ARC-272	Building Construction-IV	35
ARC-210	History of Architecture-IV	45
ARC-214	Building Services-II	60

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Internalize energy conscious concepts in built environments	A5 in Affective domain	Rubric/Viva
2	Design of hostel building based on principles of sustainability	K6 in Cognitive domain	Rubric/Viva
3	Create working drawings of a hostel building	K6 in Cognitive domain	Rubric/Viva
4	Construct and simulate a scale model of hostel building	P5 in psychomotor domain	Rubric/Viva
5	Illustrate Indian architectural history from Islamic to Colonial period	K3 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1. To produce a set of working drawing and GFCs of project
2. Indian History of Islamic Architecture
3. Trip report
4. Climatology
5. Environmental Lab

Project: working drawing and GFCs of Hostel Building

ARC-271 Architectural Design-IV

Design of climate responsive hostel building, using passive cooling techniques and strategies taught during the module.

ARC-272 Building Construction-IV

Unit-I: Expansion Joints

Introduction to expansion joints, need and their types, design criteria as per IS codes, construction details at foundation, walls, floor and roof level. Study of materials used in their construction, filling and finishing.

Unit-III: Building Chemicals

Anti-termite treatment to foundation, masonry walls and wood work (pre-construction) water proofing and weather proofing materials like chemical admixtures and surface applications, sealants for water, smoke and fire proofing. Pest & rodent control treatment.

Unit-III: Interior Materials & Details

Types & Details of Internal Partition & False Ceiling systems.

Design and detailing of wardrobes, modular kitchens, cabinet shelves and show cases for residence, offices, book stores and commercial buildings, work stations using materials like plywood, PVC, marble, granite, cement, fiber board, gypsum products, particle board, wood wool, straw and any other materials introduced in the market.

ARC-210 History of Architecture-IV

Unit-I: Introduction to Islamic Architecture
Introduction and understanding of "Islam's" philosophy and its interpretation in building types – Mosque, Tomb, Fort and their elements like dome, arches, minarets etc. Typical Layout of Mosque, its features and related nomenclature. Islamic Architecture Worldwide – Persia, Turkish, Arabian and their typical features

Unit-II: The Imperial Style
With reference to the Slave, Khalji, Tughlaq, Sayyid & Lodi Dynasties. Explanation withexamples of the buildings, construction technology, building materials used, evolution of form anddevelopment with significant changes over the time period.

Unit-III: The Provincial Style
Architecture at Punjab & Bengal, LVjrat, Bijapur, Jaunpur, Malwa and Deccan. Explain withexamples of the buildings, construction technology, building materials used, evolution of form anddevelopment with significant changes over the time period.

Unit-IV: Mughal Architecture
Concepts of city planning of various Islamic towns like Shahajahanabad and Fhatehpur Sikri. The Architecture developed under the rein of Babur, Humanyu, Akbar, Shahajan Period and later Mughal period and its implication on Indian traditional architecture.Explain with examples of the buildings, construction technology, building materials used,evolution of form and development with significant changes over the time period.

Unit V: Colonial Architecture
Colonial architecture and its amalgamation into India Architecture.

ARC-214 Building Services II

Unit 1 Electrical Illumination Introduction –
Terminology and unit. Light and its characteristics – scattering, propagation, transmission, reflection, absorption, refraction and dispersion of light. Electromagnetic spectrum and visible radiation.

Illumination –
Types of illumination schemes e.g. Ambient, Task, Focal and Decorative etc. lighting.
Design considerations for illumination Schemes. Methods for lighting calculation – Watts per square meter, Light flux and Point to point method.

Sources of light (Electrical) –
Familiarization and understanding of electrical sources of light e.g. Thermal radiators - Incandescent, Halogen. Discharge lamps – Low pressure (fluorescent, compact fluorescent, sodium, cold cathode neon), High pressure (mercury, metal halide, sodium). New technologies - LED, Fiberoptics.

Luminaries –
Types of Luminaries – Indirect, Semi-indirect, General diffusing, Semi-direct and Direct.

APPLICATION
Electrical Drawing The understanding of electrical needs for individual spaces e.g. Living room, Dining room, Bed room, Kitchen, Toilet, Staircases, and Corridors etc.

The electrical layout drawing for a residence.

Field / Market

Surveys

Familiarization to types of electrical luminaries available in market, manufactured by various brands e.g. Recessed mounted luminaries, Spot / Projectors, Surface mounted luminaries, Decorative luminaries, Pendant luminaries, Free-floor-standing luminaries, Up lights, Trunking lighting systems, Down Lights.

Module 20 ARMO 2010		**M20: Facade**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-268	Computer Application in Architecture-IV	75
ARC-272	Building Construction-IV	05
ARC-215	Estimation and Costing-I	100

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Relate outer surface of buildings with its structure for performance improvement	K6 in Cognitive domain	Rubric/Viva
2	Create a building façade	K6 in Cognitive domain	Rubric/Viva
3	Analyze Glass as Building material	K4 in Cognitive domain	Rubric/Viva
4	Appraise manufacturing and processing of glass through industrial visit	K5 in Cognitive domain	Rubric/Viva
5	Justify the role of facade system in built environment	A3 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

1.

Project: Building skin section design

Lectures from Glass academy/ MOOC to be incorporated.

ARC-272 Building Construction-IV

Unit-I: Glass & Glazing

Introduction to Glass as building material, history of glass, manufacturing and properties of various types of glass like plate, tinted, decorative, reinforced, laminated glass block, fiber glass, glass murals, partially coloured glass, etching of glass and its applications in building industry for both exteriors and interiors.
Glass fabrication techniques.
Application of glass in buildings, types of glazing, fixing methods, related hardware and construction details of glass curtain wall and structural glazing.

ARC-215 Estimation and costing-I

Unit-I: Procedure of Estimation

Introduction to Building Estimate and its need, importance of estimation, types of estimates, mode of measurement of various items.

Procedure of estimating and preparation of Bill of Quantity (BoQ) – Method of building estimates; estimation of earth work, PCC, brick work, DPC, RCC works, plastering, stone and tile works, wood work, water supply and sanitary work. Estimating of quantities of materials like cement, sand, aggregate, brick, reinforcement, tiles, structural steel for trusses, paints used in building, ACP, paneling and cladding, joinery etc.

Unit-II: Specifications

Brief and detailed specification (conforming to IS codes) for all items of works in the construction of a compound wall, septic tank, load bearing residential building, RCC framed office building, factory building with truss, etc; Specification of special items like false ceiling, decorative elements, flooring, wall cladding etc.

Unit-III: Analysis of Rates

Definition; method of preparation; quantity and manpower estimate for unit work.

Analysis of rates for items in building works like earth work, concrete works, first class brick work, reinforced brick and concrete work, cement plastering, DPC with cement mortar/ concrete, finishing (cement paint, distemper, acrylic emulsion, enamel paint) to walls & ceiling.

Local Schedule of Rates, market rates, measurement book, Running Account (RA) bill, interim and final certificate.

ARC-268 Computer Application in Architecture-IV

Modeling With Energy Simulation Sostware

Ecotect and E-Quest

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

SEMESTER-V

Module 21 ARMO 3001		**M21: Congent 1**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-358	Architectural Design-V	15
ARC-305	Theory of Design	65
ARC-306	Building Structures-V	20

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Design an art gallery	K6 in Cognitive domain	Rubric/Viva
2	Appraise renowned architects work to understand their design philosophies	K6 in Cognitive domain	Rubric/Viva
3	Appreciate various design styles and movements	A3 in Affective domain	Rubric/Viva
4	Make a scale model of art gallery	P5 in psychomotor domain	Rubric/Viva
5	Develop his own Philosophy/Rational thought process	A5 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

1. To study various philosophies in and philosophers in popular literature
2. Congent – Clear, logical and convincing

Project: Art Gallery

ARC-358 Architectural Design-V

Philosophy and Philosophers

Idea of challenging the norm, questioning and analyzing the philosophies, manipulation and debate.
Learning through Videos on sociology
Following philosophers shall be studied individually and discussed – Plato, Aristotle, Immanuel Kant, Karl Marx, Michel Focault, Jacques Derrida, Friedrich Nietzsche, Rene' Descartes, David Hume, Jean Paul Sartre, Martin Heidegger, Socrates, Confucius
Popular philosophers in Architecture – Patric Schumarker, Christopher Alexander, Charles Jenx, Kevin Lynch, Jane Jacobs

Design Evaluation and Criticism: Value judgments in design, Appreciation of designer's skills, theories of perception and variability of perception. Theoretical issues in contemporary architectural though, Seminars on the works of selected Indian and International architects and related topics.

Part 1 - Exhibition of the study and analysis

ARC-305 Theory of Design

Modern Architecture Social intentions and search for ideal world. Pluralism in place of past unity of styles. Search for paradigms in historical sources: It return to fundamentals and origins in geometry, nature and paradigms of technology.

Expressions of construction and technology. Equating technology and progress with present. Functionalism and functional appropriateness. Thoughts and works of Frank Lloyd Wright, Walter Groupies, Le Corbusier, Miesvan der Rohe, Alvar Aalto, Louis Kahn, Dutch De Stijl Italian futurists and Russian Constructivists. International style: Oversimplification of the modern Movement into functional, steel and glass, cubes. Monotonous functionalist abstractions and Modernism as a style.
Disenchantment of modern cities and fall of modern Movement.

Post Modern Architecture

Post modern architecture as a revision of modern architecture and resistance to functional containers of 60's. Objective, representational and emphasis on content. Pluralistic and differing trends.

Post Modern – Historicism

Rooted to place and history. Regards of expression: ornaments, symbolism and context with irony and humour, exemplified through the works of James Stirling, Michael Graves, Charles Moore, Arata Isozaki.

ARC-306 Building Structures-V

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 22 ARMO 3002		**M22: Congent 2**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-358	Architectural Design-V	15
ARC-306	Building Structures-V	20
ARC-305	Theory of Design	35

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Design an art gallery	K6 in Cognitive domain	Rubric/Viva
2	Appraise renowned architects work to understand their design philosophies	K6 in Cognitive domain	Rubric/Viva
3	Appreciate various design styles and movements	A3 in Affective domain	Rubric/Viva
4	Make a scale model of art gallery	P5 in psychomotor domain	Rubric/Viva
5	Develop his own Philosophy/Rational thought process	A5 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

1. Develop and understanding of architectural theories and act of being in time
2. Analyze and learn from master architects philosophies
3. Incorporate Philosophies in their work

Project: Art Gallery

ARC-358 Architectural Design-V

Design of an Art Gallery based on the Philosophies studied

Theory of Architecture

Digitalization, utopia, deconstruction, fluidism, parametric design, morphism, modernism, classicism, minimalism, regionalism, brutalism, blobitecture, schism, expressionism, cubism, duality

Architects Work

Frank Lloyd Wright, Le Corbusier, Hassan Fathy, Piter Issenman, Mario Botta, Nervey, Renzo Piano, Richard Roger, Santiago Calatrava, Ebenzer Harvard, Richard Mier, Ciser Pelli, Felix, Bernard Tshumi, Zaha Hadid, Ero Saarinen, Charles Correa, B V Doshi, Raj Reval, AP Kanvinde

ARC-359 Building Construction-V

ARC-306 Building Structures-V

ARC-305 Theory of Design

Neo - Modern Disregard historical imaginary to recapture ideas for modern architecture of 20's. Hi-tech metal abstractions of Richard Rogers, Normal Foster, showing structure and equipment as implied ornament. References of Russian Constructivists. The early works of New York Five including later works of Richar Mier as complicated, exaggerated and sophisticated revival of the modern grid and Corbusier's geometry. Synthesis of Hi-Tech and Historicism in the works Aldo Rossi, Mario Botta, Cesar Pelli.

Deconstructive Narrative and representational. Sources in Russian Constructivism. Non perfection in the works of Frank Gehry, Peter Eisenman, Bernard Tschumi, Daniel Libeskind, Questioning traditional purity of form, geometry and structure.

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
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Module 23 ARMO 3003		**M23: Dionysia**
Contacts Hours		**216 (6 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-358	Architectural Design-V	35
ARC-359	Building Construction-V	40
ARC-357	Computer Application in Architecture-V	15
ARC-306	Building Structures-V	60
ARC-303	Building Services-III	50

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Analyze large span roof forms	K6 in Cognitive domain	Rubric/Viva
2	Design an auditorium	K6 in Cognitive domain	Rubric/Viva
3	Apply the principles of acoustics in design of auditorium	K6 in Cognitive domain	Rubric/Viva
4	Compose a drama script and enact the same in groups	P6 in psychomotor domain	Rubric/Viva
5	Illustrate architectural history from modern to Contemporary period	K3 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1. Scripting, Acoustics, performance, Set design, Video Making, Lighting and sounds, VR, Temperature control, AC control, Camera setting
2. Develop script, drama performance, apply history of, Auditorium design, apply acoustics

Project: Auditorium/theater

ARC-358 Architectural Design-V

Dramatics, Introduction to designing of performance space-auditorium, theatre, cinema hall types on an intermediate scale.Importance of space programming, case studies and site analysis in architectural design. Importance of culture/traditions, and building byelaws in shaping built forms. Developing roof forms for large span structures, Angle of vision, types of Auditorium, Cinema Hall, Performance space.

ARC-359 Building Construction-V

Interior cladding/ thermal performance standards, interior insulating assemblies, sound absorbers, reflectors etc. Interior Finishes.

ARC-306 Building Structures-V

Unit-I Introduction to Shear and Development Length in Beams

Understanding of Shear stress, Diagonal tension, Shear reinforcement, Spacing of shear reinforcement, Problems of shear reinforcement, Development length, Anchorage bond, Flexural bond.

Unit-II Analysis & Design of R.C.C. Beam (Simply Supported & Cantilevered)

(Limit State Method) Analysis & Design of R.C.C. singly reinforced & doubly reinforced rectanLVlar and flanged (L & T) beam sections.
Analysis & Design of R.C.C. Beam (Continuous).
(Limit State Method) Analysis & Design of R.C.C. continuous Beam.
Analysis & Design of R.C.C. Flat Slab.

(Limit State Method) Analysis & Design of R.C.C. flat slab.
Analysis & Design of R.C.C. Cantilever
Retaining Wall (Limit State Method) Introduction, Type of retaining walls, Analysis & Design of Cantilever retaining walls and detailing of its reinforcement.

Unit-III Analysis & Design of R.C.C. Stairs (Limit State Method)
Introduction, Types of stairs, Effective span of stairs, loading on stairs,
Analysis & design of stairs (dog legged with waist slab) and detailing of its
Reinforcement.

ARC-357 Computer Application in Architecture-V
Introduction to Rhino

ARC-303 Building Services-III
Acoustics:

HVAV Application

Unit 1
Acoustical Design The understanding the audio needs and layout for projects e.g. Auditoriums, Cinema halls, Conference rooms etc.

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
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Module 24 ARMO 3004		M24: Decor
Contacts Hours		216 (6 Weeks)
Subject Code	**Subject Name**	**Max Marks**
ARC-358	Architectural Design-V	35
ARC-359	Building Construction-V	60
ARC-304	Estimation and Costing-II	50
ARC-303	Building Services-III	50
ARC-357	Computer Application in Architecture-V	10

COURSE OUTCOMES

Architectural Graduate will be able to:		Knowledge domain and level	Evaluation Method
1	Apply basic concepts of interior design	K3 in Cognitive domain	Rubric/Viva
2	Design interior of a restaurant	K6 in Cognitive domain	Rubric/Viva
3	Design a commercial kitchen	K6 in Cognitive domain	Rubric/Viva
4	Create furniture elements	K6 in Cognitive domain	Rubric/Viva
5	Estimate the cost of interiors in a built structure	K5 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1. Interior environment, theme, ambience, material, color, texture and its impact on human psychology and behavior. Performing market surveys, soft furnishing and upholstery, floor finishes etc.
2.

Project:Restaurant interiors / office interiors/ Hotel room/ Lobby

ARC-358 Architectural Design-V

Introduction to Interior Design

Definitions related to interior design. Review of enclosing elements like walls, floors, ceilings, openings, staircases, furniture & design elements such as color, light textures in interior spaces. Principles of interior design.

History of Interior & Furniture Design

Concise understanding of evolution from ancient to modern, post-modern ideologies to contemporary (Egyptian, Greek, Roman, Gothic, Baroque, Renaissance, Arts and Crafts Movement, Art Nouveau, De Stilj, Modernism, Post Modernism and Contemporary).

Study of Materials, Finishes & their applications in Furniture & other Interior Elements

An in-depth understanding of the characteristics and workability of various materials used in interiors. Their classification could be on basis of elements of usage (floor, ceilings, walls, doors, windows and fabrics/upholstery) or materials based like wood, metal plastics and their variants.

Understanding innovation in Furniture & Interior Design

Modern materials, Modular furniture, interior landscaping, Fittings & fixtures.

Analysis & Design of Furniture

Analyzing existing designs of selected furniture on basis of ergonomics, user type, economics, material, joinery and maintenance to ascertain their suitability. Design furniture for specific use complying with the aforementioned formulated design criteria. Build scaled models of the designed furniture for better understanding of working and materials.

Analysis & Design of small Interior spaces

Analyze small selected interior spaces like study, bedroom, executive/ architect office, retail outlet, conference, reception & waiting lobby including toilets and kitchens in detail, for varied aspects like function, ergonomics, and materials and establishing detailed design criteria. Design of selected small interior spaces on specific sites/ locations based on formulated design criteria using modern design methodologies. Develop design details of the afore-designed projects for their furniture and finishing.

ARC-359 Building Construction-V

Introduction to Aluminum as building material, advantage and disadvantages, study of various sections available for doors and windows together with accessories. Aluminum framed doors, windows & partitions types, design and construction details.Preparation of variety of surfaces, Application of various coats.

Finishes

Lime / Color wash, Dry distemper, Oil bound distemper,Cement paints, Acrylic emulsions, Synthetic enamels, Wall textures etc. Polishes and Varnishes

ARC-357 Computer Application in Architecture-V

Rendering of interior Views

ARC-303 Building Services-III

Advanced Building Services with respect to Commercial Interors

ARC-304 Estimation and Costing-II

Interior estimation only (to be revised)

Unit-I: Procedure of Estimation

Introduction to Building Estimate and its need, importance of estimation, types of estimates, mode of measurement of various items. Procedure of estimating and preparation of Bill of Quantity (BoQ) – Method of building estimates;

estimation of earth work, PCC, brick work, DPC, RCC works, plastering, stone and tile works, wood work, water supply and sanitary work. Estimating of quantities of materials like cement, sand, aggregate, brick, reinforcement, tiles, structural steel for trusses, paints used in building, ACP, paneling and cladding, joinery etc.

Unit-II: Specifications

Brief and detailed specification (conforming to IS codes) for all items of works in the construction of a compound wall, septic tank, load bearing residential building, RCC framed office building, factory building with truss, etc; Specification of special items like false ceiling, decorative elements, flooring, wall cladding etc.

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 25 ARMO 3005		**M25: BIM**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-357	Computer Application in Architecture-V	75
ARC-304	Estimation and Costing-II	50

COURSE OUTCOMES

Architectural Graduate will be able to:		Knowledge domain and level	Evaluation Method
1	Analyze interior specifications	K4 in Cognitive domain	Rubric/Viva
2	Analyze interior estimation and costing	K4 in Cognitive domain	Rubric/Viva
3	Create a project report of Ground+1 brick residence	K6 in Cognitive domain	Rubric/Viva
4	Apply basic concepts of building information modeling software	K3 in Cognitive domain	Rubric/Viva
5	Model a DPR in BIM software	K6 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1.Create a project report of Ground+1 brick residence in BIM

2.

Project: Interiors rendering

COURSE OBJECTIVES

1. To introduce the fundamentals of Building Information Modeling (BIM).
2. To learn various workflows and procedures of BIM work-environment.
3. To develop basic skills in application of BIM tools and techniques in Architecture.

COURSE CONTENT

ARC-357 Computer Application in Architecture-V

Unit-I: Introduction to BIM

Introduction to BIM, Concepts & Principles, User-Interface, Viewing the Model, Resources.
Understanding terms, elements and properties. Creating a project in BIM environment, creating levels and grids, creating conceptual design.

Unit-II: Basic Modelling

Modelling of walls, windows, doors, setting view range, components, columns, roof, ceiling, floors, openings, surfaces, stars, ramps, railings, curtain elements.
Understanding families and working with families, family editor, creating a component, in-place components, reference planes, voids, join/cut geometry. Rooms and areas.

Unit-III: Annotation and Visualization

Annotations; grids, dimensions, text, tags, rooms, schedules, sheets, symbols, creating views.
Setting of colour schemes, legends, openings.
Visualization; rendering, materials, lights, paint tool, decals.
Project phasing, detailing and preparing construction documents.

Unit-IV: Site and Solar Studies

Site, topo-surface, building pads, divided surface, creating topo-surface from CAD contours, massing studies. Setting up and creating solar studies. Applying and removing constraints.

Unit-V: Maya/ Rhino/ Grasshopper

3D Max, Lumion or any other rendering software.

ARC-304 Estimation and Costing-II

Unit-III: Analysis of Rates

Definition; method of preparation; quantity and manpower estimate for unit work. Analysis of rates for items in building works like earth work, concrete works, first class brick work, reinforced brick and concrete work, cement plastering, DPC with cement mortar/ concrete, finishing (cement paint, distemper, acrylic emulsion, enamel paint) to walls & ceiling. Local Schedule of Rates, market rates, measurement book, Running Account (RA) bill, interim and final certificate.

Accounting Procedures Introduction to P.W.D accounts procedure, measurement book, daily labour, muster roll, stores, stock, and issue of material from stock, indent form,
imprest account, cash book, mode of payment.

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
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SEMESTER-VI

Module 26 ARMO 3006		**M26: Prefab**
Contacts Hours		**50 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-370	Architectural Design-VI	15
ARC-371	Building Construction-VI	30

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Analyze defects and remedies in buildings	K4 in Cognitive domain	Rubric/Viva
2	Analyze retrofitting in buildings	K4 in Cognitive domain	Rubric/Viva
3	Analyze prefabricated speedy construction in a building	K4 in Cognitive domain	Rubric/Viva
4	Apply basic concepts of modular construction	K3 in Cognitive domain	Rubric/Viva
5	Appreciate the role of prefab construction in respect of technology, culture, time and environment	A3 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

1. To develop and include universal design principles
2. Designing in light weight construction – concrete, pre tensioning, post tensioning
3. Defects and remedies

Project: Analysis of buildings constructed through speedy construction

ARC-370 Architectural Design-VI

Defects in Building

Analyze defects in building and understanding the role of advanced construction techniques. Defects in buildings and their remedies.

Universal Design- People needs

Principles of Universal Design,Universal Design Definition, seven principles:-Equitable Use Flexibility in Use, Simple and Intuitive, Perceptible Information, Tolerance for Error, Low Physical Effort, Size and Space.

ARC-371 Building Construction-VI

Unit1-Prefabrication Systems

Open prefab system, large panel prefab system, joints, pre-casting methods, materials, on-site and off-site prefabrication, components, etc.

Unit 2-Pre-stressed Concrete

Introduction, methods of pre-stressing and their application to large-space structures.

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 27 ARMO 3007		**M27: Tall Buildings**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-370	Architectural Design-VI	10
ARC-371	Building Construction-VI	15
ARC-314	Human Values	80
ARC-372	Building Structures-VI	25

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Design core of a tall building	K6 in Cognitive domain	Rubric/Viva
2	Analyze structural system of a tall building	K4 in Cognitive domain	Rubric/Viva
3	Illustrate evolution of mega structures	K3 in Cognitive domain	Rubric/Viva
4	Analyze building on the basis of earthquake and dynamic loads	K4 in Cognitive domain	Rubric/Viva
5	Appreciate the role of services in tall building design	A3 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

To design tall building core, earthquake resistant structures, structural grids- diagrid, tensegrity, fire proofing, historic evolution of tall buildings, contemporary mega structures

Project: Design core of a Tall Building

ARC-370 Architectural Design-VI

Documentaries of Megastructures for analysis of high rise structures. Understanding structural grids, form geometry

ARC-371 Building Construction-VI

Industrial Construction Structural Steel Works:Portal Frame Construction,
Construction for tall buildings

ARC-372 Building Structure-VI

UNIT 1 INTRODUCTION TO HIGH-RISE BUILDINGS AND STRUCTURAL SYSTEMS

Height analysis, plan shapes, grids and core design - Foundations and soil conditions - Construction sequencing, building skin and envelope - Design philosophy, structural loading, sequential loading, materials, high performance concrete – Fibre reinforced concrete, High strength concrete, Light weight concrete - Loading and movement Gravity Loading, Dead and Live load - Methods of Live load reduction – impact, gravity loading, construction loads, wind loading – Static and dynamic approach – Earth quake loading – Equivalent lateral force, model analysis, combinations of loading – Working stress design, limit state design, plastic design - Codes & Standards - Tensile structures in high-rise.

UNIT 2 BEHAVIOR OF VARIOUS STRUCTURAL SYSTEMS

Factors affecting growth, height and structural form – High rise behavior, rigid frames, braced forms, infilled frames, shear walls, coupled shear walls, wall frames, tubular, cores, outrigger- braced and hybrid mega systems.

UNIT 3 DISASTER RESISTANT STRUCTURES

Overall buckling analysis of frames, wall frames - Approximate methods, second order effects of gravity of loading, simultaneous first order and P delta analysis, translational, torsional instability, out of plumb effects, stiffness of member in stability, effect of foundation rotation - Case study of a high-rise structure with 3D model analysis.

UNIT 4 PREFABRICATED STRUCTURES

Specific requirements for planning and layout of prefabricates plant, IS code specification - Design Principles, modular coordination, standardization, disuniting of prefabricates production, transportation and erection, stages of loading and code provisions, safety factors - Reinforced concrete - Prefabricated structures, wall panel types and two way fabricated slabs, partial and curtain walls, trusses, shells, crane - gantry systems - Floor slabs and roofs, types of floor slabs, cored and panel types and two way systems, stair case slab , insulation requirements, joints, their behavior and reinforcement requirements – Walls, types of wall panels blocks and large panels, curtain – Partition and load bearing walls, wall joints - Behavior and design, leak prevention, joint sealant, sandwich wall panels.

ARC-314 Human Values

UNIT 1: Course Introduction - Need, Basic LVidelines, Content and Process for Value Education

1. Understanding the need, basic LVidelines, content and process for Value Education
2. Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfill the above human aspirations: understanding and living in **harmony** at various levels

UNIT 2: Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
8. Understanding the needs of Self ('I') and 'Body' - *Sukh* and *Suvidha*
9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in 'I'
11. Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensure *Sanyam* and *Swasthya*

- Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

13. *Understanding Harmony in the family – the basic unit of human interaction*

14. Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*;
Trust (*Vishwas)* and Respect (*Samman)* as the foundational values of relationship

15. Understanding the meaning of *Vishwas*; Difference between intention and competence

16. Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship

17. Understanding the harmony in the society (society being an extension of family): *Samadhan, Samridhi, Abhay, Sah-astitva* as comprehensive Human Goals

18. Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj),* Universal Order (*Sarvabhaum Vyawastha)*- from family to world family!

- Practice Exercises and Case Studies will be taken up in Practice Sessions.

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 28 ARMO 3008		**M28: Neighborhood**
Contacts Hours		**216 (6 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-370	Architectural Design-VI	40
ARC-372	Building Structures-VI	55
ARC-315	Building Economics	50
ARC-314	Human Values	20
ARC-368	Computer Application in Architecture-VI	30

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Apply basic theory of design	K3 in Cognitive domain	Rubric/Viva
2	Analyze advance structural concepts	K3 in Cognitive domain	Rubric/Viva
3	Analyze advance services concepts-(automation)	K3 in Cognitive domain	Rubric/Viva
4	Illustrate basic concept of neighborhood and masterplans	K3 in Cognitive domain	Rubric/Viva
5	Design vertical housing	K6 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1.Including building services and structural system
2.Area calculation, building byelaws, FAR/FSI, Height restrictions, covered area.

Project: mid rise/low rise housing

ARC-370 Architectural Design-VI

Design of a medium to high-rise building in a dense urban setting. The problem shouldattempt to bring out a comprehension of the framework that outlines a building interior, thestructural system and the services core, and the relation of this interior with the exteriorenvironment through the building skin. The project should be of high services complexity withmechanical systems for space conditioning, parking and other services, and include theintegration of active energy systems

ARC-315 Building Economics

Elementary concepts of economics

Introduction to economics- Definitions, Needs & Wants, Nature & Scope of Economics.
Division of economics – Micro Economics - Scarcity, Utility - Marginal, Total & Average. Laws of Demand and Supply.
Macro Economics - Economic system in India.

Economics in relation to architecture,engineering and other sciences

Meaning and scope of building economics, Issues and challenges associated with building projects. Building Efficiency, Building Life-cycle. Costs and Benefits of Building - Monetary and Non Monetary.

ARC-314 Human Values

UNIT 4: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfillment among the four orders of nature-recyclability and self-reLVlation in nature
3. Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space
4. Holistic perception of harmony at all levels of existence
    a. Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

23. Natural acceptance of human values
24. Definitiveness of Ethical Human Conduct
25. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
26. Competence in professional ethics:

    a) Ability to utilize the professional competence for augmenting universal human order

    b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,

    c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

27. Case studies of typical holistic technologies, management models and production systems
28. Strategy for transition from the present state to Universal Human Order:

    a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers

    b) At the level of society: as mutually enriching institutions and organizations

ARC-368 Computer Application in Architecture-VI

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 29 ARMO 3009		**M29: Agora**
Contacts Hours		**216 (6 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-370	Architectural Design-VI	35
ARC-371	Building Construction-VI	25
ARC-315	Building Economics	50
ARC-369	Research/Dissertation-I	55
ARC-368	Computer Application in Architecture-VI	35

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Analyse theory of design	K3 in Cognitive domain	Rubric/Viva
2	Analyse basic concepts of waste management	K3 in Cognitive domain	Rubric/Viva
3	Design a landscaped central court of vertical housing	K6 in Cognitive domain	Rubric/Viva
4	Write a dissertation	K5 in Cognitive domain	Rubric/Viva
5	Design a shopping mall	K6 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1. Study and analysis of a live site for site services and site planning.
2. Planning and designing of a campus.

Project: Institutional building complex

ARC-370 Architectural Design-VI(130 Contact Periods)
problem of a complex building involving a high level of services and advanced structuralsystems eg. Sports complex, institutional campus.Exercises in simulation and conceptual modeling shall be conducted.The studio will also focus on sustainable design principles, including waste recycling, rain waterHarvesting, site planning principles and landscaping.

ARC-371 Building Construction-VI
Unit 1-Lightweight constructions
Hollow bricks, slabs, party wall and shell roofs.
Unit 2 Speedy Construction Methods
Types of floor construction - Beam & Slab, Waffle Grid Slab, Drop Beam & Slab, Flush Slab, Lift Slab Construction; Cast-in-situ service & stair cores; Cross wall & Box frame construction.

ARC-315 Building Economics
Project Financing Equity, Financing Institutions in Financing Process, Interim Finance and Permanent Financing, Bank Loan - Simple Interest and Compound Interest. Types of Mortgage, Lease Arrangements.

Module-4 Economic performance of building
Decision Making using techniques of economic performance to measuretangible and non-tangible issues - Cost-Benefit Analysis, Incremental Analysis and Multi-criteria Analysis.
ARC-369 Research/Dissertation-I
ARC-368 Computer Application in Architecture-VI

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 30 ARMO 3010		**M30: Management**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-371	Building Construction-VI	30
ARC-372	Building Structures-VI	20
ARC-369	Research/Dissertation-I	45
ARC-368	Computer Application in Architecture-VI	35

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Analyse building specifications	K4 in Cognitive domain	Rubric/Viva
2	Analyse building estimation and costing	K4 in Cognitive domain	Rubric/Viva
3	Appreciate the role of economics in built environment	K3 in Cognitive domain	Rubric/Viva
4	Apply building byelaws to their design	K3 in Cognitive domain	Rubric/Viva
5	Make a detail working drawing of shopping mall	K6 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1.
2.

Project: Reports/Research/dissertation

ARC-371 Building Construction-VI
ARC-372 Building Structures-VI

ARC-369 Research/Dissertation-I

Unit I Introduction Aspects of Analysis of an Architectural project

Unit II

Technical Writing Critical Appreciation of a Project: Analyzing on the basis of site, Built Form and Space, Spatial Organization, Materials and Techniques, Elements and Special Characteristics, Activity Pattern.

Unit III

Book Reviews Review of Book with presentation of the précis.

ARC-368 Computer Application in Architecture-VI

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

SEMESTER-VII

Module 31 ARMO 4001		**M31: Resurgence**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-406	Environmental Studies	100
ARC-459	Research/Dissertation	50

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Apply basic concepts of environment and ecology	K3 in Cognitive domain	Rubric/Viva
2	Evaluate the impact of environmental pollution	K5 in Cognitive domain	Rubric/Viva
3	Apply basic concepts of environmental laws and reLVlations	K3 in Cognitive domain	Rubric/Viva
4	Make Environmental impact assessment reports	K6 in Cognitive domain	Rubric/Viva
5	Value the role of sustainability in built environment	A3 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

1.
2.

Project: project assessment

ARC-406 Environmental Studies

Unit-I: Ecology & Ecosystem

Concept of Ecology & Ecosystem, Resource analysis for various ecosystems and development imperatives (land, geology, soil, climate, water. vegetation) characteristics, exploitation, causative factors for degradation, analytical techniques.

Unit-II: Environmental Pollution

Definition, causes, effects, standard parameters and control measures of Air, Water, Soil, Noise, Marine, Thermal, Nuclear and Light pollution.

Causes, effects and control measures of urban and industrial waste.

Physical, Chemical and Biological transformation of pollutants.

Unit-III: Introduction to EIA & EMP

Role of EIA in the Planning and decision making process, definition and need, evolution and objectives, tasks and scope, methods of EIA; advantages and limitations.

EMP, Best practices in Environmental Protection and Conservation.

Unit-IV: Environmental Laws and ReLVlations

Introduction to Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Factories Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, MoEF LVidelines.

Sustainability

Unit I

Introduction to sustainability &Intelligent buildings Social, economic, environmental factors, ecological footprint, local and worldwide sustainable benchmarks, building ecosystem, building life cycle Concept. Concept of intelligent buildings, energy efficiency, vertical transportation systems, communication systems, security systems, building automation and lighting systems.

Unit II

Sustainable design Principles and strategies, site design, energy management, renewable energy, sustainable material selection, water management, indoor air quality, alternative energy, environmental systems, environmental assessment methods.

Unit III

Building Management Systems (BMS) Methods to control, monitor and optimize building services, eg., lighting, heating, security, CCTV and alarm systems, access control, audio-visual and entertainment systems, ventilation, filtration and climate control, etc., even time & attendance control and reporting (notably staff movement and availability).

Unit IV

Energymanagement inservices

ARC-459 Research/Dissertation

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 32 ARMO 4002		**M32: Ocular**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-408	Product Design*1	100
ARC-409	Art Appreciation*1	-

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Apply basic concept of the elective topic	K3 in Cognitive domain	Rubric/Viva
2	Appreciate the role of Elective topic in global scenario	K3 in Cognitive domain	Rubric/Viva
3	Internalize the values of the topic	A5 in Affective domain	Rubric/Viva
4	Conduct the surveys on the topic given	P5 in psychomotor domain	Rubric/Viva
5	Present the researched topic in an seminar	K6 in Cognitive domain	Rubric/Viva

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

ARC-408 Product Design (Elective I-A)
ARC-409 Art Appreciation (Elective I-A)

Module 33 ARMO 4003		**M33: Hospitality**
Contacts Hours		**216 (6 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-460	Architectural Design-VII	45
ARC-461	Building Construction-VII	50
ARC-407	Project Management	50
ARC-459	Research/Dissertation	50

COURSE OUTCOMES

Architectural Graduate will be able to:		Knowledge domain and level	Evaluation Method
1	Design a hotel with convention center	K6 in Cognitive domain	
2	Apply basic concepts of service floor and safety in built environment	K3 in Cognitive domain	Rubric/Viva
3	Design indoor recreational facilities	K6 in Cognitive domain	Rubric/Viva
4	Application of waste management techniques in hotel	K3 in Cognitive domain	Rubric/Viva
5	Make a detail working drawing of service floor	K6 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1.

Project: Hotel, Haat,

ARC-460 Architectural Design-VII

Concept

ARC-461 Building Construction-VII

Machinery ,Advanced Building Technology

Introduction of pre-stressing, prefabrication & systems building.Jointing, tolerances and modular co-ordination.Mass production, transportation, storage and handling of materials. Characteristics, performance and application of mechanized construction equipment. Advanced vernacular construction techniques.

ARC-407 Project Management

Introduction to Project Management. Project Planning, feasibility studies,
project report, project financing, Project organization, process and structure and personnel selection, responsibilities of the project manager. Project implementation, Site investigations, layout, site organisation, networking techniques, PERT/CPM, LOD, time-cost analysis, value engineering, Project monitoring, cost control, manpower management, safety and labour laws.

ARC-459 Research/Dissertation

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 34 ARMO 4004		**M34: Health Care**
Contacts Hours		**216 (6 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-460	Architectural Design-VII	55
ARC-461	Building Construction-VII	50
ARC-407	Project Management	50

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Design a hospital	K6 in Cognitive domain	Rubric/Viva
2	Illustrate low cost constructional techniques	K3 in Cognitive domain	Rubric/Viva
3	Apply basic concepts of hospital information system	K3 in Cognitive domain	Rubric/Viva
4	Design healing landscapes	K6 in Cognitive domain	Rubric/Viva
5	Internalize the values of hygiene and social care	A5 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

1.

Project:Hospital

ARC-460 Architectural Design-VII

(Working Drawings, GFC Drawings)

Preparation of architectural GFC drawings and details of a medium / large project.Preparation of electrical drawings, water supply and sanitary drawings, structural drawings of a small project. Specifications of building materials and simple construction as separate document or annotated on the working drawings.

ARC-461 Building Construction-VII

Defects and Remedies

The study of various defects in buildings and their remedies, Defects caused by dampness, applied forces and changes in size.

ARC-407 Project Management

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 35 ARMO 4005		**M35:Perception**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-410	Low Cost Architecture*2	100
ARC-411	Architectural Journalism*2	-

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Apply basic concept of the elective topic	K3 in Cognitive domain	Rubric/Viva
2	Appreciate the role of Elective topic in global scenario	K3 in Cognitive domain	Rubric/Viva
3	Internalize the values of the elective topic	A5 in Affective domain	Rubric/Viva
4	Conduct the surveys related to elective topic	P5 in psychomotor domain	Rubric/Viva
5	Present research work through seminar	K6 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

1.

Project: Report

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ARC-410 Low Cost Architecture (Elective II-A)

UNIT I

- An introduction to the subject to understand the various building techniques adopted in different climatic zones of the country, which resulting in varied vernacular expressions.
- Use of cost effective technologies through the use of local materials, up gradation of traditional technologies, prefabrication etc.

UNIT II

- Need for low cost construction, both in the rural and the urban sectors.
- Innovations of building techniques for low cost construction.
- Analysis of space norms for low cost buildings.

UNIT III

- Study of usages pattern of low cost buildings by the habitants.
- Comparative analysis of building materials and costing.
- Works of Laurie Baker, Hassan Fathy and other prominent architects.

NOTE The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

REFERENCE BOOKS

- "Building Systems for Low Income Housing", Ashok Kumar Jain; Management Publishing House, 1992

- "Low Cost Housing in Developing Countries", LVru Charan Mathur; For Centre for Science & Technology of the Non-Aligned and Other Developing Countries, Oxford & IBH Publishing Company, 1993

ARC-411 Architectural Journalism (Elective II-B)

Unit I

Introduction to Architectural Journalism

What is Journalism and its importance?? Relation betweenArchitectural Journalism. Reading contemporary and historical writings by Journalists and critics, study their approaches.

Unit II
Introduction to Architectural writing
Writing on different articles, on buildings and social issues
Reports on building under construction
Learn how to gather info and do research for stories

Unit III
Structure of Architectural Journalism and Photo Journalism
Learning of documentation of collected info, content writing, formatting, Page composition
Learning the technique of how the photographs are supporting the write-ups about built environment, to help them understand the expression of pictorial, verbal and visual relationship of architecture journalism

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

SEMESTER-VIII

Module 36 ARMO 4006		**M36: Professional Training**
Contacts Hours		**22 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-480	Professional Training	100

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Test the theories taught	K5 in Cognitive domain	Rubric/Viva
2	Appraise the relation between the site work and drawings	K5 in Cognitive domain	Rubric/Viva
3	Inculcate teamwork	A4 in Affective domain	Rubric/Viva
4	Devise a procedure for accomplishing a task	K6 in Cognitive domain	Rubric/Viva
5	Display self-reliance, work ethics in an office	A5 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

1.
2.

Project: Training portfolio

ARC-480 Professional Training

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

SEMESTER-IX

Module 37 ARMO 5001		**M37: AMENABLE**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-503	Disaster Mitigation & Management*3	85
ARC-504	Sustainable Cities & Energy Compliance*3	-
ARC-502	Professional Practice-I	15

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Apply basic concepts of the Sustainable Cities & Energy Compliance	K3 in Cognitive domain	Rubric/Viva
2	Appreciate the role of Sustainable Cities & Energy Compliance in global scenario	K3 in Cognitive domain	Rubric/Viva
3	Internalize the values of the Sustainable Cities & Energy Compliance	A5 in Affective domain	Rubric/Viva
4	Conduct the surveys related to the Sustainable Cities & Energy Compliance	P5 in psychomotor domain	Rubric/Viva
5	Present research work through seminar	K6 in Cognitive domain	Rubric/Viva

Project:

COURSE CONTENT

ARC-503 Disaster Mitigation & Management (Elective III-A)

Unit-1 Introduction to Hazards & Disasters
Introduction to disaster management, Indian scenario, Understanding ofdisaster, Hazard and its classification, Vulnerability, Capacity, Risk.Various types of disasters.To understand in detail for the causes, adverse effects, distribution patterns,mitigation measures of Earthquake, Tsunami, Cyclone, Flood and Landslide.Disaster management cycle.

Unit -II Case Studies
Studies to understand above mentioned disasters (National as well asInternational) occurred in past and their inferences.

Unit -III Disaster Preparedness
Disaster Management Act, LVidelines, NDMA.Vulnerability Assessment & Warning systems for above said disaster types.

Unit -IV Disaster Response
Programmes and strategies for disaster reduction. Communications.

Unit -V Disaster Mitigation
Pre disaster, emergency, transition, and recovery. Disaster management plan,Natural crisis management committee, State crisis management group.

Unit -VII Disaster Resistant Construction Techniques
Risk reduction measures through land use control, site planning and landmanagement, design and construction of structures for above mentioneddisasters.

Unit-VI: DISASTER RISK MANAGEMENT IN INDIA
1. Evolution of Disaster Management in India
2. To understand the institutional and legal framework for India
3. Policy and Programmers for Disaster In India
4. Roles and Responsibilities of Panchayat, urban and Local bodies in DisasterManagement
5. community participation, public awareness
6. Indian Case Studies

ARC-504 Sustainable Cities & Energy Compilance (Elective III-B)

People, Environment & Buildings

Relationship between people and environment, impact of people on environment and vice versa, extent of the energy and environmental crises facing the world ,Need for implementing energy efficiency on an international, national and individual basis in the context of the building industry & environmental issues. Introduction to Indoor environment – spatial environment, Thermal environment, visual environment, sonic environment and olfactory environment.

Climate and Built form Responses

Global climate factors, elements of climate, classification of climate zones, desirable conditions, principals of thermal conditions and STI, body heat exchange, thermal balance, psychometric chart, sun path, sun angles ,SAP, sunshine hours, and solar noon, declination, extraterrestrial radiation, solar constant, radiation on different of different directions with different inclination of walls. Radiation spectrum, spectral sensitivity of eye, visual cone and comfort, daylight assessment, types of reflection, glare and quality and spread of light in buildings. Sound waves, audible range of sounds, equal loudness controls, noise reduction systems, sound transmission path.

Emphasis on responses related to cultural, strategic, technological, social and physical with specific reference to climate and built forms.

Traditional Wisdom and Sustainable Concepts

Socio-cultural aspects in the spatial formation of traditional buildings under different climate zones in India. Concepts of 'Sacred build-up and Landscape', An Architectural and Theological Interface, Indigenous knowledge, antiquity, Indian vernacular architecture concepts covering informal, functional architecture of structures, built of local materials and designs to meet the needs of the local people and the intricate variations in local social customs, craftsmanship and climate.

The Architectural concepts may have to emphasize local conditions, geography of region and peoples mind to emphasize traditional wisdom and sustainable concepts.

Sustainable Built Environment, Issues and approaches

Building on the general appreciation of this area in the core studies, students will be required to have a greater insight into matters relating to specific issues concerning the environment and the ecology. An appreciation of particular issues relating to urban and rural morphological sensitivity will be expected. Scarce material/physical resources should be discussed in the context of (a) choice of materials and (b) diminishing natural resources as should eco-friendly and 'safe' materials with specific reference to thermal, visual comforts. Besides, Students should have an appreciation of aesthetic issues in the built environment. The participants should also have knowledge of the principal considerations involved in the evaluation or survey of built up environment intended for sustainable concepts. They should be familiar with safety considerations relating to the built environment.

Water and Built Forms, Land and Vegetation

Introduction, water demand, growing water misuse, pollution, threat to environment, social implications, sustainability of water recourses, ground water management, issues related to urban water supply. Running water and underground water; channel networks and drainage basins, hill slope geomorphology.

Introduction, land forms, Grazing lands, soil erosion, deforestation, air pollution.
Growing concerns of vegetation due to excessive usage, impact of vegetation on soil erosion, prevention of erosion, livestock management, sustainability of urban landscape, wet lands, and sustainable agriculture.

ARC-502 Professional Practice-I

Unit I Role of Professional Bodies
The Indian Institute of Architects, its working constitution and byelaws, categories of membership, election procedures. The Uttar Pradesh Architects Association.

Module 38 ARMO 5002		**M38: Smart Cities**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-503	Disaster Mitigation & Management*3	15
ARC-504	Sustainable Cities & Energy Compliance*3	-
ARC-557	Architectural Design-IX	10
ARC-502	Professional Practice-I	35

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Illustrate basic concepts of smart city	K3 in Cognitive domain	Rubric/Viva
2	Illustrate basic concepts of resilient city	K3 in Cognitive domain	Rubric/Viva
3	Illustrate the contemporary trends in urban development	K3 in Cognitive domain	Rubric/Viva
4	Apply basic concepts of internet of things related to urban context	K3 in Cognitive domain	Rubric/Viva
5	Internalize the values of vision/ mission of govt. policies related to urban fabric	A5 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

Project:

COURSE CONTENT

ARC-503 Disaster Mitigation & Management (Elective III-A)

Project Work: (Field Work, Case Studies)
The project /fieldwork is meant for students to understand vulnerabilities and to work on reducing disaster risks and to build a culture of safety. Projects are conceived creatively based on the geographic location and hazard profile of given region

ARC-504 Sustainable Cities & Energy Compliance (Elective III-B)

Solar Passive Design (Concepts, Strategies & Services)

Introduction of passive solar architecture, appreciation of Built form for different climates, building clusters and solar exposure, thermal environment. Types of passive systems, direct gain, thermal storage wall, attached green house, thermal storage roof and convective loop.
Modern and postmodern passive architecture, methods, strategies, systems, and construction details emphasizing the passive architecture and non-active services.

ARC-557 Architectural Design-IX

ARC-502 Professional Practice-I

Unit I Architects' Act 1972
Detail study of the Act, Council of Architecture; Procedures of membership.

Unit II
Scale of charges Conditions of engagement of an architect – Duties; Responsibilities and liabilities of a professional architect; Scale of charges, mode of payment etc

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 39 ARMO 5003		**M39: Urban Design**
Contacts Hours		**216 (6 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-557	Architectural Design-IX	40
ARC-5002	Professional Practice-I	50

COURSE OUTCOMES

Architectural Graduate will be able to:		Knowledge domain and level	Evaluation Method
1	Appreciate basic concepts of urban design	K3 in Cognitive domain	Rubric/Viva
2	Value the role of urban systems in society	A3 in Affective domain	Rubric/Viva
3	Illustrate history of urban design	K3 in Cognitive domain	Rubric/Viva
4	Illustrate concepts of professional practice	K3 in Cognitive domain	Rubric/Viva
5	Design intervention in a bazzar street	K6 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

Project:

COURSE CONTENT

ARC-557 Architectural Design IX

Project: Urban Space Analysis

Unit 1: STUDY AND ANALYSIS OF URBAN SPACES, MODERN CONCEPTS IN URBAN DESIGN

A brief study and analysis of urban space.
Study of Urban design theories of Christopher Alaxander, Jane Jacob, Gordon Cullen and Kevin Lynch.
Relevance of historic concepts of urban design in the present context-Critical analysis of Indian cities & understanding the urban design projects of Singapore, China & United States.

Unit 2: BASIC PRINCIPLES & TECHNIQUES IN URBAN DESIGN

Components in urban design composition. Urban scale, mass and space, definition of urban fabric,visual surveys and their influence for urban design, various methods of conducting a visual survey.
Definition and purpose of open spaces and their hierarchy in urban design-hierarchy of utility spacesfor residential, commercial, recreational and industrial use. Special focus on streets-Expressive qualityof built forms, spaces in public domain.

UNIT 3: RENEWAL, RE-DEVELOPEMENT AND FORMULATING URBAN DESIGN

Definition and need for urban renewal and re-developement, scope for urban renewal in Indiachallenges and implementation methods of urban renewal for Indian historic towns and cities, impactof public participation.
Analysis and formulation of urban design LVidelines for new developments.
National and international case studies for urban renewal.

ARC-502 Professional Practice-I

Unit -I Code of Professional conduct & Architectural Competition

Clauses governing conduct of professional architect.Types of competitions; need and procedure for conducting competitions.

Unit -II Tender and Contract

Type of building contracts, their demands. Preparation of tender documents, method of inviting tenders, opening of tenders, preparation of comparative statement recommendation and award of projects, preparation of contract documents, general conditions of contract, interim certificates, defect liability period, retention amount and virtual completion.

Unit -III Easements

Introduction to various easement process and precautions to protect easement rights.

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 40 ARMO 5004		**M40: Mixed Use Development**
Contacts Hours		**216 (6 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-557	Architectural Design IX	45
ARC-505	Transport Planning*4	15
ARC-506	Urban & Regional Planning*4	-

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Illustrate concepts of various Land Uses and land planning	K3 in Cognitive domain	Rubric/Viva
2	Apply basic concepts of town planning	K3 in Cognitive domain	Rubric/Viva
3	Design intervention in transit oriented development	K6 in Cognitive domain	Rubric/Viva
4	Develop a vision document for mixed land use	K6 in Cognitive domain	Rubric/Viva
5	Integrate social, ecological and economic concerns	A4 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

Project:

COURSE CONTENT

ARC-557 Architectural Design IX

Project: Urban Design Intervention

Design intervention into an existing urban precinct. Creating proposal document, drawings, maps and 3D physical model for proposed project. Urban outdoor lighting, urban green infrastructure, acoustic consideration for urban fabric, air quality at street level.

ARC-505 Transport Planning (Elective IV-A)

Unit I Introduction:
Transport and Socioeconomic Activities, Historical Development of Transport, Transportation in the Cities, Freight Transportation, Future Developments

ARC-506 Urban & Regional Planning (Elective IV-A)

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.

Module 41 ARMO 5005		**M41: Sprawl**
Contacts Hours		**72 (2 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-557	Architectural Design IX	05
ARC-505	Transport Planning*4	85
ARC-506	Urban & Regional Planning*4	-

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Apply basic concept of the elective topic	K3 in Cognitive domain	Rubric/Viva
2	Appreciate the role of Elective topic in global scenario	K3 in Cognitive domain	Rubric/Viva
3	Internalize the values of the elective	A5 in Affective domain	Rubric/Viva
4	Conduct the surveys related to elective	P5 in psychomotor domain	Rubric/Viva
5	Present research work through seminar	K6 in Cognitive domain	Rubric/Viva

COURSE OBJECTIVES

Project:

COURSE CONTENT

ARC-557 Architectural Design IX

ARC-505 Transport Planning (Elective IV-A)

Unit I

Urban Transportation System Planning- Conceptual Aspects:

Transport Planning Process, Problem Definition, Solution Generation, Solution Analysis, Evaluation and Choice, Implementation, Sequence of Activities Involved in Transport analysis.

Unit II

Trip Generation Analysis: Trip Production Analysis, Category Analysis, Trip Attraction Modelling. Mode Choice Modelling: Influencing Factors, Earlier Modal Split Models, Trip-End Type Modal Split Model, Trip-Interchange Modal Split Model, Disaggregate Mode-Choice Model, Logit Model of Mode Choice, Binary Choice Situations, Multinomial Logit Model, Model calibration, Case studies.

Unit III

Route Assignment:

Description of transport network, Route Choice Behaviour, The Minimum Path, Minimum Path Algorithm, Route Assignment Techniques, All-or-Nothing Assignment, Multipath Traffic Assignment, Capacity-Restrained Traffic Assignment

Unit IV

Transportation Surveys

Definition of Study Area, Zoning, Types of Movements, Types of Surveys, Home- Interview Survey, Commercial Vehicle Survey, Intermediate Public Transport Survey, Public Transport Survey, Roadside-Interview Survey, Cordon-Line Survey, Post-Card Questionnaire Survey, Registration-Number Survey, Tag-on- Vehicle Survey.

Unit V
Transport Related Land-Use Models:
Development of Land - Use models, The Lowry Model, Application of Lowry Model.

Unit VI
Urban Structure:
Urban Activity Systems, Urban Movement Hierarchies, Types of Urban Structure, Centripetal-Type Urban Structure, Grid- Type Urban Structure, Linear-Type Urban Structure, Directional Grid Urban Structure.

ARC-506 Urban & Regional Planning (Elective IV-A)

SEMESTER-X

Module 42 ARMO 5006		**M42:Architectural Thesis**
Contacts Hours		**936 (26 Weeks)**
Subject Code	**Subject Name**	**Max Marks**
ARC-565	Thesis	100
ARC-515	Professional Practice-II	100

COURSE OUTCOMES

Architectural Graduate will be able to:		**Knowledge domain and level**	**Evaluation Method**
1	Design architectural project in totality	K6 in Cognitive domain	Rubric/Viva
2	Communicate the thesis proposal to expert jury	K3 in Cognitive domain	Rubric/Viva
3	Write thesis report	K6 in Cognitive domain	Rubric/Viva
4	Make scale model of the design thesis	K6 in Cognitive domain	Rubric/Viva
5	Value the role of time management in architectural project	A3 in Affective domain	Rubric/Viva

COURSE OBJECTIVES

1. To prepare a student to independently handle and present all aspects of an architectural design, from its evolution

to final solution in totality.

2. To understand the importance of the evolutionary stages of a design process and various techniques required for

a successful presentation of an architectural design.

3. To develop in students the ability to handle specific aspects / thrust area of design relevant to the topic2.

Project: Thesis

ARC-565 Thesis (400 Contact Periods)

ARC-515 Professional Practice-II

Units I-Valuation Valuation of immovable properties, elements of valuation and factors affecting valuation; Techniques of valuation of landed and building property; Value classification and types of valuation.

Units II-Arbitration Arbitration, Arbitrator, Umpire, Nature of arbitration. Appointment, Conduct, Powers, and duties of arbitrators and umpires; Procedure of arbitration and preparation of awards.

Units IV-Law related to Land

The land acquisition Act, UP Urban Development Act 1973

Units IV-Law of Control

The Partnership Act, 1932

Units V-Law related to Conservation

The elements of the Ancient monument,(site remains) Act 1956

NOTE:	Internal and external exams shall be carried out by a Jury of Internal or External Examiners which would be marked on the basis of the approved evaluation rubric
	S / P Internal Marks shall be awarded on students' work in the form of Case Study / Design Sheets / Reports / Models / Presentations / Seminars, which shall be evaluated by approved evaluation rubric by concerned faculty.