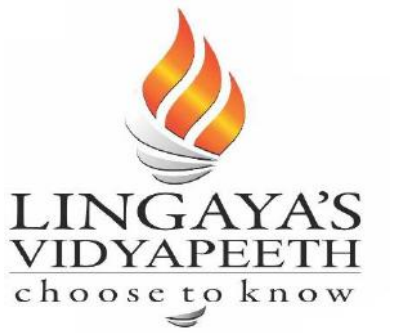
LINGAYA'S VIDYAPEETH



Department of Computer Science & Engineering

Scheme & Syllabus

Of

B.Tech (CSE)

Batch: 2017-2021

VISION

To be a school, committed to education, research & innovation and develop globally competent professionals in the area of Computer Science, Information Technology and Computer Applications who are responsible citizens and have respect for life and sensitivity towards environment.

MISSION

1. To develop professionals and leaders in Computer Science, IT and allied areas who have right attitude and aptitude to serve the society.

2. To develop and maintain state-of-the-art infrastructure and research facilities to enable create, apply and disseminate knowledge.

3. To foster linkages with all stakeholders for continuous improvement in academics in Computer Science, IT and Computer Applications.

4. To develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders can emerge who have deep respect for human life and values.

5. To undertake disciplinary and inter-disciplinary collaborative research and innovation which offer opportunities for long term interaction with academia and industry and develop technologies relevant to the society.

PROGRAM OUTCOMES:

PO1- Engineering Knowledge: Apply the knowledge of mathematics, science, engineering and Application fundamentals, and an engineering and Application specialization to the solution of complex engineering problems.

PO2- Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3-Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4- Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5- Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6- The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7- Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10- Communication: Communicate effectively on complex engineering activities with the engineering 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.

PO11- Project management and finance: Demonstrate knowledge and understanding of the engineering 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.

PO12- Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES:

PSO1: To equip the students with theoretical and implementation knowledgebase in all the latest areas of Computer Science & Engineering for a successful career in software industries, pursuing higher studies, or entrepreneurial establishments.

PSO2: To nurture the students with the critical thinking abilities for better decision making by offering them a socially acceptable solutions to real life problems through computing paradigm.

PSO3: To nurture the students with the comprehensive analytical and design abilities by offering them techno-commercially feasible solutions of real business problems through computing.

LINGAYA'S VIDYAPEETH

SCHEME OF STUDIES

SESSION: 2017-18

School: School of Computer Science & Engineering	Batch:2017-2021
Department: CSE	Year:1st
Course: B.Tech	Semester: I

SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PCC	PH-103B	Applied Physics	3	1	0	4	15	25	60	-	-	100
2	PCC	MA-101B	Applied Mathematics-I	3	1	0	4	15	25	60	-	-	100
3	PCC	CS-105B	Computer Programming	3	0	0	3	15	25	60	-	-	100
4	PCC	EN-107B	Communication Skills-I	3	0	0	3	15	25	60	-	-	100
5	PCC	CE-109B	Environmental Science and Ecology	2	0	0	2	15	25	60	-	-	100
6	PCC	EL-111B	Basic of Electrical and Electronics Engineering	3	1	0	4	15	25	60	-	-	100
7	PCC	PH-151B	Applied Physics Lab	0	0	2	1				60	40	100
8	PCC	EN-153B	Communication Skills-I Lab	0	0	2	1				60	40	100
9	PCC	CS-155B	Computer Programming Lab	0	0	2	1				60	40	100
10	PCC	EL-157B	Basic of Electrical and Electronics Engineering Lab	0	0	2	1				60	40	100
11	PCC	ME-159B	Workshop Practice-I	0	0	4	2			40		60	100
			Total---->	**17**	**3**	**12**	**26**						

School: School of Computer Science & Engineering								Batch: 2017-21					
Department: CSE								Year:1st					
Course: B.Tech								Semester: II					
SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PCC	MA-102B	Advanced Mathematics and Numerical Method	3	1	0	4	15	25	60	-	-	100
2	PCC	EN-104B	Communication skills-II	3	0	0	3	15	25	60	-	-	100
3	PCC	BA-106B	Engineering Economics & Industrial Management	3	0	0	3	15	25	60	-	-	100
4	PEC	EC-108B	Digital Electronics	4	0	0	4	15	25	60	-	-	100
5	PEC	CS-110B	Data Structures & Algorithm	3	0	0	3	15	25	60	-	-	100
6	PCC	CS-114B	Database Management Systems	3	0	0	3	15	25	60	-	-	100
7	PEC	MA-150B	Applied Numerical Method Lab	0	0	2	1				60	40	100
8	PEC	EC-154B	Digital electronics Lab	0	0	2	1				60	40	100
9	PEC	CS-156B	Data Structures & Algorithm Lab	0	0	2	1				60	40	100
10	PCC	CS-160B	Database Management Systems Lab	0	0	2	1				60	40	100
11	PCC	PD-151	Co-Curricular Activities/Hobby Club	0	0	4	2			40		60	100
			Total---->	**19**	**1**	**12**	**26**						

School: School of Computer Science & Engineering								Batch: 2017-21					
Department: CSE								Year:2nd					
Course: B.Tech								Semester:III					
SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PCC	CS-201B	Object oriented programming using C++	3	1	0	4	15	25	60	-	-	100
2	PCC	CS-203B	Discrete structure	3	0	0	3	15	25	60	-	-	100
3	PCC	CS-205B	Analysis and design	3	1	0	4	15	25	60	-	-	100
4	ESC	CS-207B	Data mining and data warehousing	3	0	0	3	15	25	60	-	-	100
5	BSC	CS-209B	Computer architecture and organization	3	1	0	4	15	25	60	-	-	100
6	HSS	CS-211B	Web technologies	3	0	0	3	15	25	60	-	-	100
7	PCC	CS-251B	Object oriented programming using C++ lab	0	0	2	1				60	40	100
8	PCC	CS-257B	Data mining and data warehousing lab	0	0	2	1				60	40	100
9	ESC	CS-261B	Web technologies lab	0	0	2	1				60	40	100
10	ESC	HOT-201B	Minor project/hand on training	0	0	2	1					100	100
			Total---->	**18**	**3**	**8**	**25**						

School: School of Computer Science & Engineering								Batch: 2017-21					
Department: CSE								Year:2nd					
Course: B.Tech								Semester:IV					
SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PCC	CS-202B	Computer network	3	0	0	3	15	25	60	-	-	100
2	PCC	CS-204B	Operating system	3	0	0	3	15	25	60	-	-	100
3	PCC	CS-206B	Computer graphics	3	0	0	3	15	25	60	-	-	100
4	PCC	CS-208B	Core java	3	1	0	4	15	25	60	-	-	100
5	PCC	CS-210B	Software engineering	3	0	0	3	15	25	60	-	-	100
6	ESC	EC-202B	Digital and analog communication	3	1	0	4	15	25	60	-	-	100
7	PCC	CS-252B	Computer network lab	0	0	2	1				60	40	100
8	ESC	CS-254B	Operating system lab	0	0	2	1				60	40	100
9	PCC	CS-256B	Computer graphics lab	0	0	2	1				60	40	100
10	PCC	CS-258B	Core java lab	0	0	2	1					100	100
11	PCC	CS-282B	Minor project	0	0	4	2					100	100
12	PDP	PD-293A	Interpersonal skills	0	0	2	1			40		60	100
			Total---->	**18**	**2**	**14**	**27**						

School: School of Computer Science & Engineering								Batch: 2017-21					
Department: CSE								Year:3rd					
Course: B.Tech								Semester: V					
SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	ESC	CS-301B	Advance java	3	0	0	3	15	25	60	-	-	100
2	PCC	CS-303B	Artificial intelligence	3	0	0	3	15	25	60	-	-	100
3	PCC	CS-305B	Python programming	3	0	0	3	15	25	60	-	-	100
4	PCC	CS-307B	Soft computing technique	3	0	0	3	15	25	60	-	-	100
5	PCC	CS-309B	Formal language and automata theory	3	0	0	3	15	25	60	-	-	100
6	PCC	EC-303B	Microprocessor and interfacing	3	1	0	4	15	25	60	-	-	100
7	**ESC**	**CS-351B**	Advance java lab	0	0	2	1				60	40	100
8	**PCC**	**CS-353B**	Artificial intelligence lab	0	0	2	1				60	40	100
9	PCC	EC-353B	Microprocessor and interfacing lab	0	0	2	1				60	40	100
10	PCC	CS-355B	Python programming lab	0	0	2	1				60	40	100
11	Proj	CS-381	Minor project	0	0	4	2					100	100
			Total---->	**18**	**1**	**12**	**25**						

School: School of Computer Science & Engineering								Batch: 2017-21					
Department: CSE								Year:3rd					
Course: B.Tech								Semester:VI					
SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PCC	CS-302B	Statistical Learning Theory	3	0	0	3	15	25	60	-	-	100
2	PEC	CS-304B	Professional Elective-I(Machine Learning)	3	0	0	3	15	25	60	-	-	100
3	PEC	CS-306B	Professional Elective – II(Neural Networks)	3	0	0	3	15	25	60	-	-	100
4	PEC	CS-308B	Professional Elective-III(Cryptography & Network security)	3	0	0	3	15	25	60	-	-	100
5	PEC	CS-310B	Professional Elective IV (Information Security Fundamentals)	3	0	0	3	15	25	60	-	-	100
6	PEC	CS-312B	Professional Elective V(Cloud Computing)	3	0	0	3	15	25	60	-	-	100
7	PCC	CS-352B	Statistical Package for Social Science (SPSS) Lab	0	0	2	1				60	40	100
8	PEC	CS-354B	Professional Elective-Lab-I (Machine Learning Lab)	0	0	2	1				60	40	100
9	PEC	CS-356B	Professional Elective – Lab-II(Neural Networks using MATLAB Lab)	0	0	2	1				60	40	100
10	PEC	CS-358B	Professional Elective Lab-III(Cryptography & Network Security Lab)	0	0	2	1				60	40	100
11	PROJ-III	CS-384B	Minor Project-III	0	0	4	2					100	100
12	PDP	PDP-302	Problem Solving Skills	0	0	2	1			40		60	100
			Total---->	**18**	**0**	**14**	**25**						

School: School of Computer Science & Engineering								Batch: 2017-21					
Department: CSE								Year:4th					
Course: B.Tech (AI&ML)								Semester:VII					
SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PEC	CS-401B	R programming	3	0	0	3	15	25	60	-	-	100
2	PEC	CS-403B	Deep learning	3	0	0	3	15	25	60	-	-	100
3	PEC	CS-405B	Patter recognition	3	0	0	3	15	25	60	-	-	100
4	PEC	CS-407B	Speech and natural language processing	3	0	0	3	15	25	60	-	-	100
5	OEC	BA-271B	Human resource management	3	0	0	3	15	25	60	-	-	100
6	PEC	CS-451B	R programming lab	0	0	2	1				60	40	100
7	PEC	CS-453B	Deep learning lab	0	0	2	1				60	40	100
8	PEC	CS-455B	Pattern recognition lab	0	0	2	1				60	40	100
9	PROJ	CS-481B	Major project	0	0	8	4					100	100
10	PDP	PD-492	Professional career skills	0	0	1	2			40		60	100
			Total---->	**15**	**0**	**15**	**24**						

School: School of Computer Science & Engineering	Batch: 2017-21
Department: CSE	Year:4th
Course: B.Tech (Cloud Computing)	Semester:VII

SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PEC	CS-421B	Introduction to open-source software and open standards	3	0	0	3	15	25	60	-	-	100
2	PEC	CS-423B	Cloud Computing Architecture and Development Model	3	0	0	3	15	25	60	-	-	100
3	PEC	CS-425B	Introduction to Internet of Things	3	0	0	3	15	25	60	-	-	100
4	PEC	CS-427B	Cloud Security	3	0	0	3	15	25	60	-	-	100
5	OEC	BA-271B	Human resource management	3	0	0	3	15	25	60	-	-	100
6	PEC	CS-471B	Introduction to open-source software and open standards lab	0	0	2	1				60	40	100
7	PEC	CS-473B	Cloud Computing Architecture and Development Model lab	0	0	2	1				60	40	100
8	PEC	CS-475B	Introduction to Internet of Things lab	0	0	2	1				60	40	100
9	PROJ	CS-481B	Major project	0	0	8	4					100	100
10	PDP	PD-492	Professional career skills	0	0	1	2			40		60	100
			Total---->	**15**	**0**	**15**	**24**						

School: School of Computer Science & Engineering								Batch: 2017-21					
Department: CSE								Year:4th					
Course: B.Tech (Cyber Security)								Semester: VII					
SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PEC	CS-411B	Information Security Audit and Monitoring	3	0	0	3	15	25	60	-	-	100
2	PEC	CS-413B	Digital Forensics	3	0	0	3	15	25	60	-	-	100
3	PEC	CS-415B	IT Application Security	3	0	0	3	15	25	60	-	-	100
4	PEC	CS-417B	Physical Security	3	0	0	3	15	25	60	-	-	100
5	OEC	BA-271B	Human resource management	3	0	0	3	15	25	60	-	-	100
6	PEC	CS-461B	Information Security Audit and Monitoring lab	0	0	2	1				60	40	100
7	PEC	CS-463B	Digital Forensics lab	0	0	2	1				60	40	100
8	PROJ	CS-481B	Major project	0	0	8	4					100	100
9	PDP	PD-492	Professional career skills	0	0	1	2			40		60	100
			Total---->	**15**	**0**	**13**	**23**						

School: School Of Computer Science & Engineering	Batch: 2017-21
Department: CSE	Year:4th
Course: B.Tech	Semester:VIII

SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PCC	IT-306	Department Elective-IV(Software Project Management)	3	0	0	3	15	25	60	-	-	100
2	PCC	CS-483/484	Internship/ Seminar based on Internship	0	0	24	12					100	100
			Total---->	**3**	**0**	**24**	**15**						

SYLLABUS
B.TECH (All Branches)
1st Semester

MA-101B	APPLIED MATHEMATICS-I	L-T-P	Credits
		4-0-0	4

Unit-1: 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-2:INFINITE SERIES: Convergence and divergence; comparison test;D'Alembert's ratio test;Cauchy's root test;Raabe's test; logarithmic test;Gausstest;Cauchy's integral test;Leibnitz's alternate series test; absolutely convergent; conditionally convergent.

Unit-3:CALCULUS OF SINGLE VARIABLE: Successive Differentiation and Leibnitz theorem Taylor's series and Maclaurin's series; asymptotes; curvature.

Unit-4: CALCULUS OF SEVERAL VARIABLES: Functions of two or more variables; partial derivatives; total differential and differentiability; derivative of composite and implicit functions;Jacobians. Homogeneous functions and Euler's theorem;Taylor's series for functions of two variables; maxima-minima of function of two and three variables, Lagrange's method of undetermined multipliers; differentiation under integral sign.

Unit-5: MULTIPLE INTEGRATIONS: Double integral; change of order of integration; double integral in polar co-ordinates. Triple integration; change of variable. Application of double integral to find area enclosed by plane curves and volume of solids of revolution; volume of solid; beta & gamma functions and relationship between them.

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. Dass, H.K., " Higher Engineering Mathematics",10th Edition, 2008, S. Chand & Company Ltd.
5 " Higher Engineering Mathematics" by H.C Taneja

PH-103 B	APPLIED PHYSICS	L-T-P	Credits

		4-0-0	**4**

Unit-1: Wave Optics-I

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-2: Wave Optics-II

Polarization: Phenomena of double refraction, Nicol prism, Production and analysis of plane, circular and elliptical polarized light, Retardation Plate (Quarter & Half).

Laser: Spontaneous and stimulated emission of radiation, population inversion, construction and working of Ruby, He-Ne lasers and laser applications.

Fiber Optics: Fundamental ideas about optical fiber, Propagation mechanism, Acceptance angle and cone, Numerical aperture, Single and Multi Mode Fibers

Unit-3: Dielectric

Dielectric Properties: Dielectric constant and Polarization of dielectric materials, Types of Polarization (Polarizability). Displacement vector (D), Magnetic susceptibility, Relation between D, E And P, ClaussiusMussoti Equation, Important applications of dielectric material.

Unit-4: Magnetic & Superconducting properties of matter

Magnetic Properties: 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.

Unit-5: Relativistic Mechanics

Inertial & non-inertial frames, Michelson- Morley experiment, Einstein's postulates, Lorentz transformation equations, Length contraction & Time dilation, Addition of velocities; Variation of mass with velocity, Mass energy equivalence.

TEXT BOOK

1. BrijLal and Subramanyam, "A Text Book of Optics" S. Chand & Co.
2. Modern Physics for Engineers – S.P.Taneja (R. Chand)
3. Engineering Physics – SatyaPrakash (PragatiPrakashan).

REFERENCE BOOKS

1. Sears, F.W., "Electricity and Magnetism", Narosa
2. Arthur Beiser, "Perspectives of Modern Physics", Tata McGraw Hill
3. AjoyGhatak 'Optics' Tata McGraw-Hill Education, 2005.

4. David Halliday, Robert Resnick and Jearl Walker, "Fundamentals of physics", 4th edition.
5. David J. Griffiths, 'Introduction to electrodynamics' 3rd edition, Prentice Hall.

CS-105B	COMPUTER PROGRAMMING	L-T-P	Cr
		3-0-0	3

Unit-1: INTRODUCTION TO COMPUTER SYSTEM: Computer Fundamentals: Definition, Block Diagram along with Computer components, Characteristics & classification of computers, hardware & software, types of software, Introduction to Compiler, Assembler, and Interpreter, Operating System, Definition, functions, data representation – bits and bytes and operations of data, radix number system – decimal, binary, octal, hexadecimal numbers and their inter conversions, representation of information inside the computers.

Unit-2: BASICS OF PROGRAMMING AND OVERVIEW OF C PROGRAMMING: Programming Fundamental, Problem definition, Algorithm, Flow charts and their symbols Types of programming languages, Translators, Introduction to C, Structure of C program, C character set, Identifier and Keywords, Data types, constants, variables, Declaration, expressions, 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-3: COMPOSITE DATA TYPES: 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. Declaration and Initialization of structure, structure within structure, Array of structure

Unit-4: 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-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

EN-107B	COMMUNICATION SKILLS-1	L T P	Cr
		3-0-0	3

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.

CE-109B	ENVIRONMETAL SCIENCE AND ECOLOGY	L T P	Cr
		2 -0 -0	2

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: 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

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. 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

EL-111B	BASICS OF ELECTRICAL & ELECTRONICS ENGG.	L T P	Cr
		2-0-0	2

Unit-1:DC NETWORK THEOREMS: Ohm's law; Voltage and current sources; Series parallel Circuits; Network Teminology; Kirchoff's laws; Network Simplification by using Loop method and Nodal method; Superposition Theorem; Thevenin's theorem; Norton's theorem, Maximum Power Transfer theorem; Star to Delta and Delta to Star transformation.

Unit-2:SINGLE PHASE &THREE PHASE AC CIRCUITS: AC Terminology; Derivation of RMS and maximum value of alternating current and voltage; Form factor and peak factor; Behavior of pure R, L & C components in ac circuits; single phase series R-L, R-C, R-L-C circuit; Introduction to resonance; Merits & Demerits of three phase system over single phase system;Three phases interconnection using star and Delta arrangement;Measurement of power using 2-wattmeter method.

Unit-3:BASICS OF ELECTRICAL MACHINES: Construction and operation of dc machines (both dc generator and motor); emf equation of dc generator; starting and speed control of dc motor; Necessity of starters in dc motors; Transformers- basic principle, its emf equation, operation of ideal & non-ideal transformer with Phasor diagrams, power losses, efficiency; introduction to auto-transformer.

Unit-4:DIODES & TRANSISTORS: Depletion layer; Barrier potential; Forward and reverse biasing of pn junction didode; switching Characteristics of p-n junction diode; zener diode; basic theory of operation of PNP and NPN transistor-Vl characteristics; CB; CE and CC configuration; different biasing techniques.

Unit-5:FIELD EFFECT TRANSISTOR AND THYRISTOR FAMILY: Introduction of FET ; Theory of operation; JFET Parameters; and JFET Amplifiers. MOSFET: Introduction;theory of operation; MOSFET parameters; application, different biasing techniques of FET. Introductory idea of multistage and feedback amplifiers; Introduction to Thyristor Family (SCR).

TEXT BOOK

1. Gupta, J.B. "Electrical Technology", 2nd Edition, Katson Publication, 2007
2. Boylestad and Nashelsky, "Electronic Devices and Circuits", 4th Edition, Pearson Education, 1999.

REFERENCE BOOKS

1. Leonard S. Bobrow, "Fundamentals of Electrical Engineering", 2nd Edition, Oxford University Press, 2005
2. Kothari and Nagarath, "Basic Electrical Engg.", 2nd Edition, Tata McGraw Hill
3. Malvino, "Electronic Principles", 5th Edition, Tata McGraw Hill, 2004.
4. Millman and Halkias, "Electronic Devices and Circuits", 2nd Edition, Tata McGraw Hill, 2000.

method.

PH-151B	APPLIED PHYSICS LAB	L-T-P	Credits
		0-0-2	1

LISTOF EXPERIMENTS

1. To find the wavelength of sodium light by Newton's rings experiment.
2. To find the wavelength of various colors of white light with the help of a plane transmission diffraction grating.
3. To find the refractive indexof a prism by using spectrometer.
4. To determine the cauchy's constant (A & B) of a prism by using spectrometer.
5. To find the resolving power of a telescope.
6. To find the velocity of ultrasonic waves in non-conducting medium by piezo-electric method.
7. To find the specific rotation of sugar solution by using a Polarimeter.
8. To find the frequency of A.C. mains by using electric vibrator.
9. To find the wavelength of sodium light by Fresnel's bi-prism experiment.
10. To verify inverse square law.
11. To determine the capacity of a capacitor (unknown) by using flashing & quenching method.

TEXT BOOK

1. Worshnop, B. L. and Flint, H. T. "Advanced Practical Physics", KPH

REFERENCE BOOKS

1. Gupta, S. L. & Kumar, V. "Practical Physics", PragatiPrakashan
2. Chauhan& Singh, "Advanced Practical Physics Vol. I & II", PragatiPrakashan.
3. Advanced Practical Physics; Worsnop and Flint, Methuen & Co., London,

EN-153 B	COMMUNICATION SKILLS LAB-1	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

1. English Edge Self Learning Basics – Each module should be cleared systematically and star the intermediate as time permits as time permits. Students are free to go at their pace with the module even away from the campus.
2. Conversation ability to converse in given situations
3. Listening comprehension (Speeches, Dialogues, Narrations)
4. Discussion on the various topics- Group Discussion
5. Oral presentation of views / ideas based on the given picture/ hint
6. Role Play to develop a co-ordination between action and dialogue.
7. JAM
8. Extempore Speeches
9. Turncoat Speeches
10. Building a Story from a given beginning/ starting line.

CS-155B	COMPUTER PROGRAMMING LAB	L-T-P 0-0-2	CR 1

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 circumfrenceof 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 fibonacciupto 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 whether 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 Write a program to calculate the area and perimeter of circle using pointers
40 Write 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

FILE HANDLING

43 Write a program to Create a file and store text and display the contents

EL-157B	**BASICS OF ELECTRICAL & ELECTRONICS ENGG. LAB**	**L T P**	**Cr**
		0-0-2	**1**

LIST OF PRACTICALS

1. To verify KCL and KVL in a given DC circuit.
2.To verify Thevenin's and Norton's Theorems.
3.To verify maximum power transfer theorem in D.C Circuit.
4.To verify Reciprocity and Superposition theorems on Dc circuit.
5.To study frequency response of a series & parallel R-L-C circuit and determine its resonant frequency.
6. To perform direct load test of a transformer and plot its efficiency Vs load characteristic.
7.. To study V-I characteristics of diode; and its use as a capacitance.
8. Study of the characteristics of transistor in Common Base configuration.

9. Study of the characteristics of transistor in Common Emitter configuration.
10. Study of V-I characteristics of a photo-voltaic cell.

REFERENCE BOOKS

1. Theraja, B.L. "Electrical Technology Vol I & II", S. Chand Publications, 2005
2. Kothari and Nagarath, "Basic Electrical Engg.", 2nd Edition, Tata McGraw Hill, 2002
3. Del Torro Vincent, "Electrical Engineering Fundamentals", 2nd Edition, Prentice Hall of India, 1994.
4. Cathey, J.J. and Naser, S.A."Basic Electrical Engg.", 2nd Edition, Schaum

ME-159 B	**WORKSHOP PRACTICE – I**	**L T P**	**Cr**
		0-0-4	**2**

1.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.

2. 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

3. 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.

4. 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.

5. 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.

B Tech Degree Programme
(Common to all Disciplines)
1St Year **(EVEN SEMESTER)**

MA-102B	ADVANCE MATHEMATICS & APPLIED NUMERICAL METHODS	L-T-P	Credits
		3-1-0	4

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.

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 & INTERPOLATION : Gauss elimination method; Gauss-Jordan method; Jacobi's iteration method; Gauss-Seidal iteration method; **:** Introduction to interpolation; Newton's forward and backward interpolation formulae; Stirling formula; Lagrange interpolation; Newton's divided difference formula.

Unit-III:NUMERICAL DIFFERENTIATION AND INTEGRATION & SOLUTION OF ORDINARY DIFFERENTIAL EQUATION: 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. Taylor series method; Euler method; Euler modified method; Runge kutta method.

Unit-IV: LAPLACE TRANSFORMS AND ITS APPLICATIONS: Laplace transform (LT) of elementary functions; properties of LT; existence conditions of LT; LT of derivatives; LT of integrals; LT of the function multiplication by t; LT of the function division by t; inverse LT's; LT of convolution of two functions.

Unit V: FOURIER SERIES: Euler's formula; conditions for a Fourier expansion; change of interval; Fourier expansion of odd and even function; Fourier expansion of square wave, rectangular wave.

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.
3. Advanced Engg Mathematics: Michael D. Greenberg
4. Advanced Engineering Mathematics: E. Kreyszig

EN-104 B	COMMUNICATION SKILLS-II	L T P	Cr
		3-0-0	3

Unit 1: Vocabulary:-One word substitution, words often confused, Phrasal verbs & idioms & foreign words & phrases (30 each) and their usage in sentences.

Unit 2: Applied Grammar:- Parts of speech – conversion and usage; Rules of concord: grammatical and notional Concord ,Types of sentences, conditional sentences, Sentence correction with respect to Parts of speech, tenses & types of sentences, principle of subject &verb.

Unit3:- Technical Writing:-Resume Writing (interview skills), Report writing, Types of report including press report by individual – students.

Unit 4:-Reading Comprehension:-Comprehending selected prose & poem, unseen passages and preparing précis, Note making,Frankenstein - Merry Shelley

Unit 5: Business correspondence:-Format of Business letter writing, Strategies for effective letter writing; Letter of business enquiry, complaint, adjustment and placing order.

Prescribed Text book

1. Technical Communication Principles & Practice (2nd Ed.) by Meenakshi Raman &Sangeeta Sharma published by Oxford University
2. The Functional Aspects of Communication Skills by Dr.Prajapati Prasad published by S.K.Kataria& Sons
3. Business Communication by K.Sundar& A Kumara Raj published by Vijay Nicole Imprints Pvt Ltd. Chennai

SUGGESTED READING:

1. Language in Use (Upper intermediate Level, Adrian Doff Christopher Jones, Cambridge University Press
2. Common Errors in English, AbulHashem, Ramesh Publishing House, new Delhi.
3. Objective English, Tata Mc. Graw Hill Publishing Company Ltd., New Delhi.
4. Spoken English for India, R.K. Bansal& J.B. Harrison, Orient Longman, Delhi.
5. The sounds of English, Veena Kumar, Makaav Educational Software, New Delhi.
6. English Phonetics & Phonology, P. Roach, Cambridge University Press, London.

BA-106 B	Engineering Economics and Industrial Management	L T P	Cr
		3-0-0	3

UNIT 1

Meaning and definition of Economics, Central Problem of an economy, Demand, Law of Demand, Elasticity of Demand, Meaning of production, production function, law of variable proportion, cost concept, fixed cost, variable cost, average cost, marginal cost and opportunity cost.

Unit 2

Meaning of market and main features of Perfect Competition, Monopoly, Oligopoly and Monopolistic Competition. National Income: GDP and GNP

Unit 3

Definition of management, Nature and scope of management, Functions of management: Planning, Organizing, Staffing, Directing and Controlling

Unit 4

Meaning of marketing management, Concept of marketing, Functions of marketing, Marketing Mix

Unit 5

Meaning, Nature and scope of financial management, Functions of Financial Management, Objectives of FM, Sources of finance: Short term finance, Medium term finance and Long term finance. Stock exchange: NSE, BSE and NIFTY

Reference Books for Economics:

1. P.N. Chopra, Principles of economics, Kalyani Publishers
2. H.L. Ahuja, Modern Economic theory, S. Chand
3. S. K. Mishra, Modern Micro Economics, Pragati Publications

Reference books for management

1. T.N. Chabra, Principles of Management, Dhanpat Rai Publishers
2. L.M. Prasad, Principles & Practices of management, Sultan Chand & Sons 2005
3. Harold Koontz & O' Doneell Cyril Management, McGraw Hill, 1968.

EC-108 B	DIGITAL ELECTRONICS	L T P	CR
		3 1 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

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 QuineMcluskey methods of simplification.

2 **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.

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.

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.

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, DhanpatRai and Sons, 2000.
5. Wakerly, John F, ”Digital Design Principles and Practices”, 4th Edition, Prentice Hall of India,2005

CS-110B	DATA STRUCTURE AND ALGORITHMS	L T P	Cr
		4 0 0	4

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

PRE-REQUISITES: Knowledge of basic computer programming

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.
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.
3. **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.
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.
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. 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

EL-111B	BASICS OF ELECTRICAL & ELECTRONICS ENGG.	L T P	Cr
		3-0-0	3

Unit-1:DC NETWORK THEOREMS: Ohm's law; Voltage and current sources; Series parallel Circuits; Network Teminology; Kirchoff's laws; Network Simplification by using Loop method and Nodal method; Superposition Theorem; Thevenin's theorem; Norton's theorem, Maximum Power Transfer theorem; Star to Delta and Delta to Star transformation.

Unit-2:SINGLE PHASE &THREE PHASE AC CIRCUITS: AC Terminology; Derivation of RMS and maximum value of alternating current and voltage; Form factor and peak factor; Behavior of pure R, L & C components in ac circuits; single phase series R-L, R-C, R-L-C circuit; Introduction to resonance; Merits & Demerits of three phase system over single phase system;Three phases interconnection using star and Delta arrangement;Measurement of power using 2-wattmeter method.

Unit-3:BASICS OF ELECTRICAL MACHINES: Construction and operation of dc machines (both dc generator and motor); emf equation of dc generator; starting and speed control of dc motor; Necessity of starters in dc motors; Transformers- basic principle, its emf equation, operation of ideal & non-ideal transformer with Phasor diagrams, power losses, efficiency; introduction to auto-transformer.

Unit-4:DIODES & TRANSISTORS: Depletion layer; Barrier potential; Forward and reverse biasing of pn junction didode; switching Characteristics of p-n junction diode; zener diode; basic theory of operation of PNP and NPN transistor-Vl characteristics; CB; CE and CC configuration; different biasing techniques.

Unit-5:FIELD EFFECT TRANSISTOR AND THYRISTOR FAMILY: Introduction of FET ; Theory of operation; JFET Parameters; and JFET Amplifiers. MOSFET: Introduction;theory of operation; MOSFET parameters; application, different biasing techniques of FET. Introductory idea of multistage and feedback amplifiers; Introduction to Thyristor Family (SCR).

TEXT BOOK

1. Gupta, J.B. "Electrical Technology", 2nd Edition, Katson Publication, 2007
2. Boylestad and Nashelsky, "Electronic Devices and Circuits", 4th Edition, Pearson Education, 1999.

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2. Kothari and Nagarath, "Basic Electrical Engg.", 2nd Edition, Tata McGraw Hill

3. Malvino, "Electronic Principles", 5th Edition, Tata McGraw Hill, 2004.

4. Millman and Halkias, "Electronic Devices and Circuits", 2nd Edition, Tata McGraw Hill, 2000

MA-150B	Applied Numerical Methods Lab	L T P	Cr
		0-0-2	2

List of Practical (Using C++ software)

(1) Find the root of the equation by using Bisection Method.
(2) Find the root of the equation by using Newton Raphson Method.
(3) Find the root of the equation by using Secant Method.
(4) Find the root of the equation by using Regulai Falsi Method.
(5) Solve the system of linear equation by Gauss Elimination Method.
(6) Solve the system of linear equation by Gauss-Jacobi Method.
(7) Solve the system of linear equation by Gauss-Siedel Method.
(8) Lagrange Interpolation or Newton Interpolation.
(9) Simpson's rule.
(10) Trapezoidal Rule

EC-154B	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 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.

CS-156 B	DATA STRUCTURE AND ALGORITHMS LAB	L T P	Cr
		0 0 2	1

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

EL-157B	BASICS OF ELECTRICAL & ELECTRONICS ENGG. LAB	L T P	Cr
		0-0-2	1

LIST OF PRACTICALS

1. To verify KCL and KVL in a given DC circuit.
2.To verify Thevenin's and Norton's Theorems.
3.To verify maximum power transfer theorem in D.C Circuit.
4.To verify Superposition theorems on Dc circuit.
5.To study frequency response of a series & parallel R-L-C circuit and determine its resonant frequency.
6. To perform direct load test of a transformer and plot its efficiency Vs load characteristic.
7.. To study V-I characteristics of diode; and its use as a capacitance.
8. Study of the characteristics of transistor in Common Base configuration.
9. Study of the characteristics of transistor in Common Emitter configuration.
10. Study of V-I characteristics of a photo-voltaic cell.

REFERENCE BOOKS

1. Theraja, B.L. "Electrical Technology Vol I & II", S. Chand Publications, 2005
2. Kothari and Nagarath, "Basic Electrical Engg.", 2nd Edition, Tata McGraw Hill, 2002
3. Del Torro Vincent, "Electrical Engineering Fundamentals", 2nd Edition, Prentice Hall of India, 1994.

4. Cathey, J.J. and Naser, S.A."Basic Electrical Engg.", 2nd Edition, Schaum

CS-114B	DATABASE MANAGEMENT SYSTEMS	L T P	Cr
		3 0 0	3

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

1. **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
2. **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
3. **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.
4. **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.
5. **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-160 B	DATABASE MANAGEMENT SYSTEMS LAB	L T P	Cr
		0 0 2	1

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

B. Tech 2nd Year

School of Computer Science

Scheme of studies & Syllabus-2017

CS-201 B	OBJECT ORIENTED PROGRAMMING USING C++	L T P	Cr
		4 0 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.

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, preprocessors directives, Namespace, Memory management operators in C++, Inline function, default arguments, & reference types

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;.

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

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.

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

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.

CS-203 B	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

1. **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.

2. **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.

3. **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.

4. **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

5. **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

CS- 205 B	ANALYSIS & DESIGN OF ALGORITHM	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

1. **BRIEF REVIEW**: Growth of functions, Asymptotic Notations, Representation of Graphs, Breadth First Search, Depth First Search and Data Structures for Disjoint Sets.

2. **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.

3. **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.

4. **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

5. **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 :-

1. 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-207 B	Data Mining and Data Warehousing	L T P	Cr
		4 0 0	4

Prerequisite; Student can have knowledge of Database Management System and Query Language like sql Etc.

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.

SYLLABUS:

1. **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.

2. **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.

3. **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.

4. **DATA MINING QUERY LANGUAGES:** Data specification, specifying knowledge, hierarchy specification, pattern presentation and visualization specification, data mining languages and standardization of data mining.

5. **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 :

1. ArjunPujri,," Data Mining Techbniques " 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

CS-209 B	COMPUTER ORGANIZATION & ARCHITECTURE	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

1. 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.

2. 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).

3. 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.

4. 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 RAxM & ROM organization, memory expansion, static & dynamic memory types); cache memory: associative & direct mapped cache organizations.

5. 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 edition, 1998.
2. 2. V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation", V edition, McGraw-Hill Inc, 1996.
3. 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.

		L T P	Cr
CS-211 B	**WEB TECHNOLOGIES**	**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: Basic HTML: Basics of programming, Structure and HTML Tags, Images, List, Tables, Anchors and Form Elements

1 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 & REFERENCE BOOK:

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.
3. Thomas A Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Third Edition, Tata McGraw Hill, 2013.
4. David Flanagan, “JavaScript: The Definitive Guide, Sixth Edition”, O'Reilly Media, 2011
5. Bear Bibeault and Yehuda Katz, “jQuery in Action”, January 2008
6. Web link for Responsive Web Design - https://bradfrost.github.io/this-is-responsive/
7. Ebook link for JavaScript - https://github.com/jasonzhuang/tech_books/tree/master/js

CS-251 B	OBJECT ORIENTED PROGRAMMING USING C++LAB	L T P	Cr
		0 0 2	1

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

CLASS & OBJECTS

6. Write a C++ program to show the concept of class & object
7. Write A C++ program showing function taking objects as a arguments and function returning objects
8. Write C++ programs to show the concept of static data member & static member function
9. Write C++ program to show the concept of friend function
10. Write C++ program to show the concept of different type of constructor
11. Write C++ program to show the concept of destructor

OPERATOR OVERLOADING

12. Write a C++ program showing overloading of unary operator using member function & friend function
13. Write a C++ program showing overloading of binary operator using member function & friend function
14. Write a C++ program showing overloading of << and >> operators

INHERITANCE

15. Write a C++ program to show the concept of multilevel inheritance
16. Write a program to show the concept of multiple inheritance
17. Write a C++ program to show the concept of hybrid inheritance
18. Write a program to show the concept of virtual base class

DYNAMIC BINDING & VIRTUAL FUNCTION

19. Write a C++ to show the concept of virtual function to implement dynamic binding
20. Write a C++ program to show the concept of pure virtual function & abstract class

FILES HANDLING

21. Write C++ programs for creating, reading& writing sequential access file
22. Write C++ programs for creating, reading & writing random access file

TEMPLATES

23. Write a C++ program to show the concept of class template
24. Write a C++ program to show the concept of function template

TEXT BOOK

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

REFERENCE BOOKS

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

12. Bhave, ―Object Oriented Programming with C++‖, Pearson Education.

CS-257B	Data Mining & Data Warehousing Lab	**L T P**	**Cr**
		0-0-2	**1**

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.

CS-261B	Web Technology Lab	L T P	Cr
		0 0 4	2

List of Experiment

1 Design a web page using Physical and Logical tags of HTML.

2 Design a web page using
- 3.1 Ordered List
- 3.2 Unordered Lists
- 3.3 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.

B. Tech (CSE) 2nd Yr, 4th Semester

CS-202B	COMPUTER NETWORKS	L T P	Cr
		4 0 0	4

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

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.
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.
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
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.
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 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-204B	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

1. **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.

2. **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.

3. **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.

4. **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.

5. **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

CS-206B	COMPUTER GRAPHICS	L T P	Cr
		4 0 0	4

OBJECTIVE

Students completing this course are expected to be able to:

- Write programs that utilize the OpenGL graphics environment.
- Use polygonal and other modeling methods to describe scenes.
- Understand and be able to apply geometric transformations.
- Create basic animations.
- Understand scan-line, ray-tracing, and radiosity rendering methods

PRE-REQUISITES

Knowledge of computer programming, 2D and 3D geometry

1. **INTRODUCTION:** What is computer graphics, computer graphics applications, Basics of computer graphics hardware and software, 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; polygon filling algorithm, boundary filled algorithm, scan-line algorithm, flood fill algorithm.
2. **TWO DIMENSIONAL VIEWING & 2D TRANSFORMATION**: The 2-D viewing pipeline, windows, viewports, window to view port mapping; homogeneous coordinates system, two dimensional transformations: transformations, translation, scaling, rotation, reflection, shearing, transformation, composite transformation.
3. **LINE & POLYGON CLIPPING ALGORITHM:** clipping: point, clipping line (algorithms): 4 bit code

algorithm, Sutherland- Cohen algorithm, parametric line clipping algorithm (Cyrus Beck). Sutherland Hodgeman polygon clipping algorithm,

4. **THREE DIMENSIONAL GRAPHICS:** Three dimensional graphics concept, matrix representation of 3-D transformations, composition of 3-D transformation; viewing in 3D: projections, types of projections; the mathematics of planner geometric projections; coordinate systems.
5. **HIDDEN SURFACE REMOVAL & CURVES AND SURFACES:** Introduction to hidden surface removal; the Z- buffer algorithm, scan-line algorithm, area sub-division algorithm. Parametric representation of curves: Bezier curves, B-Spline curves; parametric representation of surfaces; interpolation method

TEXT BOOK

Foley James D., van Dam Andeies, Feiner Stevan K. and Hughes J ohb F., ―Computer Graphics Principles and P ractices‖, 2nd Edition, Addision Wesley, 2000

REFERENCE BOOKS

1. Hearn Donald and Baker M. Pauline, ―Computer Graphics‖, 2nd Edition, Prentice Hall of India, 1999
2. Rogers David F., ―Procedural Elements for Computer Graphics‖ , 2nd Edition, Tata McGraw Hill, 2001
3. Watt Alan, ―Fundamentals of 3-Dimensional Computer Graphics‖, Addision Wesley, 1999
4. John Corrig n, ―Computer Graphics: Secrets and Solutions‖, BP B Publications, 1994
5. Krishanmurthy N., ―Introduction to Computer Graphics‖, Tata McGraw Hill, 2002

CS-208B	CORE 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

1. 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
2. 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
3. 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
4. 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
5. 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.

CS-210B	SOFTWARE ENGINEERING	L T P	Cr
		3 0 0	3

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

1. **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.
2. **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.
3. **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
4. **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
5. **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

EC-202B	DIGITAL AND ANALOG COMMUNICATIONS	L T P	Cr
		3 0 0	3

OBJECTIVE

To acquaint the students with the knowledge of different modes of communication techniques as well as equipment and standard guiding such communication.

1. **COMMUNICATION SYSTEM COMPONENTS:** Introduction to Communication: definition & means of communications; digital and analog signals: sign waves, square waves; properties of signals: amplitude, frequency, phase; theoretical basis for data communication: Fourier analysis: Fourier series and Fourier Transform (property, ESD, PSD and Raleigh) effect of limited bandwidth on digital signal.
   DATA ENCODING SCHEMES: Physical connections: modulation, amplitude-, frequency-, phase- modulation; Data encoding: binary encoding (NRZ), Manchester encoding, differential Manchester encoding.
2. **DATA TRANSMISSION**: Transmission Media: Twisted pair-, co-axial-, fiber optic-cables, wireless media; transmission impairments: attenuation, limited bandwidth of the channels, delay distortion, noise, data rate of the channels (Nyquist theorem, Shannon limit)
3. **DATA COMMUNICATION INTERFACES:** Physical layer interfaces: RS 232, X.21; parallel interfaces: the telephone network: DDD network; private- line service; the telephone circuit; data modems: synchronous modems; asynchronous modems; modem synchronization
4. **STANDARDS IN DATA COMMUNICATIONS:** Communication modes: simplex, half duplex, full duplex; transmission modes: serial-, parallel-transmission; synchronizations: asynchronous-, synchronous-transmission; type of services: connection oriented-, connectionless-services; flow control: unrestricted simplex protocol, simplex stop- and -wait protocol, sliding window protocol.
   SWITCHING SYSTEMS: Introduction: circuit switching; packet switching: data gram, virtual circuits, and permanent virtual circuits. Telephone Systems: PSTN, ISDN, asynchronous digital subscriber line, Multiplexing: frequency division-, time-, wave- division multiplexing
5. **SECURITY IN DATA COMMUNICATIONS:** Transmission errors: feedback-, forward-error control approaches; error detection; parity check, block sum check, frame check sequences; error correction: hamming codes, cyclic redundancy check. data encryption: secret key cryptography, public key cryptograph; data compression: run length encoding, Huffman encoding.

TEXT BOOK

Simon Haykin, Communication Systems, 3rd edition, Wiley, 1995.

REFERENCE BOOKS

1. Sanjay Sharma, Communication Systems, Kataria& Sons.
2. HSU. HWei P, Analog and Digital Communications, Schaum's outline series, Tata McGraw Hill, 2003
3. Singh, R.P. and Sapre, S.D., Communication Systems, Analog and Digital, Tata McGraw Hill, 2002.
4. P Chakraborthy, Analog communication systems, Dhanapatirai& Sons, 2008
5. Sam Shanmugam.K.; Digital and Analog Communication Systems, Wiley, 1998.
6. Taub and Shilling, Principles of Communication Systems, 2nd edition, Tata McGraw Hill, 2003.

CS-252 B	COMPUTER NETWORKS LAB	L T P	Cr
		0 0 2	1

LIST OF EXPERIMENTS

S. No.	Experiment/Exercise
PART -1	Basics of Computer Networks
1	Study of computer Networks and different types of Computer Networks.

S. No.	Experiment/Exercise
2	Study of Types of Network Topology with help of diagram.
3	Study about Different types of Communication medium.
4	Study of different type of connectors used in Computer Networks.
5	Study of Diff types of devices using Computer Networks.
PART-2	Basics of IP Addressing and LAN Setup equipments
6	IP Addressing and Subnet Concepts
7	Basic LAN setup
8	How to make RJ 45 connector.
9	How to make Straight cable.
10	How to make cross- over cable.
PART-3	Paket Tracer
10	Write the steps to connection two computer using crossover cable
11	Create a peer to peer network in Packet tracer.
12	Write the steps to create a LAN in Packet tracer with the help of Hubs.
13	Write the steps to create a LAN in Packet tracer with the help of switches.
14	Write the steps to create a LAN in Packet tracer with the help of Hubs and switches both.
PART-4	Wireless and Networking Commands
15	Study of (a) Wireless Connectivity and (b) Different networking commands
16	Study of Ethernet Switch configuration (Simulator to be decided)
PART-5	Protocol Configuration
17	Configuring IPv4 Protocol
18	IPv6 addresses Protocol

CS-256B	COMPUTER GRAPHICS LAB	L T P	Cr
		0 0 2	1

LIST OF EXPERIMENTS

1. 2D line as raster graphics display using Bresenhem line drawing algorithm
2. 2D line drawing as raster graphics display using DDA line drawing algorithm
3. Circle drawing as raster graphics display using midpoint circle drawing algorithm
4. Polygon filling as raster graphics display using Boundary fill algorithm and Flood fill algorithm
5. Line clipping
6. Polygon clipping
7. Display 3D object as 2D raster graphics display using perspective transformation
8. Rotation for 3D object about arbitrary axis
9. Hidden surface removal from a 3D object
10. 2D transformations of a given object (triangle, rectangle, pentagon) for translating, scaling, rotating, reflecting, shearing
11. Create a screen saver using inbuilt functions of graphics
12. Zoom an object
13. Reverse zooming
14. Create a Bezier Curve

REFERENCE BOOKS

1. Hearn Donald and Baker M. Pauline, ―Computer Graphics‖, 2nd Edition, Prentice Hall of India, 1999
2. Rogers David F., ―Procedural Elements for Computer Graphics‖, 2nd Edition, Tata McGraw Hill, 2001

CS-258 B	CORE JAVA LAB	L T P	Cr
		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.

CS-254B	OPERATING SYSTEMS LAB	L T P	Cr
		0 0 2	1

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.

3rd Year
syllabus

CS-301B	ADVANCE JAVA	L T P	Cr
		4 0 0	4

OBJECTIVE

To relay the theoretical and practical knowledge of Advanced Java programming language

PRE-REQUISITES

Basic knowledge of programming language and object oriented programming

1. INTRODUCTION TO CORE JAVA: Overview of Core Java: Data types; variables; operators; Arrays; Control Statements; Classes & Methods; Inheritance; Package, Multithreading; Exception Handling Applet Programming, I/O Handling
2. AWT , SWING, COLLETION: Introduction to AWT: Working with windows, Text, Controls, Layout Mangers, Menus; Swing: JApplet, Icons and Labels, Text Fields, Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees, Tables; Collection overview: collection interfaces: Collection, List, Set , Sorted Set; Collection classes Array List, Linked List, Hash Set, Linked Hash Set, Tree Set
3. **JAVA DATA BASE CONNECTIVITY (JDBC):** Introduction; JDBC architecture; Different types of JDBC drivers; JDBC API; Steps for using JDBC: Loading a driver, Connecting to a database, creating and executing JDBC statements, Handling SQL exceptions; Executing DDL & DML commands; Accessing the result sets; creating a JDBC application to query a database; Creating application using advanced features of JDBC: Using the Prepared Statement, Managing database transactions, Creating stored procedures, Using meta data
4. **SERVLETS:** Introduction; The life cycle of a thread; Using Tomcat for servlet development; Simple servlet example; The servlet API; javax.servlet package; reading servlet parameter; javax. servet. http package; handling HTTP requests and responses; Using cookies; Session Tracking; Security issues
5. **JSP:** JSP overview: How JSP works, Basic example; JSP Syntax & Semantics; JSP development model: Components of a JSP page, A complete example; Expressions, Scriplets and declarations page, Request dispatching, Session and Thread management: Session Tracking, Session API, Thread Management , Servlet Thread Model; JSP Custom; Expressions Language; JSP database access with JDBC

TEXT BOOK

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

REFERENCE BOOKS

1. Phil Hanna ," The Complete Reference JSP 2.0" Tata McGraw-Hill
2. James Homes," The Complete Reference Struts " Tata McGraw-Hill
3. Balaguruswamy , E., ""Programming with Java", Tata Mcgraw Hill
4. Horetmann Cay and Cornell Gary, "Core JavaTM 2, Volume II – Advanced Features", 7th Edition, Pearson Publisher.
5. "Complete reference JDBC", Tata Mcgraw Hill
6. JDBC Study Material by NIIT

CS-303B	ARTIFICIAL INTELLIGENCE	L T P	Cr
		3 0 0	3

OBJECTIVE: To introduce about artificial intelligence approaches to problem solving, various issues involved and application areas

PRE-REQUISITES: Knowledge of neural networks, data structures

1. **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.
2. **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
3. **REASONING UNDERUNCERTAINITY:** Reasoning under uncertainty, non monotonic reasoning; Review of probability; Baye's probabilistic interferences and Dumpster Shafer theory; statistical reasoning, fuzzy reasoning.
4. **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.
5. **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 Intellig ence‖ 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 Intellig ence‖, 3rd Edition, Addition Wesley, 1992
6. Clockson & Mellish, ―Programming PROLOG‖, 3rd Edition, Narosa Publications, 2002.

CS-305B	Python Programming	L-T-P	Cr
		4-0-0	4

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.

UNIT 1: 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 2: 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 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, Handling exceptions

Text Books:

1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India

Refernce 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/

CS-307B	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.

PRE-REQUISITES : Knowledge of mathematics, statistics and probability

1. **NEURAL NETWORKS INTRODUCTION AND ARCHITECTURE:** Comparison of soft computing methods: neural networks, fuzzy logic, and genetic algorithm with conventional artificial intelligence (hard computing).Neural Networks: H istory, overview of biological Neuro-system, Mathematical Models of Neurons ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta. Associative Memories, Kohonensel forganizing networks, Hebbian learning, Hopfield network.
2. **MULTILAYER PERCEPTRON** : Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propogation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting backpropagation training, applications.Radial basis function networks.
3. **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, fuzzy associative memories.
4. **NEURO-FUZZY MODELLING:** Adaptive neuro-fuzzy inference systems; neuro-fuzzy controller-feedback control; expert control; back propagation through time and real-time recurrent learning; reinforcement learning control; gradient-free optimization.NEURO-FUZZY CONTROLLER IN ENGINEERING APPLICATIONS: Fuzzy logic in control engineering- Mamdani and Sugeno architecture for fuzzy control
5. **GENETIC ALGORITHMS:** Basics of genetic algorithms; design issues in genetic algorithm; genetic modeling; hybrid approach; GA based fuzzy model identification; fuzzy logic controlled genetic algorithm.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

Introduction to Soft Computing – S.N.Sivanandan and Deepa – Wiley Publications

REFERENCE BOOKS

1. Rajasekharan 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. Introduction to soft computing –Sivanandam and Deepa..
4. Konar Amit, “Artificial Intelligence and Soft Computing – Behavioural and Cognitive Modeling of the Human Brain”, Special Indian Edition, CRC Press, 2008
5. Goldberg David E., “Genetic Algorithms”, Pearson Education, 2003.
6. Sivanandam, “Introduction to Neural Networks with MATLAB 6.0”, Tata McGraw Hill
7. Kumar Satish, “Neural Networks: Classroom Approach”, Tata McGraw Hill
8. Yen John and Langari Reza, “Fuzzy Logic, Intelligence, Control, and Information”, Pearson Education, 2003.

9. Zurada Jack N., “Introduction to Neural Networks”, Jaico Publishers.
10. Haykin Simon, “Neural Networks”, Prentice Hall, 1993/Pearson Education, 1999.
11. Koza J., “Genetic Programming”, MIT Press, 1993

CS- 309B	Formal Languages and Automata Theory	L T P	Cr
		4-0-0	4

PRE-REQUISITES

Knowledge of mathematics and Programming Languages

OBJECTIVE:

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.

1. **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
2. **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.
3. **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.
4. **TURING MACHINES:** Basic concepts, Deterministic and non-deterministic Turing machines; design of Turing machines; halting problem of Turing machines.
5. **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-303B	Microprocessors and Interfacing	L T P	Cr
		3 1 0	4

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

PRE-REQUISITES Knowledge of Boolean algebra, number systems and basic digital circuitry

1. **THE 8085 PROCESSOR:** Introduction to microprocessor; 8085 microprocessor: Architecture; Pin Diagram; instruction set; interrupt structure; Addressing modes and assembly language programming.

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.
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.

3. **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.

4. **PROGRAMMABLE INTERRUPT CONTROLLER:** 8259 pin diagram; architecture; initialization command words; operational command wards.

5. **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-351B	Advance Java Lab	L T P	Cr
		0-0-2	1

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.

CS-353B	ARTIFICIAL INTELLIGENCE LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

1. Study of Prolog programming language.
2. Write a program to find out route distance between two cities using Prolog.
3. Write a program to implement Tower of Hanoi using Prolog.
4. Write a program to calculate factorial of a number using Prolog.
5. Write a program to implement Hardware simulation using Gates using Prolog.
6. Write a program to implement family relationship using Prolog.
7. Write a program to implement logon with recursion using Prolog.
8. Write a program to print the list of customer having different colored cars with price and model available using Prolog.
9. Write a program to implement water jug problem using Prolog.
10. Write a program to implement Breadth First Search using Prolog.
11. Write a program to implement Depth First Search using Prolog.
12. Write a program to implement five House logic puzzle problem using Prolog.
13. Write a program to analyze Grammar of sentences using Prolog.
14. Write a program to solve 8-Queens problem using Prolog.
15. Write a program to solve Monkey Banana problem using Prolog.

EC-353B	MICROPROCESSOR AND INTERFACING 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-302B	Stastical Learning Theory	L T P	Cr
		3 0 0	3

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-304B	Machine Learning	L T P	Cr
		3 0 0	3

Unit I : Introduction –Well defined learning problems,Designing a Learning System, Issues in Machine Learning; SUPERVISED LEARNING (REGRESSION/CLASSIFICATION): Basic methods: Distance-based methods, Nearest-Neighbours, Decision Trees, Naive Bayes **,** Linear models: Linear Regression, Logistic Regression, Generalized Linear Models Support Vector Machines, Nonlinearity and Kernel Methods Beyond Binary Classification: Multi-class/Structured Outputs, Ranking

Unit II: UNSUPERVISED LEARNING– Clustering: K-means/Kernel K-means, Dimensionality Reduction: PCA and kernel PCA, Matrix Factorization and Matrix Completion, Generative Models (mixture models and latent factor models)

Unit III : Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods (Boosting, Bagging, Random Forests)

UNIT IV: Sparse Modeling and Estimation, Modeling Sequence/Time-Series Data, Deep Learning and Feature Representation Learning

UNIT V: Scalable Machine Learning (Online and Distributed Learning), Introduction to Bayesian Learning and Inference, Recent trends in various learning techniques of machine learning and classification methods.

References:

1. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
2. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009 (freely available online)
3. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007

CS-306B	Neural Networks	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

UNIT-1

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 elarning rule, etc.

UNIT-2

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-3

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-4

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-5

Self organizing networks: UN supervised learning of clusters, winner-take-all learning, recall mode, Initialisation of weights, seperability limitations

Text Books:

1. 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-308B	Cryptography & Network Security	L T P	Cr
		3 0 0	3

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

1. **Attacks on Computers & Computer Security:** Introduction; The need of Security ; Security Approaches; Principal of Security; Types of Attacks
2. **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
3. **Digital Certificates and Public Key Infrastructure:** Digital Certificates ; Private Key Management; The PKIX Model ; Public Key Cryptography Standards; Creating Digital certificates using Java
4. **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
5. **User Authentication and Kerberos:** Introduction ; Authentication Basics; Passwords; Authentication Tokens; Certificate Based Authentication; Biometric Authentication; Kerberos
6. **Network Security , Firewall and VPN:** Introduction ; Firewalls: Types of Firewalls ; IP Security; Virtual Private Network; Intrusion
7. **Case Studies on Network Security :** Introduction ; secure Inter branch payment transactions; Denial of Service attacks; IP Spoofing attacks; Contract Signing; Secret Splitting ; Virtual elections

REFERENCE BOOKS

1. Atuk Kahate , "Cryptography and Network Security", 3rd Edition, Tata Mcgraw Hill

REFERENCE BOOKS

2. Stallings William, "Cryptography and Network Security", 4th Edition, Prentice-Hall, Englewood Cliffs, 2006
3. Mani Subramanian, "Network Management Principles & Practices", Addison Wesley, 1999
4. Kauffman C., Perlman R. and Spenser M., "Network Security", 2nd Edition, Prentice Hall, 2002.
5. Menezes Alfred, van Oorschot Paul, and Vanstone Scott, "Handbook of Applied Cryptography", CRC Press, NY, 2004.
6. Bellovin S. and Chesvick W., "Internet Security and Firewalls", 2nd Edition, Addison Wesley, 1998.

Schneier Bruce, "Applied Cryptography", Wiley Student Edition, 2nd Edition

CS-310B	Information Security Fundamentals	L T P	Cr
		3 0 0	3

Unit No. 1 CIA Triad

Confidentiality; Integrity & Availability; What is Information Security? Identification and Authentication; Authorization and Access Control; Auditing and Accountability

Unit No. 2 Cryptography, Operations Security

Modern Cryptography Tools; Protecting Data at rest; In motion; And In Use; Origins Of Operations Security; The Operations Security Process; Laws Of Operations Security; Operations Security in our Personal Lives

Unit No. 3 Physical Security and Network Security

Introduction; Physical Security Controls; Protecting People; Data and Equipment; Protecting Networks; Protecting Network Traffic; Network Security Tools

Unit No. 4 Operating System and Application Security

Operating System Hardening; Protecting Against Malware; Software Firewalls and Host Intrusion Detection; Operating System Security Tools; Software Development Vulnerabilities; Web Security; Database Security; Application Security Tools.

Unit No. 5 Information Security -Audit and Monitoring, Intelligence

Change and Security Implications; System Models; Targets and Methods; Log Management; Data Aggregation and Reduction; Notifications and Reporting; Monitoring and Control Challenges; Auditing Standards; SAS 70 Audits**;** Sarbanes-Oxley; Addressing Multiple Regulations for Information Security Technical Frameworks for IT Audits**;** Intelligence and Compliance; Management and Governance**.**

REFERENCE BOOKS

7. Stallings William, “Cryptography and Network Security”, 4th Edition, Prentice-Hall, Englewood Cliffs, 2006
8. Mani Subramanian, “Network Management Principles & Practices”, Addison Wesley, 1999
9. Kauffman C., Perlman R. and Spenser M., “Network Security”, 2nd Edition, Prentice Hall, 2002.
10. Menezes Alfred, van Oorschot Paul, and Vanstone Scott, “Handbook of Applied Cryptography”, CRC Press, NY, 2004.
11. Bellovin S. and Chesvick W., “Internet Security and Firewalls”, 2nd Edition, Addison Wesley, 1998.

Schneier Bruce, “Applied Cryptography”, Wiley Student Edition, 2nd Edition

CS-312B	Cloud Computing	L T P	Cr
		3-0-0	3

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.

CS-354B	Stastical package for social science Lab	L T P	Cr
		0-0-2	1

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-356B	Machine Learning Lab	L T P	Cr
		0-0-2	1

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that needto be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

CS-356B	Neural Networks Using MATLAB Lab	L T P	Cr
		0-0-2	1

1. To study about MATLAB.
2. Write a program to perform the basics matrix operations.
3. WAP to plot the Straight line.
4. WAP to plot the Sine curve.
5. How the weight & bias value effects the output of neurons.
6. 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)
7. How the weight and biased value are able to represent a decision boundary in the feature space.
8. How the Perceptron Learning rule works for Linearly Separable Problem.
9. How the Perceptron Learning rule works for Non-Linearly Separable Problem.
10. Write a program to draw a graph with multiple curve.

CS-358B	Cryptography & Network Security Lab	L T P	Cr
		0-0-2	1

List of Practicals:

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 CipherEncyption-Decryption
6. To implement Diffie Hellman Key Exchange.
7. To implement RSA Encryption-Decryption.
8. To implement TRIPLE-DES Encryption-Decryption

SYLLABUS 4th Year

CS-401B	R Programming	L T P	Cr
		3 0 0	3

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:

R Programming for Data Science by Roger D.Peng

The Art of R Programming by Prashanthsingh, VivekMourya, CengageLearning India.

CS-403B	Deep Learning	L T P	Cr
		3 0 0	3

Unit I: Convolutional Neural Networks:Invariance, stability,Variability models (deformation model, stochastic model).,Scattering networks,Group Formalism ,Supervised Learning: classification.

Unit II: Properties of CNN representations: invertibility, stability, invariance.,covariance/invariance: capsules and related models,Connections with other models: dictionary learning,

Unit III: LISTA,Other tasks: localization, regression, Embeddings (DrLim), inverse problems Extensions to non-euclidean domains,Dynamical systems: RNNs.

Unit IV: Deep Unsupervised Learning Autoencoders (standard, denoising, contractive, etc etc),Variational Autoencoders, Adversarial Generative Networks Maximum Entropy Distributions

Unit V: Non-convex optimization for deep networks,Stochastic Optimization,Attention and Memory Models ,Open Problems

References

1. https://github.com/joanbruna/stat212b
2. https://bcourses.berkeley.edu/courses.

CS-405B	Pattern Recognition	L T P	Cr
		3 0 0	3

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 anddiscriminant functions,

Unit – III Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameterestimation, 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-407B	Speech & Natural language processing	L T P	Cr
		3 0 0	3

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

CS-451B	**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 *colnames()* and *rownames()* .
13. Write an R Program to create a Matrix using *cbind()* and *rbind()*functions.
14. Write an R Program to create a Matrix from a Vector using ***dim()***function.
15. Write an R Program to create a List and modify itscomponents.
16. Write an R Program to create a DataFrame.
17. Write an R Program to access a Data Frame like aList.
18. Write an R Program to access a Data Frame like aMatrix.
19. Write an R Program to create aFactor.
20. Write an R Program to Access and Modify Components of aFactor.
21. Write an R Program to create an S3 Class and S3Objects.
22. Write an R Program to write a own generic function in S3Class.
23. Write an R Program to create an S4 Class and S4Objects.
24. Write an R Program to write a own generic function in S4 Class.
25. Write an R Program to create Reference Class and modify its Methods.

CS-453B	**Deep learning Lab**	**L T P**	**Cr**
		0-0-2	**1**

1. Python Basics with Numpy (Optional)
2. Logistic Regression with a neural network mindset
3. Planar data classification with a hidden layer
4. Building your Deep Neural Network: step by step
5. Deep Neural Network - Application
6. Initialization
7. Regularization
8. Gradient Checking
9. Optimization
10. Tensorflow
11. Convolutional Neural Network - Step by Step
12. Convolutional Neural Network - Application
13. Keras Tutorial: This assignment is optional.
14. Residual Networks
15. Car Detection with YOLOv2
16. Art Generation with Neural Style Transfer
17. Face recognition for the Happy House

CS-455B	**Pattern Recognition Lab**	**L T P**	**Cr**
		0-0-2	**1**

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-411B	INFORMATION SECURITY AUDIT & MONITORING	L T P	Cr
		3 0 0	3

Unit 1: Auditing: Accountability; Compliance

Unit 2: Audit Trails: Audit Trails; Reporting timeline; Record Retention; External Auditors; Laws

Unit 3: Monitoring: Monitoring tools; Warning banner; Traffic analysis; Trend analysis

Unit 4: 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 5: 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

CS-413B	Digital Forensics	L T P	Cr
		3 0 0	3

Unit -1: 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 -2: 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 -3: 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 -4: Mobile Forensics & Steganography

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 -5: 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

CS-415B	IT Application Security	L T P	Cr
		3 0 0	3

Unit-1: Application Security

Input Validation - Buffer Overflow, Cross-Site Scripting; SQL Injection, Canonicalization, Sensitive Information , Access Sensitive Data In Storage, Network Eavesdropping, Data Tampering.

Unit-2: 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-3: 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-4: 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-5: 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.

CS-417B	Physical Security	L T P	Cr
		3 0 0	3

Unit-1: 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-2: 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-3: 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-4: 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-5: 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.

CS-461B	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-463B	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-421B	Introduction to open source Software and Open Standards	L T P	Cr
		3 0 0	3

Unit 1

Introduction : Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History : BSD, The Free Software Foundation and the GNU Project.

Unit 2

Open Source History, Initiatives, Principle and methodologies. Philosophy : Software Freedom, Open Source Development Model Licences and Patents: What Is A License, Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copylefts, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization

Unit 3

Case Studies : Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office.

Unit 4

Starting and Maintaining an Open Source Project, Open Source Hardware, Open Source Design, Open source Teaching. and Open source media.

Unit 5

Open source vs. closed source Open source government, Open source ethics. Social and Financial impacts of open source technology, Shared software, Shared source

CS-423B	Cloud Computing Architecture and Development Model	L T P	Cr
		3 0 0	3

Unit-1: Overview of Delivery models in Cloud Computing

Cloud Computing Platform Overview, Why Cloud Computing?; Evolution of Cloud Computing; What is Cloud Computing?;Essential characteristics of Cloud Computing; Types of Cloud, Cloud Computing Advantages; Illustration of the benefits of cloud computing ;Cloud Computing Challenges; Illustration of cloud computing challenges; Cloud Computing Service models; Cloud Computing Deployment models; Cloud Service and Deployment models; Cloud adoption considerations; Cloud adoption; Cloud History – Internet technologies (SOA, Web Services, Web 2.0, mashups), Distributed computing – Utility and Grid Computing; Hardware – VMWare ESXi, Xen, KVM; Virtual Appliances and the open Virtualization format; System Management; Anatomy of Cloud; Benefits of Cloud; Cloud Transformation roadmap; cloud delivery models and their advantages; Cloud computing architecture.

Unit-2: IaaS, PaaS and SaaS

Introduction to Infrastructure as a Service delivery model; characteristics of IaaS, Architecture, examples of IaaS; Applicability of IaaS in the industry, Comparing ISPs and IaaS, Motivations for renting the infrastructure; IaaS; Case studies; IaaS enabling Technology; Trusted cloud;Introduction to Platform as a Service delivery model, characteristics of PaaS, patterns, architecture and examples of PaaS; Applicability of PaaS in the industry ; integrated Lifecycle Platform; Anchored Lifecycle platform; Enabling Technologies as a Platform; PaaS – best option or not. Introduction to Software as a Service delivery model, characteristics of SaaS, SaaS Origin; Evolvement of SaaS – Salseforce.com's approach; SaaS Economics and Ecosystem; Types of SaaS Platforms; Architecture;SaaS – Providers; Collaboration as a Service; Enabling and Management tools as a Service; Applicability of SaaS in the industry.

Unit-3: Cloud Computing Reference Architecture (CCRA)

Introduction to Cloud computing reference architecture (CCRA); benefits of CCRA, Architecture overview – The conceptual Reference Model; Cloud Consumer; Cloud provider; Cloud Auditor; Cloud carrier; Scope of control between Provider and Consumer; CCRA : Architectural Components – Service deployment , Service Orchestration, Cloud Service Management, Security; Cloud Taxonomy; IBM's Cloud Computing Reference Architecture(CCRA 2.0) – Introduction, roles, Architectural elements; CCRA evolution; Examples of Cloud Services; versions and application of CCRA for developing clouds.

Unit-4: Private, Public Cloud Deployment Models

What is a Private Cloud?, Illustration of Private Cloud, Advantages of Private Cloud, Limitations of Private Cloud; Service Management, Journey into Private Cloud; Planning and Strategy, Standardization, Virtualization, Automation, Cloud, Case study – VMware vCloud; Case Study – IBM SmartCloud Entry, Private cloud; What is a Public Cloud?, Illustration of Public Cloud, Why Public Cloud, Advantages of Public Cloud, Limitations of Public Cloud; Low degree of security and control, Lack of control on infrastructure, configuration, Network latency and accessibility concerns;Highest long term cost, Public v/s Private, Journey into Public Cloud, Revisit the idea of adopting public cloud, Cloud vendor selection; Migrating to Cloud, Cloud vendor selection, SLA – Service Level Agreements, Credits/Compensation terms, Credit process,

Disaster recovery plan, Exclusions, Security and Privacy, Periodic upgrade and maintenance; Data location and Jurisdiction, Pricing and Measurability, Interoperability and Lock-in, Exit process/Termination policies, Proven track record, Public cloud vendors,

Unit-5: Hybrid Cloud

Case studies. What is a Hybrid Cloud?, Why Hybrid Cloud, Illustration of Hybrid Cloud, Advantages of Hybrid Cloud, Challenges of Hybrid Cloud, Develop and manage hybrid workloads, Developing applications for hybrid cloud; Develop applications using PaaS, Managing hybrid workloads; Journey into Hybrid Cloud, Step 1: Asses current IT infrastructure and business, Step 2: Explore cloud computing, Step 3: Create cloud deployment strategy plan, Step 4: hybrid cloud implementation.

CS-425B	Introduction to Internet of Things	L T P	Cr
		3 0 0	3

Unit-1: Introduction

IOT Concepts, Introduction to IOT Communications, Telemetry vs IOT, Applications of IOT Communications, People, Processes and Devices. IOT Verticals; IOT Hosted Services; IOT Application development.; IOT Connectivity; IOT Software providers.

Unit-2: IOT Technologies behind smart and intelligent devices

Automation, asset management, telemetry, transportation, telematics. Telemetry and Telemetric; Report location, logistics, tracking and remote assistance; next generation kiosks, self-service technology; Cellular IOT connectivity services

Unit-3: IOT Systems and Networks

Study of RF Wireless Sensors; Wireless networks; Computer Connected to Internet; Network Devices; Device configuration and management; Exchange information in real time without human intervention.

Unit-4 : IOT Design and System Engineering

Discuss IOT Requirements; Hardware & Software; Study of IOT Sensors; Tagging and Tracking; Embedded Products; IOT Design; (U) SIM Card Technology; IOT Connectivity and Management; IOT Security & IOT Communication.

Unit-5: IOT Communication Technologies & IOT Security

Discuss Wireless Sensor Networking (WSN); Cellular Machine-to- Machine (M2M) application networks; Software for M2M Applications, Hardware, IP Based Cellular Networks & 3G, 4G, Discuss Security & Trust M2M Communications; Secure Communications;; M2M Security Framework; Securing Data input/output and internet communication.

CS-427B	Cloud Security	L T P	Cr
		3 0 0	3

Unit-1: Security Overview

Security Overview, Operating System – Security, Authentication, One Time passwords, Program Threats, System Threats, Computer Security Classifications, Application Security, Application Code Review, Secure Developer Training, Data Center Security, Security – Cloud Computing, Security Framework, Architecture Principles, System Management Components.

Unit-2: Understanding Security Risks

Understanding Security Risks, Understanding security risks, Identifying the biggest risks, Cloud computing - Working definition , Top security benefits, Top security risks, Security benefits of cloud computing, Security and the benefits of scale, Risks, Virtualization, Overview, Hypervisor, I/O Virtualization, Partitioning, Server Deployment, Virtual Server Deployment , What is a Tenant?, Defining Multi-Tenancy, Securing the Multi-Tenant Environment, Vulnerability: An Overview, Defining Vulnerability, Vulnerabilities and Cloud Risk, Cloud Computing, Core Cloud Computing Technologies , Essential Characteristics, Cloud-Specific Vulnerabilities, Core-Technology Vulnerabilities, Essential Cloud Characteristic Vulnerabilities, Defects in Known Security Controls, Prevalent Vulnerabilities in State-of-the-Art Cloud Offerings, Architectural Components and Vulnerabilities, Internal Security Breaches, Cloud Software Infrastructure and Environment, Computational Resources, Storage, Communication, Cloud Web Applications, Services and APIs, Management Access, Identity, Authentication, Authorization, and Auditing Mechanisms, Provider, Data Corruption, User account and Server Hijacking, How to Secure Your Cloud..

Unit-3: Addressing security risks in cloud

Introduction, Core Components of AAA, Example AAA Flow, Authorization Approaches, Accounting Techniques.

Unit-4: Identity Management

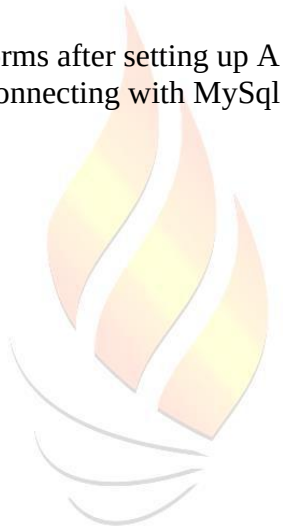
Identity management, Isolated identity management, Federated identity management, Centralized identity management, Authentication and Authorization, Challenges of Identity Management, Identity Theft, Identity Management Adoption and Benefits, Benefits of Identity Management, Conclusion, Evolution of IAM — moving beyond compliance, Identity access Management life cycle phases, IAM and IT trends, Mobile computing, Cloud computing, Data loss prevention, Social media, IAM and cybercrime, Case study — IAM in practice, Transforming IAM, Life cycle phase, Key considerations when transforming IAM, People, Process Technology, IAM tools, Key IAM capabilities, Conclusion, Detention, Field Acquisition & Analysis, Solid State Drives, Brief Discussion of Cylinders, Heads, and Sectors , Logical Block Addressing and Physical Block Addressing, “TRIM” Command.

Unit-5: Encryption and Decryption

Encryption and decryption, What is cryptography?, Strong cryptography, How does cryptography work?, Conventional cryptography, Caesar's Cipher, Key management and conventional encryption, Public key cryptography, How PGP works, Keys, Digital signatures, Hash functions, Digital certificates, Certificate distribution, Certificate servers, Public Key Infrastructures, Certificate formats, Validity and trust, Checking validity, Establishing trust, Meta and trusted introducers, Trust models, Levels of trust in PGP , Certificate Revocation, Communicating that a certificate has been revoked , What is a passphrase?, Key Splitting, Encryption, Data Encryption - Overview , Symmetric Encryption and Asymmetric encryption, Conclusions. Digital signature, Secure Sockets Layer (SSL), Encryption Protects Data During Transmission, Credentials Establish Identity Online, Authentication Generates Trust in Credentials, Extend Protection beyond HTTPS, Understanding SSL, Who Uses SSL?, How It Works, SSL Transactions , SSL Crypto Algorithms, SSL and the OSI Model, Secure messaging, Message digest, Security Technology, Identity, Integrity, Active Audit, Cryptography, Public key infrastructure, Non-repudiation, Public Key Encryption, Introduction to Authentication, Background, SSL authentication (server --> client), Mutual SSL Authentication (server <--> client), Capture and Analyze.

CS-471B	Introduction to open source Software and Open Standards Lab	L T P	Cr
		0 0 2	1

1. Kernel configuration, compilation and installation:
2. Virtualization environment
3. Compiling from source
4. Introduction to packet management system:
5. Installing various software packages:
6. Write user space drivers using fuse
7. Version Control System setup and usage using RCS,CVS,SVN
8. Text processing with Perl
9. Running PHP: simple applications like login forms after setting up A lamp stack
10. Running Python: some simple exercise e.g. Connecting with MySql database



CS-473B	Cloud Computing Architecture and Development Model Lab	L T P	Cr
		0 0 2	1

List of Practicals:

1. Open Stack Installation
2. Familiarize with OpenStack dashboard
3. deploy a virtual machine instance
4. Deploy a Linux VM from an ISO Image
5. Deploy a VM from an image snapshot
6. User and Project management
7. Common Cloud Management tasks
8. Adding a new compute note
9. Overview of Nagios
10. Overview of Openstack CLI

CS-475B	Internet of Things Lab	L T P	Cr
		0 0 2	1

List of Experiments:

1. Write a program to assign NET10 module an IPv4 address and perform a ping operation to the PC.
2. Design an application to store/update the sensed value to a HTTP webpage using the iSense IP stack and API'S
3. Implement Constraint Application Protocol (CoAP) to access the sensor value at the application layer.
4. Design a web page with default IP address such that it should display the values sent by the sensor with NET 10 interface.