LINGAYA'S VIDYAPEETH

Department of Computer Science & Engineering

Scheme & Syllabus

Of

B.Tech (Cyber Security)

Batch: 2022-2026

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: 2022-23

School: School of Computer Science & Information Technology	Batch:2022-2026
Department: Department of Computer Science & Engineering	Year:1st
Course: Bachelor of Technology (B.Tech(CS))	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	BSC	BS-107	Mathematics-I	3	1	0	4	15	25	60	-	-	100
2	BSC	BS-109	Physics	3	1	0	4	15	25	60	-	-	100
3	ESC	EC-101	Basic Electrical and Electronics Engineering	3	0	0	3	15	25	60	-	-	100
4	PCC	CS-101	Programming for Problem-Solving using C	3	0	0	3	15	25	60	-	-	100
5	HSMC	HSS-101	Effective Technical Communication	3	0	0	3	15	25	60	-	-	100
6	ESC	ME-151	Workshop Practice	0	0	4	2	15	25	60	-	-	100
7	BSC	BS-159	Physics Lab	0	0	2	1				60	40	100
8	ESC	EC-151	Basic Electrical and Electronics Engineering Lab	0	0	2	1				60	40	100
9	HSMC	HSS-151	English Communication Lab	0	0	2	1						100
10	PCC	CS-151	Programming for Problem-Solving using C Lab	0	0	2	1				60	40	100
			Total---->	15	2	12	23						

	Abbreviations:									
	PCC:	Programme Core Courses		ABQ:	Assignment Based Quiz					
	ESC:	Engineering Science		MSE:	Mid Semester Examination					
	HSMC:	Humanities, Social Science & Management course		ESE:	End Semester Examination					
	BSC:	Basic Science	IP:		Internal Practical					
	L:	Lecture		EXP:	External Practical					
	T:	Tutorial								
	P:	Practical								

LINGAYA'S VIDYAPEETH
SCHEME OF STUDIES
Session: 2022-23

School: School of Computer Science & Information Technology	Batch:2022-2026
Department: Department of Computer Science & Engineering	Year:1st
Course: Bachelor of Technology (B.Tech(CS))	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	BSC	BS-108	Mathematics-II	3	1	0	4	15	25	60	-	-	100
2	PCC	CS-106	Object Oriented Programming Using Java	3	0	0	3	15	25	60	-	-	100
3	PCC	CS-206	Database Management System	3	0	0	3	15	25	60	-	-	100
4	BSC	BS-110	Environment Science and Chemistry	3	0	0	3	15	25	60	-	-	100
5	ESC	ME-152	Engineering Graphics Lab	0	0	2	1				60	40	100
6	PCC	CS-156	Object Orient	0	0	2	1				60	40	100

			ed Programming Using Java Lab										
7	PCC	CS-256	Database Management System Lab	0	0	2	1				60	40	100
8	BSC	BS-106	Environment Science and Chemistry Lab	0	0	2	1				60	40	100
9	PDP	PEP-102	Universal Human Values	2	0	0	2						
			Total--	14	01	08	1						

			-->			9						

LINGAYA'S VIDYAPEETH
SCHEME OF STUDIES
SESSION: 2023-24

School ~~choose to know~~ puter Science & Information Technology	Batch: 2022-26
Department: Department of Computer Science & Engineering	Year: 2nd
Course: Bachelor of Technology (B.Tech(CS))	Semester: III

SN	Cate-gory	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								ABQ	Theory		Practical		
				L	T	P			MSE	ESE	IP	EXP	
1	BSC	EC-203	Digital Electronics	3	0	0	3	15	25	60	-	-	100
2	PCC	CS-205	Python Programming	3	0	0	3	15	25	60	-	-	100
3	PCC	CS-207	Computer Architecture and Organization	3	1	0	4	15	25	60	-	-	100
4	PCC	CS-209	Discrete Mathematics & Graph Theory	3	1	0	4	15	25	60	-	-	100
5	PCC	CS-202	Operating	3	0	0	3	1	2	6	-	-	100

SN	Category	Course Code	Course Name	L	T	P	Credits	Theory			Practical		Subject Total
			System					5	5	0			
6	PCC	CS-103	Data Structure Using C	3	0	0	3	15	25	60	-	-	100
7	PCC	CS-153	Data Structure Using C Lab	0	0	2	1				60	40	100
8	PCC	CS-255	Python Programming Lab	0	0	2	1				60	40	100
9	PCC	CS-252	Operating System Lab	0	0	2	1				60	40	100
10	BS	EC-253	Digital Electronics Lab	0	0	2	1				60	40	100
11	PDP	PEP-201	Exploring Self	1	0	2	2			40		60	100
12			Yoga										
13	PEC	VAC-101	Valued Added-I										
			Total	**19**	**2**	**10**	**26**						

LINGAYA'S VIDYAPEETH
SCHEME OF STUDIES
SESSION: 2023-24

School: School of Computer Science & Information Technology	Batch: 2022-2026
Department: Department of Computer Science & Engineering	Year: 2nd
Course Bachelor of Technology (B.Tech(CS))	Semester: IV

SN	Cate-gory	Course Code	Course Name	Periods	Credits	Evaluation Scheme		Subject Total
						Theory	Practical	

				L	T	P		ABQ	MSE	ESE	IP	EXP	Marks
1	PCC	CS-216	Internet of Things	3	1	0	4	15	25	60	-	-	100
2	PCC	CS-212	Design and Analysis of Algorithm	3	1	0	4	15	25	60	-	-	100
3	PCC	CS-408	Fundamentals of Cyber Security	3	0	0	3	15	25	60	-	-	100
4	PCC	CS-305	Artificial Intelligence	3	0	0	3	15	25	60	-	-	100
5	PCC	CS-210	Web & Internet Technology	3	0	0	3	15	25	60	-	-	100
6	PCC	CS-303	Formal Language Automata Theory	3	1	0	4	15	25	60	-	-	100
7	PCC	CS-260	Web & Internet Technology Lab	0	0	2	1				60	40	100
8	PCC	CS-355	Artificial Intelligence Lab	0	0	2	1				60	40	100
9	PCC	CS-458	Fundamentals of Cyber Security Lab	0	0	2	1				60	40	100
10		RA-101	Reasoning & Aptitude	1	0	0	1					50	50
11		PDP-202	Life Skills	0	0	2	1						
12	PEC		Value Added-II										

		Total	19	3	8	26						

LINGAYA'S VIDYAPEETH
SCHEME OF STUDIES
SESSION: 2024-25

School: School of Computer Science & Information Technology								Batch:2022-2026				
Department: Department of Computer Science & Engineering								Year:3rd				
Course: Bachelor of Technology (CSE- Cyber Security)								Semester: V				

S N	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	EC-301	Microprocessors & Microcontroller	3	0	0	3	15	25	60	-	-	100
2	PCC	CS-301	Computer Network	3	0	0	3	15	25	60	-	-	100
3	PSC	CS-409	Cyber Threats & Law	3	1	0	4	15	25	60	-	-	100
4	PEC	CS-313	Cyber Security Concepts & Cryptography	3	0	0	3	15	25	60	-	-	100
5	PEC	CS-315	Network & Application Security	3	0	0	3	15	25	60	-	-	100
6	ESC	EC-351	Microprocessors & Microcontroller Lab	0	0	2	1				60	40	100
7	PEC	CS-363	Cyber Security Concepts & Cryptography Lab	0	0	2	1				60	40	100
8	PEC	CS-365	Network & Application Security Lab	0	0	2	1				60	40	100
9	PROJ	CS-381	Minor Project-II/ Training	0	0	4	2					100	100
10	HSMC	PEP-301	Leadership & Management Skills	1	0	2	2						100
			Total---->	16	1	12	23						

	Abbreviations:											
	PCC:	Programme Core Courses			ABQ:	Assignment Based Quiz						
	PEC:	Programme Elective Courses			MSE:	Mid Semester Examination						
	PROJ:	Project			ESE:	End Semester Examination						
	ESC:	Engineering Science	IP:	Internal Practical								
	L:	Lecture		EXP:	External Practical							
	T:	Tutorial		HSMC:	Humanities, Social Science & Management course							
	P:	Practical										

LINGAYA'S VIDYAPEETH
SCHEME OF STUDIES
SESSION: 2024-25

School: School of Computer Science & Information Technology	Batch: 2022-2026
Department: Department of Computer Science & Engineering	Year: 3rd
Course: Bachelor of Technology (CSE- Cyber Security)	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-302	Statistical Learning Theory	3	0	0	3	15	25	60	-	-	100
2	PCC	CS-304	Software Engineering	3	0	0	3	15	25	60	-	-	100
3	PCC	CS-306	Cryptography &	3	0	0	3	15	25	60	-	-	100

#		Code	Course Name	L	T	P	C	ABQ	MSE	ESE	IP	EXP	Total
			Network Security										
4	PCC	CS-308	Compiler Design	3	0	0	3	15	25	60	-	-	100
5	PEC	CS-318	Network Architecture and Design	3	0	0	3	15	25	60	-	-	100
6	PEC	CS-320	Ethical Hacking	3	0	0	3	15	25	60	-	-	100
7	PCC	CS-352	Statistical Learning Theory Lab	0	0	2	1				60	40	100
8	PCC	CS-356	Cryptography & Network Security Lab	0	0	2	1				60	40	100
9	PEC	CS-368	Network Architecture and Design Lab	0	0	2	1				60	40	100
10	PEC	CS-370	Ethical Hacking Lab	0	0	2	1				60	40	100
11	PROJ	CS-382	Minor Project-III	0	0	4	2					100	100
12	MC	MC-302	Essence of Indian Traditional Knowledge	0	0	0	0						100
			Total---->	**18**	**0**	**12**	**24**						

	Abbreviations:											
	PCC:	Programme Core Courses			ABQ:	Assignment Based Quiz						
	PEC:	Programme Elective Courses			MSE:	Mid Semester Examination						
	PROJ:	Project			ESE:	End Semester Examination						
		L:	Lecture	IP:		Internal Practical						
		T:	Tutorial		EXP:	External Practical						
		P:	Practical									

LINGAYA'S VIDYAPEETH
SCHEME OF STUDIES
SESSION: 2025-26

School: School of Computer Science & Information Technology	Batch: 2022-2026

Department: Department of Computer Science & Engineering								Year:4th				
Course: Bachelor of Technology (CSE-Cyber Security)								Semester:VII				

S N	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-411	Information Security Audit & Monitoring	3	0	0	3	15	25	60	-	-	100
2	PEC	CS-413	Digital Forensics	3	0	0	3	15	25	60	-	-	100
3	PEC	CS-415	IT Application Security	3	0	0	3	15	25	60	-	-	100
4	PEC	CS-417	Physical Security	3	0	0	3	15	25	60	-	-	100
5	OE		Open Elective-I (From the bucket floated at University Level)	3	0	0	3	15	25	60	-	-	100
6	PEC	CS-463	Digital Forensics Lab	0	0	2	1				60	40	100
7	PEC	CS-465	IT Application Security Lab	0	0	2	1				60	40	100
8	PEC	CS-461	Information Security Audit & Monitoring Lab	0	0	2	1				60	40	100
9	PROJ	CS-485	Major Project I	0	0	8	4					100	100
10	HSMC	PEP-401	Professional skills	1	0	2	2						100
			Total---->	16	0	16	24						

	Abbreviations:								
	PEC:	Programme Elective Courses		ABQ:	Assignment Based Quiz				
	PROJ:	Project		MSE:	Mid Semester Examination				
	OE:	Open Elective		ESE:	End Semester Examination				
	L:		Lecture	IP:		Internal Practical			

	T:	Tutorial		EXP:	External Practical			
	P:	Practical						

LINGAYA'S VIDYAPEETH
SCHEME OF STUDIES
SESSION: 2025-26

School: Computer Science & Information Technology	Batch: 2022-2026
Department: Department of Computer Science & Engineering	Year:4th
Course: Bachelor of Technology (CSE-Cyber Security)	Semester: VIII

SN	Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
								Theory			Practical		
				L	T	P		ABQ	MSE	ESE	IP	EXP	
1	PEC	CS-406	Cyber Security Tools and Applications	3	0	0	3	15	25	60	-	-	100
2	PROJ	CS-490	Major Project-II/ Project Based on Internship	0	0	24	12	-	-	-	-	100	100
3	PROJ	CS-492	Seminar	0	0	2	1	-	-	-	-	100	100
			Total---->	3	0	26	16						

Open Elective-I	
Course Code	**Course Name**
BA-271A	Human Resource Management
MEOE- 401C	Industrial Robotics

Syllabus

Of

B.Tech

(Cyber Security)

1ˢᵗ Year

1ˢᵗ Semester

BS-107	MATHEMATICS - I	L T P	Cr
		3 1 0	4

OBJECTIVES

The objective of this subject is to understand the major problems of differential and integral calculus and to appreciate how calculus allows us to solve important practical problems in an optimal way.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Calculate limits, derivatives and indefinite integrals of various algebraic and trigonometric functions of a single variable.

CO2: Use the fact that the derivative is the slop of the tangent line to the curve at a given Point.

CO3: Use the properties of limits and the derivative to analyze graphs of various functions of a single variable

CO4: Apply derivative tests in optimization problems appearing in social sciences, physical sciences, life Sciences and a host of other disciplines.

UNIT I

MATRIX ALGEBRA: Elementary operations and their use in getting the Rank, Inverse of a matrix and solution of linear simultaneous equations. Orthogonal, Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, Normal & Unitary matrices and their elementary properties. Eigen-values and Eigenvectors of a matrix, Cayley-Hamilton theorem, Diagonalization of a matrix.

UNIT II

DIFFERENTIAL CALCULUS: Limit, Continuity and differentiability of functions of two variables, Euler's theorem for homogeneous equations, Tangent plane and normal. Change of variables, chain rule, Jacobians, Taylor's Theorem for two variables, Error approximations. Extrema of functions of two or

more variables, Lagrange's method of undetermined multipliers.

UNIT III
INTEGRAL CALCULUS: Review of curve tracing and quadric surfaces, Double and Triple integrals, Change of order of integration. Change of variables. Gamma and Beta functions. Dirichlet's integral. Applications of Multiple integrals such as surface area, volumes, centre of gravity and moment of inertia.

UNIT IV
VECTOR CALCULUS: Differentiation of vectors, gradient, divergence, curl and their physical meaning. Identities involving gradient, divergence and curl. Line and surface integrals. Green's, Gauss and Stroke's theorem and their applications.

REFERENCES
1. Shanti Narayan (2005), Differential Calculus, S. Chand Limited, ISBN 978-8-121-90471-4
2. P. K. Mittal (2005), Integral Calculus, S. Chand Limited, ISBN-13**:** 978-8-121-90681-4
3. Thomas (1996), Calculus and Analytical Geometry, Pearson Education, ISBN: 978-8-817- 758325-0.
4. Erwin Kreyszig, Herbert Kreyszig, Edward J. Norminton (2011), Advanced Engineering Mathematics, Wiley. ISBN: 978-0-470-45836-5.
5. R. K. Jain, S. R. K. Iyengar (2004), Advanced Engineering Mathematics, Alpha Science International. ISBN: 978-1-842-65185-8.

BS-109	PHYSICS	L T P	Cr
		3 1 0	4

OBJECTIVES
To familiar the students with the very basic knowledge of concepts and tools of applied physics and guide them to understand the various engineering subject.

COURSE OUTCOMES:
CO1: Examine the different phenomenon related with wave nature of light and significance in applications of engineering
CO2: Analyze the basics of laser and types of lasers & apply them to diverse engineering problems
CO3: Understand the concept of fundamental forces and apply the various laws in different engineering situations
CO4: Apply laws of the electrostatic and magnetostatic in different engineering situations

UNIT I
MECHANICS: Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction; Extension to cylindrical and spherical Coordinates.

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

UNIT III
LASERS: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO_2), solid-state lasers (ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine.

UNIT IV
ELECTROSTATICS: Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential, Boundary conditions of electric field and electrostatic potential; method of images; energy of a charge distribution and its expression in terms of electric field.

UNIT V
MAGNETOSTATICS: Principle of work and energy for a particle and a rigid body in plane motion – Conservation of energy - Principle of impulse and momentum for a particle and a rigid bodies in plane motion – Conservation of momentum – System of rigid bodies – Impact - direct and central impact – coefficient of restitution.

REFERENCES
1. David J. Griffiths Pati (2017), Introduction to Electrodynamics, Cambridge University Press. ISBN: 978-1-108-35714-2.
2. W H Hayt Jr, , J A Buck, M Jaleel Akhtar (2020), Engineering Electromagnetics, 9th Edition, McGraw-Hill International Edition. ISBN: 978-9-353-16973-2
3. Manoj K. Harbola (2009), Engineering Mechanics , 2nd Edition, Cengage Learning India Private Limited. ISBN: 978-8-131-50990-6
4. Mahendra K. Verma (2019), Introduction to Mechanics, Taylor & Francis Group. ISBN: 978-1-138-11677-1
5. Robert Eisberg, Robert Martin Eisberg, Robert Resnick, David O. Caldwell, Edward Derringh (1985), Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles, Wiley Publishers. ISBN: 978-0-471-87373-0.

EC-101	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L T P	Cr
		3 0 0	3

OBJECTIVES
1. To understand and analyze basic electric and Electronics concepts.
2. To study the working principles of electrical machines and power converters.
3. To study the Network Theorems.

COURSE OUTCOMES
The students undergoing this course will be able to:

CO1: Understand and analyze basic electric and magnetic circuits

CO2: Understand the working principles of electrical machines and power converters.

CO3: Understand the components of low voltage electrical installations and power converters.

UNIT I
HISTORICAL BACKGROUND: Vacuum tubes; working of vacuum tube and their characteristics; vacuum diode; triode; tetrode and pentode. PN JUNCTION: Depletion layer; Barrier potential; Forward and reverse bias; Breakdown voltage; PIV; switching characteristics of p-n junction diode; knee voltage; load line; and operating Point Ideal p-n junction diode; junction capacitance; Zener diode.

UNIT II
RECTIFIERS AND FILTERS: Half wave; centre tap full wave and bridge rectifier; percentage of regulation; PIV; ripple factor; C; RC; LC and PI filter; voltage doubler; clipping and clamping circuit; voltage regulation. Bipolar Junction Transistor: Introduction; basic theory of operation of PNP ad NPN transistor-l characteristics; CB; CE and CC configuration; different biasing techniques.

UNIT III

FET: Introduction; Theory of operation; JFET Parameters; and JFET Amplifiers. MOSFET: Introduction; theory of operation; MOSFET parameters; application; graphical analysis of BJT and FET circuits; linear models of BJT and FET; pulse and large signal models of BJT and FET.

UNIT IV
DC CIRCUITS: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real Power, reactive power, apparent power, power factor. Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin, Norton and maximum power transfer Theorems.

UNIT V
ELECTRICAL MACHINES: Three phase balanced circuits, voltage and current relations in star and delta connections. Generation of rotating magnetic fields, Construction and working of a three-phase induction Motor, Significance of torque-slip characteristic, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of dc motor. Construction and working of synchronous generators.

REFERENCES
1. Millman and Halkias (2000), Electronic Devices and Circuits, 2nd Edition, Tata McGraw Hill Publication, ISBN: 978-0-070-42380-0.
2. D P Kothari, I J Nagrath (2020), Basic Electrical and Electronics Engineering,Second Edition, McGraw-Hill Education, ISBN: 978-9-389-81125-4.
3. W.A.J.Chapman (2001), Workshop Technology, Vol 1, 5th Edition, CBS Publishers, ISBN: 978-8-123-90401-6.
4. Boylestad and Nashelsky (1999) , Electronic Devices and Circuit , 4th Edition, Pearson Education, ISBN: 978-9-332-54260-0.

CS-101	PROGRAMMING FOR PROBLEM-SOLVING USING C	L T P	Cr
		3 0 0	3

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Know the basic concepts of programming languages as well as operating system

CO2: Learn the basics of programming using C

CO3: undergo the functions and pointers

CO4: Learn about the structures, unions as well as functions using recursion

CO5: Know about the dynamic programming as well as file handling

<u>UNIT I</u>

INTRODUCTION TO COMPUTER SYSTEMS, PROGRAMMING LANGUAGES, OPERATING SYSTEM, NETWORKING, AND SECURITY: Overview of Computer Systems: Characteristics of Computer- speed, storage, Accuracy, Categories of computer- Micro Computers, Mini Computers, Main Frames, Super Computers, Computer Organization- Central processing unit, Arithmetic and Logic Unit, Control Unit, Memory System- Primary memory, secondary memory. Data Representation in a Computer System- Number system - decimal, Binary, Octal, Hexadecimal representation and conversion.

SOFTWARE BASICS: Application software, System Software, Programming languages: Low level languages, Machine language, Assembly language, High Level languages, Translator, Assembler, Interpreter, Compiler, Operating System: Need of Operating System, Function of Operating System, Types of Operating System, Introduction to Networking: Local and Wide Area Networks.

SECURITY THREATS: Intruders, Password Cracking, Types of malicious Software- Virus, Worms, Trojan Horse, Prevention from malicious Software- Antivirus

<u>UNIT II</u>

BASICS OF PROGRAMMING USING C: Problem definition, Representation of Algorithms: Flow charts/ Pseudocode with example, Types of programming languages, Translators, From algorithms to programs; source code, variables and memory location, Introduction to C: Structure of C program, C character set, Identifier and Keywords, Data types, constants, variables, Declaration, Arithmetic expressions & precedence , statements, Symbolic constants, type conversion, Types of operators, Input and output functions in C, header files, common programming errors, Control Statements, Sequencing, Selection, Condition and iteration, Arrays and Strings: Declaring, Referencing and initializing arrays, array subscript, using for loop for sequential access, multi-dimensional array, String basics string library functions, assignment and substring, concatenation, string comparison.

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

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

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

REFERENCES

1. Pradeep K. Sinha, Priti Sinha (2004), Computer Fundamentals, BPB Publications, ISBN: 9788176567527.
2. Byron S. Gottfried(1996), Programming with C, McGraw-Hill Education, ISBN:9780070240353.
3. E. Balagurusamy (1990), Programming in C, Tata McGraw-Hill Publishing ISBN: 9780074600474

HSS-101	EFFECTIVE TECHNICAL COMMUNICATION	L T P	Cr
		3 0 0	3

COURSE OUTCOMES
The students undergoing this course will be able to:
CO1: Comprehend and summarize characteristics & various structural principles prerequisite to Technical Communication
CO2: Classify and formulate the elementary intricacies of Scientific and Technical Writing using applicative grammar construct
CO3: Create cohesive technical paragraphs & text
CO4: Paraphrase text(s) and use appropriate referencing styles
CO5: Design and present/publish technical documents

UNIT I
INTRODUCTION TO TECHNICAL WRITING: An overview of Technical Writing, Nature of Scientific English & Technical writing, Taxonomy of Technical writing, Examples of Technical Writing

UNIT II
TECHNICAL WRITING DESIGN & DEVELOPMENT: Linguistic know-how in Technical Writing, Techniques of precision, Organization of Technical contents

UNIT III
SIGNPOSTING PARAGRAPH STRUCTURE & DEVELOPMENT: Signposting with strong Topic Sentence, Writing for Purpose: Explanation, Instruction, Description, Definition, Comparison & Contrast, Classification, Narration, Hypotheses

UNIT IV

FINDING DATA & INCORPORATING SOURCES: Finding data & incorporating sources, Paraphrasing, Avoiding Plagiarism, Referencing styles

UNIT V

CREATING TECHNICAL DOCUMENTS: Creating Technical Documents – Report, Manuals, Brochures etc. (Selected), Technical Presentation in Groups

REFERENCES
1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta
2. Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.
3. A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication, Delhi.
4. Rizvi, M.A. Academic Writing: A course in English for Science and Technology, Nabodaya
5. Price, Jonathan and Korman H., (1993) How to Communicate Technical Information: The Benjamin Cummings Publishing Company.
6. Muralikrishna and S. Mishra (2011) Communication Skills for Engineers, Pearson education. ISBN: 9788131733844.
7. Murphy, R. (2007) Essential English Grammar, CUP. ISBN: 8175960299.
8. Essential English Grammar by Raymond Murphy, CUP, 2011.
9. Intermediate English Grammar by Raymond Murphy, CUP, 2011.
10. Practical English Usage by Michael Swan, OUP, 2013.
11. Dignen, Bob. Presentation Skills in English. Orient Black Swan, 2007.

ME-151	WORKSHOP PRACTICE	L T P	Cr
		0-0-4	2

UNIT I: MACHINE SHOP
Step turning & Taper turning Operation
Exercise 1: To obtain required diameters (steps) on a cylindrical work piece with the given lengths.
Shoulder Turning
Exercise 2: To obtain required diameters on a cylindrical work piece with the given dimensions.

UNIT II: CARPENTARY SHOP
Dove Tail Lap Joint
Exercise 3: To make a dovetail lap joint Cross Half Lap Joint
Exercise 4: To make a Cross Half Lap Joint

UNIT III: SHEET METAL SHOP
Exercise 5: To make a funnel using G.I Sheet as per dimensions provided. Exercise 6: To make a Square box using G.I Sheet as per the dimension.

UNIT IV: WELDING SHOP
Exercise 7: To make a single v-butt joint, using the given mild steel pieces of and by arc welding.
Exercise 8: To make a T- joint using the given mild steel pieces and by arc welding.

UNIT V: FOUNDARY SHOP
Mould For A Solid
Exercise 9 To prepare a sand mould, using the given Single piece pattern.
Exercise 10. To prepare a sand mould, using the given Split piece pattern.

BS-159	PHYSICS LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

1. To study response curve of a series LCR circuit.

2. To determine the Planck's constant using LEDs.

3. To determine the Rydberg's constant of Hydrogen atom.

4. To find the refractive index and Cauchy's constants of a prism.

5. To find the wavelength of light by Newton's rings experiment.

6. To determine the thickness of a thin wire by interference.

7. To determine the wavelength of LASER using diffraction grating.

8. To determine the resolving power of a telescope.

9. To find the numerical aperture of an optical fiber cable.

10. To find the wavelength of light using Michelson's interferometer.

EC-151	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB	L T P	Cr
		0-0-2	1

LIST OF EXPERIMENTS

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi – meter, oscilloscope. Resistors, capacitors and inductors.

2. To study V-I characteristics of diode; and its use as a capacitance.

3. Study of the characteristics of transistor in Common Base configuration.

4. Study of the characteristics of transistor in Common Emitter configuration.

5. Study of characteristics of MOSFET/JFET is CS configuration.

6. To verify the Thevenin's & Norton's theorem.

7. To verify the Superposition theorem.

8. To study frequency response of series & parallel RLC Circuit.

9. Demonstration of cut – out sections of machines:

10. Load test on D.C. Shunt generator

HSS-151	ENGLISH COMMUNICATION LAB	L T P	Cr
		0-0-2	1

LIST OF TOPICS

1. Intro - Lab & Seating Plan/Ice-breaking
2. Basic Ear training & Listening Skills: Practice
3. Listening Skills Test: Graded Exercise
4. International Phonetic Alphabet & Mispronounced Words: Practice.
5. International Phonetic Alphabet-2: Practice
6. Group Discussion Techniques – Dos & Don'ts – Practice GD
7. Extempore based on Cue Cards
8. Individual Speaking Activity: Graded Exercise.
9. Reading Skills & Comprehension: Practice
10. Reading Skills & Comprehension - Graded Exercise
11. Creating Technical Posters
12. Technical Poster Presentation Graded Exercise

REFERENCES

1. Jones, D. (1909), "The Pronunciation of English", Cambridge: CUP; rpt in facsimile in Jones (2002).
2. Jones, D. (1918), "An Outline of English Phonetics", Leipzig: Teubner; rpt in Jones (2002).

3. Jones, D. (1909) "The Dictionary of English Phonetics" Cambridge: CUP (2002).
4. Bansal, R.K. The Intelligibility of Indian English, Monograph, 4 CIEFL, Hyderabad, Second abridged edition, 1976.
5. Jones, Daniel, English Pronouncing Dictionary, revised by A.C. Gimson, 14th Edition, The English Language Book Society and JM Dent Sons Ltd. London 1977.
6. Senthi. J and P.V. Dhamija, A Course in Phonetics and Spoken English Prentice Hall of India Private Ltd. New Delhi, 1989.
7. Taylor, Ken, Telephoning and Teleconferencing Skills. Orient Black Swan, 2008.
8. Dignen, Bob. Presentation Skills in English. Orient Black Swan, 2007.
9. Murphy, R. (2007) Essential English Grammar, CUP. ISBN: 8175960299.
10. C. Muralikrishna and S. Mishra (2011) Communication Skills for Engineers, Pearson education. ISBN: 9788131733844.
11. Essential English Grammar by Raymond Murphy, CUP, 2011
12. Intermediate English Grammar by Raymond Murphy, CUP, 2011
13. Practical English Usage by Michael Swan, OUP, 2013

CS-151	PROGRAMMING FOR PROBLEM-SOLVING USING C LAB	L T P	Cr
		0-0-2	1

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

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

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

LOOP CONTROL STATEMENTS

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

ARRAYS AND STRINGS

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

FUNCTIONS & POINTERS

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

STRUCTURES

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

FILE HANDLING

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

Syllabus
Of
B.TECH

(Cyber Security)
1ˢᵗ Year
2ⁿᵈ Semester

BS-108	MATHEMATICS-II	L T P	Cr
		3-1-0	4

<u>**UNIT I**</u>
SEQUENCE, POWER SERIES AND FOURIER SERIES : Sequence, Convergentce of Sequence, Series, geometric series, Convergence of series, comparision test, p-test, Leibnits Test, Periodic Function, Fourier series, Dirichlet's condition for Fourier series, Determination of Fourier coefficients (Euler's formulae), Fourier series for discontinuous, even, and odd functions.

<u>**UNIT II**</u>
COMPLEX VARIABLE: Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm), Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof) singularities, Laurent's series; Residues, Cauchy Residue theorem.

<u>**UNIT III**</u>
ORDINARY DIFFERENTIAL EQUATIONS (ODS): First order ordinary differential equations, Separation of varables, Exact, Linear and Bernoulli's equations, Second order differential equation with constant coefficients, Cauchy-Euler equation, Sturm-Liouville's problems.

<u>**UNIT IV**</u>

PARTIAL DIFFERENTIAL EQUATIONS (PDES): Formation and classification of first-order PDEs, Linear first-order PDEs, Lagrange's method, Nonlinear first-order PDEs, Charpit's method,

Linear partial differential equations with constant coefficients, Method of separation of Variables, Heat Equation, Wave Equation.

UNIT V
INTEGRAL TRANSFORMS: Definition and properties of Laplace Transform, Transform of a periodic function, Dirac delta Function, Laplace Transform, Fourier Transforms, Properties of Fourier Transforms, Convolution Theorem for Fourier Transforms Application of Laplace and Fourier transform in finding the solution of differential equations.

TEXTS BOOKS

1. Advanced Engineering Mathematic By D. G. Zill and W. S. Wright.
2. Advanced Engineering mathematics by Erwin Kreyszig.

REFERENCE BOOKS

1. Higher Engineering mathematics By B.S. Grewal.
2. Mathematical Analysis. By S.C. Malik and Savita Arora.
3. Higher Engineering Mathematics By H.K. Dass and Er. Rajnish Verma

CS-106	Object Oriented Using JAVA	L T P	C r
		3-0-0	3

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

PRE-REQUISITES
Basic Knowledge of programming language and object oriented programming

COURSE OUTCOMES
The students undergoing this course will be able:

CO1: To learn about the basics of objects, object behavior & storage of different objects

CO2: To know about the basics of Java programming language

CO3: To learn how to create a package as well as handling of exceptions

CO4: To learn about the multithreading as well as synchronization of threads to ovoid deadlocks

CO5: To aware about the database connectivity using JDBC as well as other APIs

UNIT I
INTRODUCTION TO JAVA & PRINCIPLES OF OBJECT ORIENTED PROGRAMMING:
Basic Concepts of OOP and itS Benefits, Application of OOP, Features of Java. Data types & Operators available in java; Control Structures: if, while, do while, for, switch; Break & Continue Statement; Arrays and Strings: Arrays, Arrays of Characters; String handling Using String Class; Operations on String Handling Using; String Buffer Class.

UNIT II
OBJECT-ORIENTATION: Object-Oriented Programming in Java, Java Program Structure. Defining of a Class, Definition of Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, The keyword "this", Defining and Using a Class, Automatic Garbage Collection. Extending Class and Inheritance: Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, the Universal Super class-Object Class.

UNIT III
PACKAGE & EXCEPTION: Understanding Packages, Defining a Package, Packaging up your Classes, Adding Classes from a Package to your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface. Exception Handling: The Idea behind Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions, Checked and Unchecked Exceptions.

UNIT IV
MULTITHREADING PROGRAMMING: The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread: extending Thread and implementing Runnable, Creating Multiple Threads, Thread Priorities, Synchronization, Deadlocks inter-thread communication, Deadlocks. Input/Output in Java: I/O Basic, Byte and Character Structure, I/O Classes, Reading Console Input, Writing to Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File. Stream Benefits.

UNIT V
JAVA DATA BASE CONNECTIVITY (JDBC): Database Connectivity- Relation Databases; JDBC

API; Reusing Database Objects; Transactions; Advance Techniques. Java Utilities (java.util Package) The Collection Framework : Collections of Objects; Collection Types; Sets Sequence Map; Understanding Hashing; Use of Array List & Vector.

TEXT BOOK:
Balaguruswamy , E., ""Programming with Java", Tata Mcgraw Hill.

REFERENCE BOOKS

1. Horetmann Cay and Cornell Gary, "Core JavaTM 2, Volume II – Advanced Features", 7th Edition, Pearson Publisher, 2004.
2. Horetmann Cay and Cornell Gary, "Core Java Volume – I", Pearson Education.
3. Callway Dustin R., "Inside Servlets", Pearson Education.
4. Goodwill James and Bryan Morgan, "Developing Java Servlets", Techmedia.
5. "Java Server Programming, Volume I and II", Wrox Press

CS-206	DATABASE MANAGEMENT SYSTEM	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 shareability, availability, evolvability and integrity.

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the basics of database & its architecture

CO2: To aware about the existing data models, entities as well as constraints

CO3: To learn about the different anomalies of the data and ways to normalize it

CO4: To know about the storage of data in the files & organization of files

CO5: To learn about the transactions and its ways done on the database

UNIT I

INTRODUCTION: Purpose of database system; characteristics of database approach; advantages of using DBMS; database concept and architecture; data abstraction, data models; instances and schema; data independence; schema architecture; database languages; database manager; database administrator; database users.

UNIT II

DATA MODELING: Introduction to Hierarchical model, Network model. Relational model, E-R Model, Entity sets attributes and keys; relationships (ER); database modelling using entity; type role and structural constraints; weak and strong entity types; entity-relationship diagram-basic concepts; Enforcing Data Integrity Constraints; Relational-Algebra Operations; Introduction on views; Codd's Rules.

UNIT III

NORMALIZATION& SQL: Database design process; relational database design; relation schema; anomalies in a database; functional dependencies; 1NF, 2NF, 3NF and BCNF. ; Reduction of an E-R schema to Tables; Introduction to SQL; basic queries in SQL; advanced queries in SQL; functions in SQL; basic data retrieval; updates in SQLs, views in SQL.

UNIT IV

FILE ORGANIZATION: indexing and hashing; overview of file organization techniques; secondary storage devices; operations in files; heap files and sorted files; Indexing and Hashing- Basic concepts; Static Hashing; Dynamic Hashing; ordered indices; single level ordered index; multi-level index.

UNIT V

TRANSACTION PROCESSING & QUERY PROCESSING: Desirable properties of transactions; implementation of atomicity and durability; schedules and recoverability; serializability of schedules; concurrency control. Deadlock handling - detection and resolution.

TEXT BOOK

1. Silberschatz A., Korth H. F. and Sudarshan S., "Database System Concepts", 3rd edition, McGraw-Hill, International Edition, 1997

REFERENCE BOOKS

1. Date C. J., "An Introduction to Database Systems", 7th edition, Addison- Wesley, Low Priced Edition, 2000 .
2. Desai Bipin, "Introduction to Database Management System", Galgotia Publications, 1991

3. Elmasri R. and Navathe S. B., "Fundamentals of Database Systems", 3rd edition, Addison-Wesley, Low Priced Edition, 2000

BS-110	ENVIRONMENTAL SCIENCE AND CHEMISTRY	L T P	Cr
		2-0-0	2

COURSE OBJECTIVES:

An important objective of environmental science and chemistry is to understand and characterize chemical and physical measurements of complex environmental systems. Creating the awareness about environmental problems among students, imparting basic knowledge about the environment and its allied problems and developing an attitude of concern for the environment.

COURSE OUTCOMES:
CO1. To understand the composition of water along with the hardness and their determination for treatments.
CO2. To aware the students about the principles of green chemistry.
CO3. To learn about the structure and function of ecosystems.
CO4. To know about the environmental issues and their act for prevention.

UNIT I

WATER AND ITS TREATMENT: Introduction, Composition of water, Structure, Bonding and shape of water, Hardness of water: Type of hardness, EDTA titration Method, Degree of hardness, Alkalinity and its determination, scale and sludge formation, Demineralization or Ion Exchange process, Aerobic and Anaerabic Oxidation, Dissolved Oxygen, Bio-Chemical Oxygen demand (BOD), Method for determination of BOD and Chemical Oxygen demand (COD) and Method for determination of COD.

UNIT II

INTRODUCTION TO GREEN CHEMISTRY: Introduction to green chemistry need for green chemistry. Principles of Green Chemistry with their explanations and examples (Prevention of Waste/ byproducts/ toxic products; maximum incorporation of the materials used in the process into the final products).

UNIT III

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

UNIT IV

ENVIRONMENTAL POLLUTION: Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution; solid waste management.

UNIT V

ENVIRONMENT ISSUES And ENVIRONMENTAL ACT: Global warming, acid rain, ozone layer depletion; Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Forest Conservation Act.

TEXT BOOKS/REFERENCE BOOKS:
1. M.A. Ryan & M. Tinnesand, Introduction to Green Chemistry, American Chemical Society, Washington (2002).
2. Green Chemistry Theory and Practice. P.T.Anatas and J.C. Warner
3. Real world cases in Green Chemistry M.C. Cann and M.E. Connelly
4. Green Chemistry: Introductory Text M.Lancaster: Royal Society of Chemistry (London)
5. University chemistry, by B. H. Mahan Agarwal, K.C., "Environmental Biology", 2nd Edition, Nidhi Publ. Ltd., Bikaner, 2001.
6. BharuchaErach, "The Biodiversity of India", 2nd Edition, Mapin Publishing Pvt. Ltd., 2006.
7. Brunner R. C., "Hazardous Waste Incineration", 1st Edition McGraw Hill Inc., 1989.
8. Clark R.S., "Marine Pollution", 1st Edition Clanderson Press Oxford,1989
9. Cunningham, W.P., Cooper, T.H. Gorhani, E. & Hepworth, M.T., Environmental
10. Encyclopedia", 2nd Edition, Jaico Publ. House, 2001.
11. De, A. K., "Environmental Chemistry", 2nd Edition, Wiley Eastern, 1989

PEP-102	UNIVERSAL HUMAN VALUES	L T P	Cr
		1-0-2	2

OBJECTIVE

The present course deals with meaning, purpose, and relevance of universal human values and how to inculcate and practice them

consciously to be a good human being and realise one's potentials.

COURSE OUTCOMES
The students undergoing this course will be able to:

CO1: Know about universal human values and understand the importance of values in individual, social circles, career path, and national life.

CO2: Learn from case studies of lives of great and successful people who followed and practised human values and achieved self-actualisation.

CO3: Become conscious practitioners of human values.

CO4: Realise their potential as human beings and conduct themselves properly in the ways of the world.

Module 1: Love & Compassion - 4 Hours

o Introduction: What is love? Forms of love—for self, parents, family, friend, spouse, community, nation, humanity and other beings, both for living and non-living

o Love and compassion and inter-relatedness - Love, compassion, empathy, sympathy and non-violence

o Individuals who are remembered in history for practicing compassion and love.:
Narratives and anecdotes from history, literature including local folklore

o Practicing love and compassion: What will learners learn/gain if they practice love and compassion? What will learners lose if they don't practice love and compassion?

o Sharing learner's individual and/or group experience(s)

Module 2: Truth - 4 Hours

o Introduction: What is truth? Universal truth, truth as value, truth as fact (veracity, sincerity, honesty among others)

o Individuals who are remembered in history for practicing this value: Narratives and anecdotes from history, literature including local folklore

o Practicing Truth: What will learners learn/gain if they practice truth? What will learners lose if they don't practice it?

o Learners' individual and/or group experience(s)

Module 3: Non-Violence - 4 Hours

o Introduction: What is non-violence? Its need. Love, compassion, empathy sympathy for others as pre-requisites for non-violence

o Ahimsa as non-violence and non-killing

o Individuals and organisations that are known for their commitment to nonviolence: Narratives and anecdotes about non-violence from history, and literature including local folklore

o Practicing non-violence: What will learners learn/gain if they practice nonviolence?

o What will learners lose if they don't practice it?

o Sharing learner's individual and/or group experience(s) about non-violence

Module 4: Righteousness - 2 Hours

o Introduction: What is righteousness?

o Righteousness and *dharma*, Righteousness and Propriety

o Individuals who are remembered in history for practicing righteousness: Narratives and anecdotes from history, literature including local folklore

o Practicing righteousness: What will learners learn/gain if they practice righteousness?

o What will learners lose if they don't practice it?

o Sharing learners' individual and/or group experience(s)

Module 5: Peace - 2 hours

o Introduction: What is peace? Its need, relation with harmony and balance.
o Individuals and organisations that are known for their commitment to peace: Narratives and Anecdotes about peace from history, and literature including local folklore
o Practicing peace: What will learners learn/gain if they practice peace? What will learners lose if they don't practice it?
o Sharing learner's individual and/or group experience(s) about peace

Module 5: Service - 4 Hours

o Introduction: What is service? Forms of service, for self, parents, family, friend, spouse, community, nation, humanity and other beings—living and non-living, persons in distress or disaster.
o Individuals who are remembered in history for practicing this value: Narratives and anecdotes dealing with instances of service from history, literature including local folklore
o Practicing service: What will learners learn/gain if they practice service? What will learners lose if they don't practice it?
o Sharing learners' individual and/or group experience(s) regarding service

Module 6: Renunciation (Sacrifice) - 4 Hours

o Introduction: What is renunciation? Renunciation and sacrifice.
o Self-restrain and Ways of overcoming greed.
o Renunciation with action as true renunciation
o Individuals who are remembered in history for practicing this value: Narratives and anecdotes from history and literature, including local folklore about individuals who are remembered for their sacrifice and renunciation.
o Practicing renunciation and sacrifice: What will learners learn/gain if they practice
o Renunciation and sacrifice? What will learners lose if they don't practice it?
o Sharing learners' individual and/or group experience(s)

ADDITIONAL PRACTICAL MODULES or OPERATIVE ELECTIVES:

NOTE: The faculty/institution may choose any/some of the following modules keeping in mind the level and specific needs of learners.

MODULE A - Integral Human Well-Being

Importance of well-being, inter-relatedness of different kinds of well-being and definition of well-being (state of being comfortable, healthy, happy and equanimity)

Well-being and its Kinds

(i) Physical (physical strength and endurance)
(ii) Emotional (ability to respond to emotions and control them)
(iii) Aesthetic (faculty to see and appreciate beauty in all beings)
(iv) Intellectual (rational, logical well-being)
(v) Relational well-being (obligation to self, parents, family society, nation humanity and other beings in the universe; living with others with their acceptance)
(vi) Moral (difference between good and evil and practicing goodness; righteousness)
(vii) Spiritual (thinking beyond self and journey from senses to spiritual level)
   o Establish and recognise various states of well-being, embedded in different creatures, but consciously understood by humans.
   o Identify the most pronounced emotions in the individual through given activities-
     Anecdotes/video/activity to help identify different well-beings

- Discussion of related values to well-beings: Aesthetics, ethics, gratitude, forgiveness, and spiritual health i.e., thinking beyond senses and self and for the welfare of others
- Importance and practice of well-being through case study/ activity Ways to attain different kinds of well-being
- Activities

MODULE B - Yoga & Pranayama 5 Hours Importance of Yoga and Pranayama

- Yoga and pranayama for integral well-being and balance in life
- Yoga & Pranayama: Introduction
- Mind - Body – Intellect
- Difference between Yoga and Pranayama and their inter-relatedness.
- Basic Yogasans and pranayamas for students:
  a) Every morning
  b) Before bedtime
  c) Before a presentation
  d) Before examination
  e) To fight stomach cramps
  f) To fight stress
- Healthy diet
- Healthy mind
- Recommended routine for yoga and pranayama

MODULE C - Gratitude

Outlines:
- Gratitude, a great embellishment to a person's mental quality
- Duty versus Rights
  - What is duty?
  - What is right?
- Wonderment and simplicity
- Gratitude to one's family
- Gratitude to one's teachers
- Gratitude to one's society
- Gratitude to one's nation
- Gratitude to the universe
- Count your blessings (activity)
- Live in an attitude of gratitude

SUGGESTED READINGS
1. Mookerji Radha Kumud, *Ancient Indian Education*, Motilal Banarasidass
2. Saraswati Swami Satyananda, *Asana Pranayama Mudra Bandha*, Bihar School of yoga
3. Joshi Kireet, *Education for Character Development,* Dharma Hinduja Center of Indic Studies Joshi Rokeach (1973). The Nature of Human Values. New York: The Free Press
4. Ghosh, Sri Aurobindo. 1998. *The Foundations of Indian Culture*. Pondicherry: Sri Aurobindo Ashram
5. Basham A.L., *The Wonder That was India*, London: Picador Press
6. Patra, Avinash (2012), *The Sprirtual Life and Culture of India,* Oxford University Press Shantikumar Ghosh, *UniversalValues.* The Ramakrishna Mission, Kolkata, 2004.

ME-152	ENGINEERING GRAPHICS LAB	L T P	C r
		0-0-4	2

OBJECTIVE

● To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

● to prepare you to communicate effectively

● to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Introduction to engineering design and its place in society
CO2: Exposure to the visual aspects of engineering design
CO3: Exposure to engineering graphics standards
CO4: Exposure to solid modelling

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT V

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

REFERENCE BOOKS:

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

CS-156	Object Oriented Using JAVA Lab	L T P	C r
		0-0-2	1

OBJECTIVE
To relay the practical knowledge of Java programming language

COURSE OUTCOMES
The students undergoing this course will be able:

CO1: To learn about operators used in Java Programming

CO2: To know about loops implemented in Java programming language

CO3: To implement the arrays and strings

CO4: To learn about the inheritance, packages & exception handling

CO5: To aware about the database connectivity using JDBC

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

1. **Sample Program**
(a) Write a Java program to print "Hello Java"

2. **Operators and Expressions**
(a) Write a java program to find the area of a rectangle.
(b) To write a java program to find the result of the following expressions
(i)   (a<<2) +(b>>2)
(ii)   (b>0)
(iii)   (a+b*100)/10
(iv)   a & b
         Assume a=10, b=5
(c) To write a java program to print the individual digits of a 3 digit number using Command line arguments.

3. **Decision making statements**
(a) Write a java program to read two integers and print the larger number. followed by the words "is larger". If the numbers are equal print the message "These numbers are equal"
(b) Write a java program to read an integer and find whether the number is odd or even.
(c) Write a java program to find the number of and sum of all integers greater than 100 and less than 200 that are divisible by 7.

4. **Looping Statements**
(a) Write a Java program to find the sum of digits of a given number.
(b) Write a java program to find the first 15 terms of Fibonacci sequence.
(c) Write a java program to print the Armstrong numbers.
(d) Given a number, write a program using while loop to reverse the digits of the number.
            For example, the number
                 12345
              should be written as 54321.

5. **Array & Strings**
(a) Write a java program to find the largest and smallest number in an array.
(b) Write a java program to multiply two matrices.
(c) Write a java program to sort the following numbers in descending order.
             {55, 40, 80, 65, 71}
(d) Write a java program that creates a string object and initializes it with your name and performs the following operations
(i)   To find the length of the string object using appropriate String method.
  (ii)   To find whether the character 'a' is present in the string. If yes find the number of times 'a' appear in the

name and the location where it appears.

(e) Write a java program to arrange the following word in alphabetical order

      {Madras, Delhi, Ahmadabad, Calcutta, Bombay}

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.

7. Inheritance

(a) Write a java program to implement single inheritance using "super" keyword.

(b) Write a java program to implement method overriding.

(c) Write a java program to implement multiple inheritances.

8. Package & Multithreading

(a) Write a program to create your own package and use that package in another program to print " Hello package".

(b) Write a program to implement multithreading using the system function like yield(), stop(), sleep().

9. Exception Handling & File handling

(a) Write a java program to implement multiple try/catch statements.

 (b) Write a program to copy the content of one file into another using character stream classes.

 (c) Write a program to copy the content of one file into another using byte stream classes

10. Database Connectivity

(a) Write a programme to connect java application GUI with database.(JDBC)

(b) Write a program to select all the information of a table named as "Student".

TEXT BOOK

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

REFERENCE BOOKS

1. Balaguruswamy , E., ""Programming with Java", Tata Mcgraw Hill

2. Horetmann Cay and Cornell Gary, "Core Java Volume – I", Pearson Education.

CS-256	DATABASE MANAGEMENT SYSTEM LAB	L-T-P	C r
		0-0-2	1

OBJECTIVE

To provide knowledge about implementation of practical aspects of database i.e. creation of tables and applying queries using SQL queries

COURSE OUTCOMES

The students undergoing this course will be able:

CO1: To know the basics of structured query language

CO2: To aware about applying different queries on database structured in the form of tables

CO3: To learn about the different SQL queries performed using operators as well as constraints

CO4: To create views from created table to further organize the data

CO5: To learn about the basic operations of relational algebra

LIST OF EXPERIMENTS/EXERCISES

1. Introduction to SQL.
2. Write a query for:
(i)   Creation of table.
(ii)   Insertion of data into table
(iii)   Displaying the data of table.
(iv)   Deletion of data from table
(v)   Updating the data
(vi)   Modifying the structure of a table.

3. Finding unique names of all salesmen, deletion of the structure of a table, use of delete command with conditions, updating records of a table with conditions, altering structure of a table and changing size of existing column in the table
4. Arithmetic operators, logical operators and pattern matching operator.
5. Key constraints: primary key constraints, foreign key constraints, not null constraints and unique constraints; use of check constraints.
6. Aggregate and mathematical functions: count, count(*), Avg, max, min, sum, lower, upper, power , sqrt.
7. Creating views from single and multiple tables, drop views and creating index on the table and drop them.
8. Binary operations in Relational Algebra: Union, Intersection, Set Difference, Join, Cartesian product.
9. Grouping of data into tables and listing records in ascending order or descending order.
10. Creation of sequences and explain use of sequences.
11. Access permissions in SQL.

BS-160	ENVIRONMENTAL SCIENCE AND CHEMISTRY LAB	L T P	Cr
		0-0-2	1

COURSE OBJECTIVES:

An important objective of environmental science and chemistry Lab is to understand the experimental techniques for the students to determine amount of hardness as well as understanding the complexometric titration method

COURSE OUTCOMES:

CO1. Analyze & generate experimental skills.
CO2. To understand the composition of water along with the hardness and their determination for treatments.
CO3. To learn about the complexometric titration.
CO4. To determine the total dissolved Oxygen and solid in water sample.

Experiment

1. Determination of Ca^{2+} & Mg^{2+} Hardness of water sample by EDTA Method.
2. Determination of Alkalinity in given water sample by volumetric method.
3. To determine the CO_3^{2-} & HCO_3^- in a given water sample.
4. Estimation of Calcium in limestone or dolomite ore.
5. To estimate the amount of Dissloved Oxygen (DO) in given water sample.
6. To estimate the amount of Chloride ion present in water sample by Argentomentric Method (Mohr's Method)
7. Water sampling, total dissolved solids and total suspended solids.
8. To estimate the amount of Chemical Oxygen Demand (COD) in given water sample

TEXT BOOKS/REFERENCE BOOKS:

1) Vogel's Textbook of Quantitative chemical analysis, J. Mendham et.al. (Pearson Education).
2) Concise Inorganic Chemistry, J. D. Lee (Blackwell Science).

Syllabus

Of
B.Tech
(Cyber Security)
2nd Year
3rd Semester

Of
B.Tech
(Cyber Security)
2nd Year
3rd Semester

EC-203	DIGITAL ELECTRONICS	L T P	Cr
		3 0 0	3

OBJECTIVE

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

COURSE OUTCOMES

CO1: Convert different type of codes and number systems which are used in digital communication and computer systems.

CO2: Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.

CO3: Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.

CO4: Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic, performance, efficiency, user friendly and environmental constraints.

CO5: Apply the fundamental knowledge of analog and digital electronics to get different types analog to digitalized signal and vice-versa converters in real world with different changing circumstances.

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT V

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

TEXT BOOK

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

REFERENCE BOOKS

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

CS-211	PYTHON PROGRAMMING	L-T-P	Cr
		3-0-0	3

OBJECTIVE

To build programming logic and thereby developing skills in problem solving using Python programming language; To be able to do testing and debugging of code written in Python Emphasize the concepts and constructs rather than on language features.

PRE-REQUISITES

The students are expected to have basic knowledge of programming and DBMS.

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: To learn and understand Python programming basics, looping, control statements and string manipulations.

CO2: To learn basic concepts of list, tuple and dictionary data structures.

CO3: To learn and know the concepts of Structure and Functions.

CO4: To learn and know the concepts of file handling, exception handling.

CO5: To learn how to analyze and visualize the data.

UNIT I:

Introduction to Python: History, Features & Benefits of Python, Structure of a Python Program, Identifiers and Keywords, Concept of Variable, Memory Allocation for Variable, Data Types in Python, Conversion Functions, Operators (Arithmetic Operator, Relational, Logical or Boolean Operator, Assignment, Bitwise Operator, Membership Operator).Input and Output Function, Control Statements (Looping- while Loop, for Loop, Loop Control, Conditional Statement-if...else), Difference between break, continue and pass.

UNIT II:

Data Structures & Function: String, Lists, Tuples, Sets, Dictionary Data Structure, Built-in Library Function, Method and Operation on these Data Structure. Defining Function, Type of Function Arguments (Required Arguments, Keyword Arguments, Default Arguments, Variable-Length Arguments), Scope of a Variable, Global Vs Local Variable, Python Modules & Packages, Import Statement, dir(), globals(), locals() and reload() Functions.

UNIT III:

Python Object Oriented Programming: Features of Object Oriented Programming, Creating Classes, _init_() Method, Creating Instance Object, Class Attributes, Access Specifiers in Python, Instance Method Vs Class Method. Inheritance & Polymorphism, Overriding and Overloading Methods.

UNIT IV:

Python File Handling, Exception Handling: Opening & Closing Files, File Access Modes, File Object Attributes, Reading and Writing Files, Manipulating File Pointer using seek and tell. Programming using File Operations. Exception Handling in Python.

UNIT V:

Data Analysis: Dataset generation, Importing Dataset: Importing and Exporting Data, Basic Insights from Datasets, Cleaning and Preparing the Data: Identify and Handle Missing Values. Numpy and Scipy Package, Understanding and creating N-dimensional arrays, basic indexing and slicing, Boolean indexing,

fancy indexing, Universal functions, Data processing using arrays, File input and output with arrays.

Data Visualization: Basic Visualization Tools, Specialized Visualization Tools, Creating and Plotting Maps.

TEXT BOOKS
1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India.
2. T. Budd, Exploring Python, TMH, 1st Ed, 2011

REFERENCE BOOKS
1. Python Tutorial/Documentation www.python.or 2010
2. Allen Downey, Jeffrey Elkner, Chris Meyers ,How to think like a computer scientist :Learning with Python,Freelyavailableonline.2012
3. http://docs.python.org/3/tutorial/index.html
4. http://interactivepython.org/courselib/static/pythonds

CS-207	COMPUTER ARCHITECTURE & ORGANIZATION	L T P	C r
		3 0 0	3

OBJECTIVE

To provide basic knowledge of internals of computer, its architecture, components, terminologies, etc. atminute level and ultimately about the working of a digital computer hardware as a whole.

PRE-REQUISITES

Knowledge of data structures, microprocessors and interfacing.

COURSE OUTCOMES

CO1: Understand the theory and architecture of central processing unit. Analyze some of thedesign issues in terms of speed, technology, cost, performance.

CO2: Design a simple CPU with applying the theory concepts. Use appropriate tools to design verifyand test the CPU architecture.

CO3: Learn the concepts of parallel processing, pipelining and inter-processor communication

CO4: Exemplify in a better way the I/O and memory organization.

CO5: Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.

UNIT I

GENERAL SYSTEM ARCHITECTURE: 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; Counters and Designing of counters.

UNIT II

INSTRUCTION SET ARCHITECTURE: Instruction codes, instruction set formats(fixed, variable, hybrid), types of instructions, memory reference, register reference, I/O reference; addressing modes: register, immediate, direct, indirect, indexed; operations in the instruction set; arithmetic and logical, data transfer, control flow; types of interrupts; timing and control; instruction set based classificationof processors (RISC, CISC, and their comparison).

UNIT III

BASIC ARITHMETIC AND PROCESSING MODULE: Addition and subtraction of signed

Numbers-Design of fast adders-Multiplication of positive numbers-Signed operand multi-plication and fast multiplication –integer devision

Fundamental Concept-Execution of complete instruction-Multiple bus organization –Hardwired control-MicroProgrammed control-Pipelining and its types.

MEMORY HIERARCHY & SYSTEM: Need for a memory hierarchy (Locality of Reference Principle, memory hierarchy in practice: cache, main memory and secondary memory); Basic Concept Main memory (semiconductor RAM & ROM , Speed, Size and Cost, static & dynamic memory types); cache memory: associative &direct mapped cache organizations.

UNIT V

INTRODUCTION TO PARALLELISM: Goals of parallelism (exploitation of concurrency, throughput enhancement); Amdahl's law; instruction level parallelism (pipelining, super scaling-basic features); processor level parallelism (multiprocessor systems overview).

TEXT BOOK

1. John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third
2. edition, 1998.
3. 2. V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation", V edition, McGraw-Hill Inc, 1996.
4. Carpinelli, ―Computer Organization & Architecture‖ Tata McGraw Hill, 2000

CS-209	DISCRETE MATHEMATICS and GRAPH THEORY	L T P	C r
		3 1 0	4

OBJECTIVES

To lay mathematical foundation for the fundamentals of various computational structures such as Boolean algebra, propositional logic, graph and trees.

PRE-REQUISITES: Knowledge of Data Structure

COURSE OUTCOMES

CO1: Perform operations on various discrete structures such as sets, functions, relations, and sequences.
CO2: Ability to solve problems using Counting techniques, Permutation and Combination, Recursion and generating functions
CO3: Ability to solve problems of Recursion and Recurrence Relation
CO4: Understand the various properties of algebraic systems like Rings, Monoids and Groups
CO5: Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems.

UNIT I

SET THEORY: Introduction to set theory; set operations; algebra of sets: duality, finite and infinite sets, classes of sets, power sets, multi sets, Cartesian product, representation of relations, types of relation, equivalence relations and partitions, partial ordering relations and lattices; function and its types, composition of function and relations; cardinality and inverse relations.

UNIT II

PROPOSITIONAL CALCULUS AND TECHNIQUES OF COUNTING: Basic operations: AND (∧), OR (V), NOT (~), truth value of a compound statement, propositions, tautologies, contradictions, Permutations with and without repetition, combination.

UNIT III

RECURSION AND RECURRENCE RELATION: Polynomials and their evaluation; sequences, introduction to AP, GP and AG series, partial fractions; linear recurrence relation with constant coefficients; homogeneous solutions, particular solutions, total solution of a recurrence relation using generating functions.

UNIT IV

ALGEBRIC STRUCTURES: Definition and examples of a monoid, semigroup, groups and rings; homomorphism, isomorphism and auto morphism; subgroups and normal subgroups; cyclic groups, integral domain and fields; co-sets; Lag range's theorem

UNIT V

GRAPHS: Introduction to graphs, directed and undirected graphs; homomorphic and isomorphic graphs; subgraphs; cut points and bridges; multigraph and weighted graph; paths and circuits, shortest path in weighted graphs; Eulerian path and circuits, Hamilton paths and circuits; planar graphs; Euler's formula.

TEXT BOOK

Liu C. L., Elements of Discrete Mathem atics‖, McGraw Hill, 1989

REFERENCE BOOKS

1. Johnson Bough R., ―Discrete Mathematics‖, 5th Edition, Pearson Education, 2001
2. Graham Ronald, Knuth Donald E. and Patashik Oren, ―Concrete Mathematics: A Foundation for Computer Science‖ , Addison-Wesley, 1989
3. Gersting Judith L., ―Mathematical Structures for Computer Science‖, Computer Science Press, 1993
4. Chtewynd   A. and   Diggle P..   , Discrete Mathem atics‖ , Modular Mathematics Series, Edward Arnold, London, 1995
5. Lipshutz S ., ―S chaums Outline series: Theory and problems of Probability‖, McGraw Hill Singapore, 1982
6. Kolm an B. and Busby R. C., ―Discrete Mathematical Structures‖, Prentice Hall of India, 7. 1996
8. Trembley and Manohar, ―Discrete Mathematical Structures with Applications to Com puters‖, McGraw Hill, 1995

CS-202	OPERATING SYSTEMS	L T P	C r
		3 0 0	3

COURSE OBJECTIVE

To provide the knowledge of internals, different types and purpose of operating systems

PRE-REQUISITES

Knowledge of computer organization and architecture programming skills

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand the basics of operating systems like kernel, shell, types and views of operating systems

CO2: Describe the various CPU scheduling algorithms.

CO3: Explain various process synchronization and removing deadlock.

CO4: Use disk management and disk scheduling algorithms for better utilization of external memory.

CO5: Understand various file system.

UNIT I

INTRODUCTION: Introduction to operating system concepts (including multitasking, multiprogramming, multi user, multithreading, etc)., types of operating systems: batch operating system, time-sharing systems, distributed OS, network OS, real time OS, embedded and smart card OS, various operating system services, architecture, system programs and calls.

UNIT II

PROCESS MANAGEMENT: Process concept, Life cycle and implementation of process, Thread usage and implementation in user space and in kernel, process scheduling, operation on processes, CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), priority scheduling, Round Robin (RR), multilevel feedback queue scheduling.

UNIT III

DEADLOCK: Deadlocks, Deadlock characteristics, prevention, avoidance using banker's algorithm, detection and recovery;

Process Synchronization: Critical section problems, mutual exclusion with busy waiting, Process synchronization, semaphores: binary and counting semaphores, Classical IPC problems: dining philosophers' problem, readers-writers problem.

UNIT IV

MEMORY MANAGEMENT: Logical & physical address space, swapping, contiguous memory allocation, non-contiguous memory allocation paging and segmentation techniques, segmentation with paging, virtual memory management - demand paging & page-replacement algorithms, demand segmentation.

UNIT V

I/O AND FILE YSTEMS: I/O hardware, device controllers, interrupt handlers, device drivers, application I/O interface, kernel, transforming I/O requests, performance issues, Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms, introduction to distributed file system.

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

CS-103	DATA STRUCTURE USING C	L T P	C r
		3-0-0	3

COURSE OBJECTIVE: To relay the theoretical and practical fundamental knowledge of most basic data structure like array linked list, stack, queue, tree & graph. To understand the implementation of these data structure to be familiar with basic techniques of algorithm analysis and analysis of the algorithms used for implementation of these data structure.

PRE-REQUISITES: Knowledge of basic computer programming.

COURSE OUTCOMES
CO1: Understand the concept of dynamic memory management, data types, algorithm, Big O notation.
CO2: Understand basic data structures such as arrays, linked list, stack and queue.
CO3: Describe the hash function and concepts of collision and its resolution methods.
CO4: Solve problem involving graph, trees and heaps.
CO5: Apply algorithm for solving problems like sorting, searching, insertion and deletion of data.

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

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

UNIT III: LINKED LISTS:
Lists; different type of linked Lists; implementation of singly linked list, linked list implementation of stacks and queues; implementation of circular linked list; implementation of doubly linked list, applications.

UNIT IV: TREES AND GRAPHS:
Definition of trees and binary trees; properties of binary trees and implementation; binary

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

UNIT V: SORTING AND SEARCHING ALGORITHMS:

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

TEXT BOOK

1. Langsam, Augentem M.J. and Tenenbaum A. M., ―Data Structures using C & C++‖, Prentice Hall of India, 2009.
2. R. S.Salariya, Data Structure and Algorithm, Khanna Publications.

REFERENCE BOOKS

1. Aho A. V., Hopcroft J. E. and Ullman T. D., ―Data Structures and Algorithms‖, Original Edition, Addison-Wesley, Low Priced Edition, 1983.
2. Horowitz Ellis and S ahni S artaj, ―Fundamentals of Data Structures‖, Addison-Wesley Pub, 1984.
3. Horowitz, S ahni and Rajasekaran, ―Fundamentals of Computer Algorithms‖ 2007.
4. Kruse Robert, ―Data Structures and Program Design in C‖, Prentice Hall of India, 1994
5. Lipschetz Jr. Seymour, ―Theory & Problems of Data Structures‖, S chaum 's Outline, Tata McGraw Hill
6. Weiss Mark Allen, ―Data Structures and Algorithms Analysis in C‖, Pearson Education, 2000
7. Corm en T . H . et al., ―Introduction to Algorithms‖, 2nd Edition, Prentice Hall of India, 2001.
8. Dasgupta Sanjay, Christos P. and Vazirani Umesh, ―Algorithms‖, Tata McGraw Hill, 2008

CS-153	DATA STRUCTURES USIN C LAB	L T P	C r
		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

SORTING ALGORITHMS
18. Write program to implement Bubble, Insertion & selection sort.
19. Write program to implement quick sort
20. Write program to implement merge 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

CS-255	PYTHON PROGRAMMING LAB	L T P	C r
		0 0 2	1

COURSE OUTCOMES

CO1: Define basic concepts of python programming if statement, loops.

CO2: Define and demonstrate the use of built-in data structures "lists" and "dictionary".

CO3: Design and implement a program to solve a real-world problem

CO4: Design and implement GUI application and how to handle exceptions and files.

LIST OF PROGRAMS

Program 1: Programs using if else structure

a) Find the Largest Among Three Numbers

b) Python Program to Check Leap Year

c) Python Program to Take in the Marks of 5 Subjects and Display the Grade

Program 2: Programs using for and while loop

a) Python Program to check whether given number is Prime Number or not.

b) Python Program to Find the Sum of Digits in a Number.

c) Python Program to convert binary number to decimal number.

Program 3: Program using List and String data structure

a) Write Python Program to input a list of integers, (1) display the no of elements in the list (2) display minimum and maximum element in the list (3) display sum of square of all the element in the list (4) (5) add a new element at end and display the list (6) add a new element at given index and display list (7) display the occurrence of given element in the list (8) remove the given element in the list (9) add element from a new list from given list (10) sort the given list & reverse the given list (11) also perform slicing, concatenation and multiplication operation.

b) A fruit seller sells different type of fruits. Type of fruits and corresponding rates are stored in two different lists. Customer can order any type of fruit (one or more type) in any quantity. If total bill of customer is greater than 500, customer is given 10% discount. If any of the fruits required by the customer is not available in the store, then consider the bill amount to be -1. Write a Python program to calculate and display the bill amount.

c) Accept two strings 'string1' and 'string2' as input from the user. Generate a resultant string-1, such that it is a concatenated string of all upper case alphabets from both the strings in the order they appear. Generate a resultant string-2 that contain character which are in both string1 and 2. Print the actual resultant string-1 and resultant string-2.

Program 4: Programs using concept of list, tuple & dictionary

a) Write a Python program that take a string as input and store the character and occurrence of each character in a dictionary. Create two lists from dictionary first having each character in sorted order of their frequency and second having corresponding frequency.

b) A furniture seller sells different type of furniture, Type of Furniture and rates are stored in a dictionary. Customer can order any type of furniture (one or more type) in any quantity. If total bill of customer is greater than 10,000, customer is given 5% discount. 8% GST is charged on total bill. If any of the furniture required by the customer is not available in the

store, then consider the bill amount to be -1. Write a Python program to calculate and display the bill amount.

c) Students name and their corresponding marks are stored in a dictionary. Write a Python program to perform following (1) Display name and marks of each student (2) Display the names of top two scorer (3) display the class average for this course (4) check if the marks for given student is stored in dictionary or not, if not add the name and marks in the dictionary else display his/her marks (5) delete the name and marks of a given student in the dictionary (6) add name and marks from another dictionary and display combined dictionary.

Program 5: Program using Function in Python:

a) Write Python functions using the concept of Keyword & default arguments and write a program to use them.

b) Write python functions to use the concept of variable length argument & global variable.

Program 6: Program using concept of Class, object, class variable, class method:

a) Create a class Account with name, account no and balance as attribute and no_of_accounts as class variable. Account no should be generated automatically (starting from 1) using the class variable no_of_account. Add the methods for displaying the account information, depositing given amount, withdrawing given amount and initializer method to initialize the object. Create objects of Account class and call different method to test the class.

b) Create a class Employee with name , empid ,salary as attribute and no_of_ employee and annual_incr (% annual increment) as class variable. empid should be generated automatically (starting from 1) using the class variable, no_of_employee. Add the instance methods for displaying the employee information, annually increasing the salary with help of class variable annual_incr , class method to change the value of annual_incr and initializer method to initialize the object. Create objects of employee class and call different method to test the class (program using class method).

Program 7: Program using the concept of Inheritance

a) Create a class Polygon to represent a polygon having no of sides and a list having magnitude of each side as attribute. Add the inputSides() to input sides and displaySides() to display sides as methods. Derive a class Triangle from Polygon and add an additional method displayArea() to display area. Create object of Triangle and call different methods to test the class.

b) Create a class Person having name, age, as attributes, __init__() method to initialize the object and display() to display person information. Derive a class Student from Person having roll no, University name, branch as additional attributes and_init_(), display() to display student information and change_Branch() method. Create object of Student type and call different methods to test the class.

Program 8: Program using the concept of Polymorphism, Operator Overloading

a) In a retail outlet there are two modes of bill Payment (1) Cash : Calculation includes VAT(10%) Total Amount = Purchase amount + VAT (2) Credit card: Calculation includes

processing charge and VAT Total Amount = Purchase amount + VAT (10%) + Processing charge (2%) The act of bill payment is same but the formula used for calculation of total amount differs as per the mode of payment. Can the Payment maker simply call a method and that method dynamically selects the formula for the total amount? Demonstrate this Polymorphic behaviour with code.

b) Write a program to create a class to represent length in feet and inch. Overload the "+" operator to add the two object of length type.

Program 9: Program on file handling and Exception handling in Python

a) Write a python program to write few lines on a file, read it back and create a dictionary having each word in file as keys in dictionary and occurrence of these word as values and print the dictionary.

b) Write a function divide (arg1, arg2) to divide arg1 by arg2. Use the exception handling mechanism to handle all type of possible exceptions that may occur. Take the value of arg1 and arg2(of any type) from user as input and call the function divide to print the result of division or suitable message if any type of exception occurs(use also else and finally block).

Program 10: Program on Data Analysis and Visualization

a) Importing and Exporting Data, Basic Insights from Datasets, Cleaning and Preparing the Data: Identify and Handle Missing Values.

b) Basic Visualization Tools, Specialized Visualization Tools, Creating and Plotting Maps.

EC-253	**DIGITAL ELECTRONICS LAB**	**L T P**	**C r**
		0 0 2	**1**

COURSE OUTCOMES
CO1 Perform conversions among different number systems, became familiar with basic logic gates and understand Boolean algebra and simplify simple Boolean functions by using basic Boolean properties & design of combinational circuits such as MUX, DEMUX, Encoder and Decoder etc.
CO2 Understand the design of sequential Circuits such as Flip-Flops, Registers, and Counters
CO3 Obtain a basic level of Digital Electronics knowledge and set the stage to perform the analysis and design of Complex Digital electronic Circuits.

LIST OF EXPERIMENTS

1. Study of TTL gates – AND; OR; NOT; NAND; NOR; EX-OR; EX-NOR.

2. Design and realize a given function using k-maps and verify its performance.

3. To verify the operation of multiplexer and demultiplexer.

4. To verify the operation of comparator.

5. To verify the truth tables of S-R; J-K; T and D type flip flops.

6. To verify the operation of bi-directional shift register.

7. To design and verify the operation of 3-bit synchronous counter.

8. To design and verify the operation of synchronous up/down decade counter using JK flip- flops and drive a seven-segment display using the same.

9. To design and verify the operation of asynchronous up/down decade counter using JK flip- flops and drive a seven-segment display using the same.

10. To design and realize a sequence generator for a given sequence using J-K flip-flops.

11. Study of CMOS NAND and NOR gates and interfacing between TTL and CMOS gates.

12. Design a 4-bit shift-register and verify its operation. Verify the operation of a ring counter and a johnson counter.

CS-252	OPERATING SYSTEMS LAB	L T P	C r
		0 0 2	1

LIST OF EXPERIMENTS

1. Basics of UNIX commands.

2. Shell programming

3. Implementation of CPU scheduling. a) Round Robin b) SJF c) FCFS d) Priority

4. Implement all file allocation strategies

5. Implement Process System call.

6. Implement I/O system call.

7. Implement Bankers algorithm for Dead Lock Avoidance

8. Implement Producer/Consumer problem using semaphore.

9. Implement the all page replacement algorithms a) FIFO b) LRU c) LFU

10. Implement first fit, best fit algorithm for memory management.

11. To write a program for file manipulation for displays the file and directory in memory

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.

Syllabus
Of
BTECH
(CYBER SECURITY)
2nd YEAR
4th Semester

| CS-408 | Fundamentals of Cyber Security | L-T-P | Cr |

		3-0-0	3

OBJECTIVES

- Analyse the different types of information security threats and vulnerabilities.
- Evaluate the effectiveness of information security policies and procedures at various levels of an organization.
- Design and develop a comprehensive risk management program for an organization's information assets.
- Understanding security attacks and the basics of cryptography.
- Assess different security protocols and their applications.

COURSE OUTCOMES

The student after undergoing this course will be able:

CO1. Identify and classify various information security threats and vulnerabilities based on their characteristics.

CO2. Evaluate the strengths and weaknesses of information security policies and procedures at different levels of an organization.

CO3. Create a risk management program that aligns with the business requirements and addresses potential risks to information assets.

CO4. Classify the symmetric encryption techniques and Illustrate various Public key cryptographic techniques.

CO5. Understand security protocols for protecting data on networks and be able to digitally sign emails and files

UNIT I

Introduction to Cyber Security

Introduction, Computer Security, Threats, Harm, Vulnerabilities, Controls, Authentication, Access Control and Cryptography. Web attack: Browser Attacks, Web Attacks Targeting Users, Obtaining User or Website Data, Email Attacks.

UNIT II

Network Defense Security

 Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) and Port Forwarding. VPN: the basic of Virtual Private Networks. Firewall: Introduction, Linux Firewall, Windows Firewall

UNIT III

Web Application Security

Scanning for web vulnerabilities tools: Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel. Application Inspection tools – Zed Attack Proxy, Sqlmap, DVWA, Webgoat. Password Cracking and Brute-Force Tools: John the Ripper, L0htcrack, Pwdump, HTC-Hydra

UNIT IV

Introduction to Cyber Crime

Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Clarification of Terms, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics, Computer Language, Network Language, Realms of the Cyber world. Internet crime and Act: A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT Page 3 of 23 2000. Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks.

UNIT V

Cyber Laws and Ethics

Privacy Issue and Access Rights, Introduction to Cyber Ethics Freedom of Speech and Expression in Cyber Space , Right to Privacy and Right to Data protection, Cyber Security Audit, Information and Technology Act & Intellectual Property Rights, Historical Background and objectives, Legal Recognition of Electronic Record & Procedure, Offences and Penalties.

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TEXT BOOK

1. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cybersecurity: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.
2. Cryptography and Network Security Principles and Practices, by William Stallings, Pearson Education; Seventh edition (30 June 2017)
3. C K Shyamala, N Harini, Dr. T.R.Padmnabhan Cryptography and Security ,Wiley
4. Bruce Schiener, "Applied Cryptography". John Wiley & Sons

REFERENCE BOOKS

1. Mark Stamp's Information Security: Principles and Practice (WIND) Paperback – 2009 by Deven N. Shah, Wiley (2009)
2. Information Security Risk Analysis - Thomas R. Peltier, Third Edition, Pub: Auerbach, 2012
3. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole, Wiley, 1st ed; 2008
4. Principles of Information Security by Michael E. Whitman, Cengage Learning India Private Limited; 5 edition (2015)

CS-216	INTERNET OF THINGS	L-T-P	Cr
		3-0-0	3

OBJECTIVE

It enables the students to describe what IoT is and how it works today, Recognise the factors that contributed to the emergence of IoT and Design and program IoT devices.

Pre-Requisites:

Basic knowledge of passive electrical & electronics components, basic programming such as C language, accessibility to the Hardware such as Arduino UNO & Arduino IDE.

COURSE OUTCOMES

The students undergoing this course will be able:
CO1: To Use real IoT protocols for
communication CO2: To Secure the elements of
an IoT device
CO3: To Design an IoT device to work with a Cloud Computing
infrastructure CO4: Transfer IoT data to the cloud and in between cloud
providers
CO5: To Define the infrastructure for supporting IoT deployments

UNIT I

IOT: What is the IoT and why is it important? Elements of an IoT ecosystem, Technology drivers, Business drivers, Trends and implications, Overview of Governance, Privacy and Security Issues

UNIT II

IOT PROTOCOLS: Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFIDProtocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4–BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security

UNIT III

IOT ARCHITECTURE:

IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity : An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction.

UNIT IV

WEB OF THINGS:

Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture
– WoT Portals and Business Intelligence.

IOT APPLICATIONS:

IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc

Textbook:
1. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011.
3. David Easley and Jon Kleinberg, "Networks, Crowds, and Markets: Reasoning About a Highly Connected World", Cambridge University Press, 2010.
4. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key applications and Protocols", Wiley, 2012.

References Books:
1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014
2. Francis da Costa, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013 Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1- 4493-9357-1

CS-212	DESIGN & ANALYSIS OF ALGORITHMS	L T P	C r
		3-1-0	4

OBJECTIVE

To relay the theoretical and practical aspects of design of algorithms

PRE-REQUISITES

Knowledge of fundamentals of basic computer programming for implementing algorithms

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Define the basic concepts of algorithms and analyze the performance of algorithms.

CO2: Discuss various algorithm design techniques for developing algorithms.

CO3: Discuss various searching, sorting and graph traversal algorithms.

CO4: Understand NP completeness and identify different NP complete problems.

CO5: Discuss various advanced topics on algorithms.

UNIT I

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

UNIT II

DIVIDE AND CONQUER: General method; binary search; merge sort; quick sort; Strassen's matrix multiplication algorithms and analysis of algorithms for these problems.

UNIT III

GREEDY METHOD: General method; knapsack problem, job sequencing with deadlines; minimum spanning trees Algorithm of Kruskal's and Prim's; single source paths and analysis of these problems.

UNIT IV

DYNAMIC PROGRAMMING AND BACK TRACKING: General method; optimal binary search trees; O/I knapsack; the traveling salesperson problem, 8 queens 'problem; graph coloring; Hamiltonian cycles

UNIT V

NP HARD AND NP COMPLETE PROBLEMS: Basic concepts; Cook's theorem; NP hard graph and NP scheduling problems; some simplified NP hard problems.

TEXT BOOK

Horowitz Ellis and Sahni Sartaj, ―Fundamental of Computer Algorithms‖, Galgotia Publications, 1978

REFERENCE BOOKS

1. Cormen Thomas H., Leiserson Charles E. and Rivest Ronald L., ―Introduction to Algorithms‖, Tata McGraw Hill, 1990
2. Aho A. V. and Hopcroft J. E., ―The Design and Analysis of Computer Algorithm‖, Addison Wesley, 1974
3. Berlion P., and Bizard P., Algorithms – The Construction, Proof and Analysis of Programs, John Wiley & Sons, 1986.
4. Bentley J. L., ―Writing Efficient Programs‖, Prentice Hall of India, June 1982.
5. Goodman S. E. and Hedetnieni, ―Introduction to Design and Analysis of Algorithm‖, McGraw Hill, 1997
6. Trembley Jean Paul and Bunt Richard B., ―Introduction to Computers Science - An Algorithms Approach‖, Tata McGraw Hill, 2002
7. Knuth Donald E., ―Fundamentals of Algorithms: The Art of Computer Programming‖, Vol. l, Naresh Publications, 1985
8. Goodrich Michael T. and Roberto Tamassia, ―Algorithm Design: Foundations, Analysis & Internet Examples‖, Wiley Student Ed., 2002

CS-305	ARTIFICIAL INTELLIGENCE	L T P	C r
		3 0 0	3

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

PRE-REQUISITES: Knowledge of neural networks, data structures

COURSE OUTCOMES
CO1: Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems. Solve basic AI based problems

CO2: Define the concept of Artificial Intelligence and Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

CO3: Apply AI techniques to real-world problems to develop intelligent systems.

CO4: Select appropriately from a range of techniques when implementing intelligent systems.

CO5: Discuss the basics of ANN and different optimizations techniques

UNIT I
INTRODUCTION TO AI AND SEARCH TECHNIQUES: Foundation and history of AI; data, information and knowledge; AI problems and techniques – AI programming languages, problem space representation with examples; blind search strategies, breadth first search, depth first search, heuristic search techniques: hill climbing: best first search, A * algorithm AO* algorithm, Minimax search procedure for Game Playing.

UNIT II
KNOWLEDGE REPRESENTATION ISSUES AND TECHNIQUES: Predicate logic; representing knowledge using rules. Semantic nets, partitioned nets, parallel implementation of semantic nets; frames, forward and backward chaining; frame based systems.

UNIT III
REASONING UNDER UNCERTAINITY: Reasoning under uncertainty, non monotonic reasoning; Review of probability; Baye's probabilistic interferences and Dumpster Shafer theory; statistical reasoning, fuzzy reasoning.

UNIT IV
PLANNING & LEARNING: Goal stack planning; non linear planning, hierarchical planning representation for planning; partial order planning algorithm. Basic concepts of Learning ; rote learning, learning by taking advices, learning by problem solving, learning from examples, discovery as learning, learning by analogy; explanation based learning; neural nets; genetic algorithms.

EXPERT SYSTEM AND APPLICATIONS OF ARTIFICIAL INTELLIGENCE: Expert systems: rule based systems architecture: Principles of natural language processing: knowledge acquisition concepts; AI application to robotics, and current trends in intelligent systems; parallel and distributed AI.

TEXT BOOK

Rich Elaine and Knight Kevin, ―Artificial Intelligence 3rd Edition, Tata McGraw Hill, 1991

REFERENCE BOOKS
1. Nilson Nils J., ―Artificial Intelligence‖, McGraw-Hill, New York 1971
2. Russell Stuart and Norvig Peter, ―Artificial Intelligence: A Modern Approach‖, Prentice Hall of India, 1998
3. Negnevitsky, ―Artificial Intelligence: A Guide to Intelligent System ‖, Pearson Education, 2004.
4. Patterson O. W., ―Introduction to Artificial Intelligence & Expert Systems‖, Prentice Hall of India, 1996.
5. Winston Patrick Henry, ―Artificial Intelligence, 3rd Edition, Addition Wesley, 1992
6. Clockson & Mellish, ―Programming PROLOG‖, 3rd Edition, Narosa Publications, 2002.

CS-210	WEB & INTERNET TECHNOLOGIES	L T P	C r
		3 0 0	3

OBJECTIVE

- To understand the concepts and architecture of the World Wide Web.
- To understand and practice Markup Language.
- To understand and practice Embedded Dynamic Scripting on Client-side Internet Programming.
- To understand and practice Web Development Techniques on client-side.

PRE-REQUISITES

Basics of programming, Structure and HTML Tags, Images, List, Tables, Anchors and Form Elements

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Explain the history of the internet and related internet concepts that are vital in understanding web development.

CO2: Discuss the insights of internet programming and implement complete application over the web.

CO3: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.

CO4: Utilize the concepts of JavaScript and Java

CO5: Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.

UNIT I

INTRODUCTION TO WWW: Introduction to Computer networks - Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response — Generation of dynamic web pages.

UNIT II

UI DESIGN: HTML5: What is HTML5 - Features of HTML5 – Semantic Tags – New Input Elements and tags - Media tags (audio and video tags) – Designing Graphics using Canvas API - Drag and Drop features – Geolocation API - Web storage (Session and local storage).

CSS3: What is CSS3 – Features of CSS3 – Implementation of border radius, box shadow, image border, custom web font, backgrounds - Advanced text effects(shadow) - 2D and 3D Transformations - Transitions to elements - Animations to text and elements

UNIT III

RESPONSIVE WEB DESIGN (RWD): Responsive Design: What is RWD – Introduction to RWD Techniques – Fluid Layout, Fluid Images and Media queries - Introduction to RWD Framework .

TWITTER BOOTSTRAP – Bootstrap Background and Features - Getting Started with Bootstrap - Demystifying Grids – Off Canvas - Bootstrap Components - JS Plugins - Customization

UNIT IV
INTRODUCTION TO JAVASCRIPT: Introduction - Core features - Data types and Variables - Operators, Expressions and Statements - Functions & Scope - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling – Browser Object Model - Windows and Documents - Form handling and validations.

OBJECT-ORIENTED TECHNIQUES IN JAVASCRIPT - Classes – Constructors and Prototyping (Sub classes and Super classes) – JSON – Introduction to AJAX.

UNIT V
INTRODUCTION TO JQUERY: Introduction – jQuery Selectors – jQuery HTML - Animations – Effects – Event Handling – DOM – jQuery DOM Traversing, DOM Manipulation
– jQuery AJAX

TEXT BOOKS
1. Harvey & Paul Deitel & Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web - How To Program", Fifth Edition, Pearson Education, 2011.
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Second Edition, Tata McGraw Hill, 2012.

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

CS-303	Formal Language Automata	L T P	C r
		3-1-0	4

PRE-REQUISITES: Knowledge of basic computer programming.

COURSE OUTCOMES

CO1: Understand the relation between types of languages and types of finite automata.
CO2: An ability to design grammars and automata for different language classes.
CO3: Understanding the Context free languages and grammars and also normalizing CFG.
CO4: Understand the concept of pushdown automata and its application.
CO5: To understand basic properties of Turing machines and computing with Turing machines.

UNIT I: FINITE AUTOMATA AND REGULAR EXPRESSIONS: Finite state systems; basic definitions non-deterministic finite automata (NDFA), deterministic finite automata (DFA), equivalence of DFA and NDFA, finite automata with e-moves, limitations of FSM, Moore and Mealy Machines, equivalence of Moore and Mealy Machines, Minimization of Finite Automata.

UNIT II: PROPERTIES OF REGULAR SETS: Regular expressions, equivalence of finite automata and regular expressions, regular expression conversion and vice versa, Arden's theorem. The Pumping Lemma for regular sets, applications of the pumping lemma, closure properties of regular sets.

UNIT III: CONTEXT FREES GRAMMARS & GREIBACH NORMAL FORM: Definition, context free and context sensitive grammar; ambiguity regular grammar; reduced forms; Chomsky Normal Form (CNF), Greibach Normal Form (GNF).

UNIT IV: PUSHDOWN AUTOMATA: Introduction to pushdown machines; design of PDA; conversion of PDA to CFG and vice versa, application of pushdown machines.

UNIT V: TURING MACHINES: Basic concepts of Turing machines, deterministic and non-deterministic Turing machines; design of Turing machines; halting problem of Turing machines.

TEXT BOOK
   1. Mishra K. L. P. and Chandrasekaran N., "Theory of Computer Science - Automata, Languages and Computations", Prentice Hall of India, 2000.
   2. Hopcroft, Ullman O. D. and Mothwani R., "Introduction to Automata Theory, Language & Computations", Addison Wesley, 2001.

REFERENCE BOOKS
   1. Linz Peter, "Introduction to Formal Languages & Automata", Narosa Publications, 2001
   2. Greenlaw Ramond and Hoover H. James, "Fundamentals of the Theory of Computation - Principles and Practice", Harcourt India Pvt. Ltd., 1998

CS-458	**Fundamentals of Cyber Security LAB**	**L T P**	**Cr**
		0-0-2	**1**

LIST OF EXPERIMENTS

1.Implement the following Substitution & Transposition Techniques concepts:

 a) Caesar Cipher

b) Rail fence row & Column Transformation.

2 Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript. Consider the end user as one of the parties (Alice) and the JavaScript application as other party (bob).

3 Implement the following Attack:

a) Dictionary Attack

 b) Brute Force Attack.

4.Installation of Wire shark, tcpdump, etc and observe data transferred in client server communication using UDP/TCP and identify the UDP/TCP datagram.

5. Installation of rootkits and study about the variety of options.

6. Perform an Experiment to Sniff Traffic using ARP Poisoning.

7. Demonstrate intrusion detection system using any tool (snort or any other s/w).

8. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures.

CS-260	WEB & INTERNET TECHNOLOGIES LAB	L T P	C r
		0 0 2	1

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Explain the history of the internet and related internet concepts that are vital in understanding web development.

CO2: Discuss the insights of internet programming and implement complete application over the web.

CO3: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.

CO4: Utilize the concepts of JavaScript and Java

CO5: Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.

LIST OF EXPERIMENTS

1   Design a web page using Physical and Logical tags of HTML.
2   Design a web page using
    2.1 Ordered
    List 2.2
     2.2 Unordered List
     2.3 Nested Lists

3   Design a web page to show the use of image as a hyperlink
4   Design a web-page using frames and linking
5   Design a class Time Table using tables in HTML.
6   Code to create a bookmark.
7   Design a web-page showing the use of forms using HTML 4.01 and HTML 5 Tags.
8   Design a page using basic tags of HTML 5.0.
9   Design a web-page using style sheets (External, Internal and Inline)
10   Write a Program to print if the no is even or odd using JavaScript
11   Input a number and find the difference of the sum of factors and non-factors.
12   WAP in JavaScript to print the

       pattern 12345

       1234

       123

       12

       1

13   WAP to Accept an Array of 10 numbers and display the sum of elements.
14   WAP to find greatest of all elements of an array
15   Design a web-page to show different validation checking using Java Script

16   WAP in PHP code for calculating S.I

17   WAP to Calculate factorial of a number

18   WAP to print the table of 10.

19   WAP to print the sum of diagonal elements

20   WAP to enter 5 elements each from Array1 and Array2 and print these elements using third array.

21   WAP to show database connectivity using PHP and Mysql.

CS-355	ARTIFICIAL INTELLIGENCE LAB	L T P	C r
		0-0-2	1

COURSE OUTCOMES
CO1 Explain artificial intelligence, its characteristics and its application areas.
CO2 Formulate real–world problems as state space problems, optimization problems or constraint satisfaction problems
CO3 Select and apply appropriate algorithms and AI techniques to solve complex problems.
CO4 Design and develop an expert system by using appropriate tools and techniques.

LIST OF EXPERIMENTS

1. Study of Python programming language.

2. Write a program to find out route distance between two cities using Python.

3. Write a program to implement Tower of Hanoi using Python.

4. Write a program to calculate factorial of a number using Python.

5. Write a program to print the list of customer having different colored cars with price and model available using Python.

6. Write a program to implement water jug problem using Python.

7. Write a program to implement Breadth First Search using Python

8. Write a program to implement Depth First Search using Python

9. Write a program to solve 8-Queens problem using Python.

10. Write a program to solve Monkey Banana problem using Python.

PDP-202	LIFE SKILLS	L T P	C r
		0 0 2	1

COURSE OUTCOMES

The students undergoing this course will be able to**:**

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

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

UNIT II
STRESS MANAGEMENT – Meaning of Stress, Effects of Stress on Body & Mind. How to overcome stress

UNIT III
TIME MANAGEMENT – Concept of TM, Time Matrix, 24 hr Time tracker. How to manage time effectively?

UNIT IV
SELF -AWARENESS & SELF - ESTEEM – What is SA & SE? Importance of Self Awareness, Emotional Intelligence – Definition and significance

UNIT V
ART OF CONVERSATION – Conversational Skills - How to start, sustain and conclude conversation?

UNIT VI
MOTIVATION – Meaning, Internal & External Motivation, How to stay motivated? Self Motivation

RA-101	Reasoning & Aptitude-I	L T P	C r
		1 0 0	1

UNIT 1 – Logical Reasoning – Logical Deductions (Syllogism & Venn Diagrams) logical connectives

UNIT 2- Analytical Reasoning – Seating Arrangements, combinations, selections, comparisons, blood relations, directions etc

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

UNIT 4 – Higher Maths – Algebra & Mensuration

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

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

Syllabus
Of
B.Tech
(Cyber Security)
3rd Year
5th Semester

EC-301	MICROPROCESSORS & MICROCONTROLLER	L T P	Cr
		3 0 0	3

<u>OBJECTIVES</u>
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

<u>PRE-REQUISITES</u>
Knowledge of Boolean algebra, number systems and basic digital circuitry.

COURSE OUTCOMES
CO1: Understand the taxonomy of microprocessors and knowledge of contemporary microprocessors.
CO2: Describe the architecture, bus structure and memory organization of 8085 as well as higher order microprocessors.
CO3: Explore techniques for interfacing I/O devices to the microprocessor 8085 including several specific standard I/O devices such as 8251 and 8255.
CO4: Demonstrate programming using the various addressing modes and instruction set of 8085 microprocessor
CO5: Design structured, well commented , understandable assembly language programs to provide solutions to real world control problems

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

UNIT II
THE 8086 MICROPROCESSOR ARCHITECTURE: Architecture; block diagram of 8086 with details of sub-blocks; memory segmentation and physical address computations; program relocation; addressing modes; pin diagram and description of various signals; Interrupt Structure.

INSTRUCTION SET OF 8086: Data transfer instructions; arithmetic instructions; branch instructions; looping instructions; NOP and HLT instructions; flag manipulation instructions; logical instructions; shift and rotate instructions; directives; programming examples.

UNIT III
INTERFACING DEVICE: The 8255 PPI chip: Architecture; control words and modes; interfacing and programming with 8085.
DMA: Introduction to DMA process; 8257 pin diagram; architecture; operation; command words; interfacing and programming with 8085.

UNIT IV
PROGRAMMABLE INTERRUPT CONTROLLER: 8259 diagram; architecture; initialization command words; operational command wards.

UNIT V
PROGRAMMABLE INTERVAL TIMER: 8253 pin diagram; architecture; modes.

TEXT BOOK
Gaonkar, Ramesh S., ―Microprocessor Architecture: Programming and Applications with 8085‖, 5th Edition,

Prentice Hall of India, 1995

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

CS-301	COMPUTER NETWORK	L T P	Cr
		3 0 0	3

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

PRE-REQUISITES
Knowledge of computers hardware and software

COURSE OUTCOMES
CO1: Understand computer network basics, network architecture, TCP/IP and OSI reference models.
CO2: Identify and understand various techniques and modes of transmission

CO3: Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN

CO4: Describe routing and congestion in network layer with routing algorithms and classify IPV4 addressing scheme

CO5: Discuss the elements and protocols of transport layer. Understand network security and define various protocols such as FTP, HTTP, Telnet, DNS

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

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

UNIT III
MEDIUM ACCESS SUBLAYER RANDOM ACCESS: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, Controlled Access: Reservation, Polling, Channelization: FDMA, TDMA, CDMA, IEEE Standards, Standard Ethernet, Changes in the standard, Fast Ethernet, Gigabit Ethernet

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

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

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

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

CS-303	**FORMAL LANGUAGE & AUTOMATA THEORY**	**L T P**	**Cr**
		3-1-0	**4**

OBJECTIVES
To understand the theory and practice of compiler implementation. To learn finite state machines and lexical scanning. To learn context free grammars, compiler parsing techniques, construction of abstract syntax trees, push down Automata and Turing Machine.

PRE-REQUISITES
Knowledge of mathematics and Programming Languages

COURSE OUTCOMES
CO1: Understand the basic concepts of formal languages, automata and grammar types, as well as the use of formal languages and reduction in normal forms
CO2: Demonstrate the relation between regular expressions, automata, languages and grammar with formal mathematical methods
CO3: Design push down automata, cellular automata and turing machines performing tasks of moderate complexity
CO4: Analyze the syntax and formal properties, parsing of various grammars such as LL(k) and LR(k)
CO5: Describe the rewriting systems and derivation languages

UNIT I
FINITE AUTOMATA AND REGULAR EXPRESSIONS: Finite state systems; basic definitions non-deterministic finite automata (NDFA), deterministic finite automata (DFA), equivalence of DFA and NDFA finite automata with e-moves;, limitations of FSM, Moore and Mealy Machines; Equivalence of Moore and Mealy Machines., Minimization of Finite Automata. Concept of basic machine; properties

UNIT II
PROPERTIES OF REGULAR SETS: regular expressions; equivalence of finite automata and regular expressions, regular expression conversion and vice versa, Arden's theorem; The Pumping Lemma for regular sets; applications of the pumping lemma; closure properties of regular sets.

UNIT III
CONTEXT FREES GRAMMARS & PDA: Definition, Context free and context sensitive grammar; ambiguity regular grammar; reduced forms; removal of useless symbols and unit production; Chomsky Normal Form (CNF), Greibach Normal Form (GNF). Introduction to pushdown machines; design of PDA; conversion of PDA to CFG and vice versa, application of pushdown machines.

UNIT IV
TURING MACHINES: Basic concepts, Deterministic and non-deterministic Turing machines; design of Turing machines; halting problem of Turing machines.

UNIT V
INTRODUCTION TO COMPILER DESIGN AND PARSING: Introduction to translators and its need, structure of Compilers and its different phases. **:** Introduction to Parser and role of Parser (Syntax analyzer), Types of parsers: Bottom up and Top down Parser.

TEXT BOOK
Hopcroft, Ullman O. D. and Mothwani R., "Introduction to Automata Theory, Language & Computations", Addison Wesley, 2001

REFERENCE BOOKS
1. Mishra K. L. P. and Chandrasekaran N., "Theory of Computer Science - Automata, Languages and Computations", Prentice Hall of India, 2000
2. Linz Peter, "Introduction to Formal Languages & Automata", Narosa Publications, 2001
3. Greenlaw Ramond and Hoover H. James, "Fundamentals of the Theory of Computation - Principles and Practice", Harcourt India Pvt. Ltd., 1998
4. Lewis H. R. and Papaditriou C. H., "Elements of Theory of Computation", Prentice Hall of India, 1998
5. Martin John C., "Introduction to Languages and Theory of Computations", Tata McGraw Hill, 2003

CS-409	**CYBER THREATS & LAW**	**L T P**	**Cr**
		3-1-0	**4**

OBJECTIVES

● To help students understand the usage of the internet as a tool of crime in cyberspace.

● To make it possible for students to the number of emerging cybercrimes (cyber-stalking,

hacking, and attacks on critical infrastructure), and also explore how old crimes are affected

in new mediums.

COURSE OUTCOMES

The student after undergoing this course will be able:

CO1: Analyze the usage of the internet as a tool of crime in cyberspace.

CO2: Visualize through various case studies the number of emerging cybercrimes (cyber-stalking,

hacking, and attacks to critical infrastructure), and also explores how old crimes are affected in new

mediums.

CO3: Interpret how the computer has become both a target of attack and a tool for criminal activity.

CO4: Discuss the various domestic and international cyber law framework.

UNIT I: INTRODUCTION TO CYBERSPACE, CYBERCRIME AND CYBER LAW

Cyber World: An Overview: The internet and online resources, Security of information, Digital

Signature. Cyber Crimes- Cyber Squatting, Cyber Espionage, Cyber Warfare, Cyber Terrorism,

Cyber Defamation. Social Media-Online Safety for women and children, Misuse of Private

Information. The World Wide Web, Web-Centric Business, e-Business Architecture, Models of e-

Business, e- Commerce, online Contracts; PRs (copyright, trademarks and software patenting-

taxation). Threats to the virtual world. IT Act 2000 - OBJECTIVESs, Applicability, Non-

applicability, Definitions, Amendments and Limitations.

UNIT II: REGULATORY FRAMEWORK OF INFORMATION AND TECHNOLOGY ACT

Information Technology Act 2000, Digital Signature, E-Signature, Electronic Records, Electronic

Evidence and Electronic Governance. Regulation of Certifying Authorities; Controller, Duties of

Subscribers, Penalties, Adjudications; offences under the act; Making of Rules and Regulations and

Cyber Appellate Tribunal. (Rules announced under the Act), Network and Network Security, Access

and Unauthorized Access, Data Security, E Contracts and E Forms.

UNIT III: OFFENCES AND PENALTIES

Information Technology (Amendment) Act 2008 – OBJECTIVES, Applicability and Jurisdiction; Various cyber-crimes under Sections 43 (a) to (j), 43A, 65, 66, 66A to 66F, 67, 67A, 67B, 70, 70A, 70B,71, 80-elaboration and respective penalties, punishment and fines, Penal Provisions for Phishing, Spam, Virus, Worms, Malware, Hacking, Trespass and Stalking; Human rights in cyberspace, International Co-operation in investigating cybercrimes.

UNIT IV: INDIAN EVIDENCE ACT

Classification – civil, criminal cases. Essential elements of criminal law. Constitution and hierarchy of criminal courts. Criminal Procedure Code. Cognizable and non-cognizable offences. bailable and non-bailable offences. Sentences which the court of Chief Judicial Magistrate may pass. Indian Evidence Act – Evidence and rules of relevancy in brief. Expert witness. Cross-examination and re-examination of witnesses. Sections 32, 45, 46, 47, 57, 58, 60, 73, 135, 136, 137, 138, 141. Section 293 in the code of criminal procedure. Secondary Evidence- Section 65-B.

UNIT V: INTERNATIONAL REGULATION FRAMEWORK

International Legal Regime; International legal regime relating to Cyber Crimes, European Convention on Cyber Crimes, Hague Convention on Jurisdiction and Foreign Judgments: Jurisdiction Agreement. International legal regime relating to E- Commerce; UNCITRAL Model Law on Electronic Commerce 1996, International legal regime relating to Intellectual Property Rights; Berne Convention, Rome Convention, WIPO Copyright Treaty, WIPO Performance and Phonograms Treaty, UDRP, OECD Convention on Database protection.

TEXT BOOK

1. H Computers, Internet and New Technology Laws Lexis Nexis Butterworth Wadhwa,2012

2. Law and practice of intellectual property in India Vikas Vashishth Prentice Hall of India Pv1. Ltd

3. Cyber Law: The Law of Internet", Springer- Verlag, New York Jonathan Rosenoer

REFERENCE BOOKS

1. Sreenivasulu N.S Nandan Kamath Patridge Publishing, 2013

2. Cyber Law – The Indian Perspective Pavan Duggal Saakshar Law Publications

3. Cyber Laws and IT Protection, Harish Chander, PHI Learning Pvt. Ltd, 2012

CS-313	Cyber security concepts & cryptography	L-T-P	Cr
		3-0-0	3

OBJECTIVES

- Analyse the different types of information security threats and vulnerabilities.
- Evaluate the effectiveness of information security policies and procedures at various levels of an organization.
- Design and develop a comprehensive risk management program for an organization's information assets.
- Understanding security attacks and the basics of cryptography.
- Assess different security protocols and their applications.

COURSE OUTCOMES

The student after undergoing this course will be able:

CO1. Identify and classify various information security threats and vulnerabilities based on their characteristics.

CO2. Evaluate the strengths and weaknesses of information security policies and procedures at different levels of an organization.

CO3. Create a risk management program that aligns with the business requirements and addresses potential risks to information assets.

CO4. Classify the symmetric encryption techniques and Illustrate various Public key cryptographic techniques.

CO5. Understand security protocols for protecting data on networks and be able to digitally sign emails and files

UNIT I

Model 1:

Introduction to Cybersecurity

Introduction to information systems, Types of information Systems, Development of Information Systems, Introduction to information security, Need for Information security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis. Evolution of Cybersecurity, Principles of Cybersecurity, CIA – Confidentiality, Integrity, Availability, Vulnerabilities, and People-process-technology based vulnerabilities, Zero-day vulnerability, Threats – Actors, Tools, Types of cyber-attacks, Countermeasures – Cryptography, hashing, authentication, authorization, accountability

UNIT II

Need for Cybersecurity

Business Needs-Protecting the functionality, Enabling the safe operations, Protecting the data, safeguarding the technology assets; Threats-compromises to Intellectual property, deliberate software attacks, Espionage and trespass, sabotage and vandalism; Attacks-Malicious Codes, Back Doors, Denial of Service and Distributed Denial of Service, Spoofing, sniffing, Spam, Social Engineering

UNIT III

Risk Management

Definition of risk management, risk identification, and risk control, Identifying and Accessing Risk, assessing risk based on probability of occurrence and likely impact, the fundamental aspects of documenting risk via the process of risk assessment, the various risk mitigation strategy options, the categories that can be used to classify controls.

UNIT IV

Introduction to Cryptography

Introduction to security attacks, services and mechanism, Classical encryption techniques-substitution ciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers. Modern Block Ciphers: Block ciphers principles, Shannon's theory of confusion and diffusion, fiestal structure, Data encryption standard (DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of operations, Triple DES

UNIT V

Security protocols on network

Introduction to group, field, finite field of the form GF(p), modular arithmetic, prime and relative prime numbers, Extended Euclidean Algorithm, Advanced Encryption Standard (AES) encryption and decryption Fermat's and Euler's theorem, primarily testing, Chinese Remainder theorem, Discrete Logarithmic Problem, Principals of public key crypto systems, RSA algorithm, security of RSA

TEXT BOOK

5. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cybersecurity: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.
6. Cryptography and Network Security Principles and Practices, by William Stallings, Pearson Education; Seventh edition (30 June 2017)
7. C K Shyamala, N Harini, Dr. T.R.Padmnabhan Cryptography and Security ,Wiley
8. Bruce Schiener, "Applied Cryptography". John Wiley & Sons

REFERENCE BOOKS

5. Mark Stamp's Information Security: Principles and Practice (WIND) Paperback – 2009 by Deven N. Shah, Wiley (2009)
6. Information Security Risk Analysis - Thomas R. Peltier, Third Edition, Pub: Auerbach, 2012
7. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole, Wiley, 1st ed; 2008
8. Principles of Information Security by Michael E. Whitman, Cengage Learning India Private Limited; 5 edition (2015)

CS-315	NETWORK AND APPLICATION SECURITY	L T P	Cr
		3 0 0	3

OBJECTIVES:

To have a fundamental understanding of the design, performance and state of the art of wireless communication systems, Topics covered include cyber security concepts with respect to network security and application security in any IT infrastructure.

PRE-REQUISITE: Basic Cyber Security Concepts

COURSE OUTCOMES:

CO1: Describe and analyse the hardware, software, components of a network and the interrelations.
CO2: Analyse security risks in networks.
CO3: Explain complex security concepts.
CO4: Understand the basic concepts of application security.

CO5: Identify and understand the steps involved in various attacks on web application.

UNIT-1: SECURING COMMUNICATIONS AND LAN/WAN NETWORKS-I

1.1.   International Organization for Standardization/Open Systems Interconnection (ISO/OSI) Layers and Characteristics,
1.2.   LANs vs. WANs
1.3.   Network Cabling, Wireless
1.4.   LAN Technologies (Ethernet, Token Ring, and FDDI)
1.5.   Network Topologies, Network Protocols.

UNIT-2: SECURING COMMUNICATIONS AND LAN/WAN NETWORKS-II

2.1.   Lan Manager / Microsoft Network / NT Domains
2.2.   TCP/IP, Weaknesses
2.3.   Routing Protocols
2.4.   PPP (Point to Point Protocol), DNS (Domain Name Service),
2.5.   NIS, NIS + (Network Information Service)

2.6. DHCP (Dynamic Host Configuration Protocol), NFS (Network File System)
2.7. IPX/SPX, OSI protocols, X.25
2.8. Decnet Telephone/Fax Network

UNIT-3: PHYSICAL NETWORK TYPES & INTERNET/INTRANET/EXTRANET COMPONENTS

3.1. Ethernet, Leased lines, FDDI
3.2. ATM Hubs, Bridges, Routers, Modems, Gateways
3.3. Firewalls, Internet, Email
3.4. Gateway Permission for external connections, Remote Access Security Management Network
3.5. Protocol Security Mechanisms (VPN, Secure Communications Protocols, E-Mail Security Solutions, Dial-Up Protocols, Authentication Protocols)

UNIT-4: APPLICATION SECURITY

4.1 Input Validation - Buffer Overflow,
4.2 Cross-Site Scripting; SQL Injection,
4.3 Canonicalization,
4.4 Sensitive Information ,
4.5 Access Sensitive Data In Storage,
4.6 Network Eavesdropping,
4.7 Data Tampering.

UNIT-5 : AUTHENTICATION & AUTHORIZATION

5.1 Network eavesdropping,

5.2 Brute force attack,

5.3 Dictionary attacks,

5.4 Cookie replay,

5.5 Credential theft,

5.6 Elevation of privilege,

5.7 Disclosure of confidential data,

5.8 Data tampering; luring attacks,

5.9 Phishing.

Text Books / Reference Books:

1. IT Network security, IBM ICE Publication.
2. IT Application security, IBM ICE Publication

Software required/Weblinks:

http://ptac.ed.gov/sites/default/files/issue-brief-threats-to-your-data.pdf
http://faculty.nps.edu/dedennin/publications/Denning-CryptographyDataSecurity.pdf

CS-365	NETWORK AND APPLICATION SECURITY LAB	L T P	Cr
		0 0 2	2

List of Experiments:

1) To study Microsoft security essentials settings, check the firewall inbound and outbound rules.

   a. Allowing an application to communicate through firewall

   b. To close firewall port

   c. Customize the logging settings

   d. Viewing and creation of firewall rules.

2) To install Wire-shark tool and analyze different packets.

3) To install and block websites using In-defend tool and study various categories.

4) Discuss OWASP in detail. How OWASP ranking is done.

5) Design the security essentials for a product-based company which sells online goods.

6) To study the boot process of Windows Operating System and install an Operating System

7) Install Hydra and test it with dummy websites for cracking different passwords through rainbow tables.

8) Study ZenMap on Windows for port scanning

9) Install fiddler tool and study HTTP requests like get and post.

10) Study the different types of Web Application Firewall like Imperva, Microsoft TMG.

Software required/Web links:

Wire- shark, InDefend, Hydra, ZenMap, Fiddler, Imperva, Microsoft TMG
https://www.owasp.org/index.php/Main_Page
https://support.microsoft.com/en-in/help/14210/security-essentials-download
https://www.wireshark.org/

CS-363	Cyber security concepts & cryptography lab	L-T-P	Cr

		0-0-2	1

List of Experiments:

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and display the result.
2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
a. Ceaser cipher b. Substitution cipher c. Hill Cipher
4. Write a C/JAVA program to implement the DES algorithm logic.
5. Write a C/JAVA program to implement the Blowfish algorithm logic.
6. Write a C/JAVA program to implement the Rijndael algorithm logic.
7. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.
8. Write a Java program to implement the RSA algorithm.
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11. Calculate the message digest of a text using the MD5 algorithm in JAVA

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and display the result.

2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.

3. Write a Java program to perform encryption and decryption using the following algorithms. Ceaser cipher b. Substitution cipher c. Hill Cipher

4. Write a C/JAVA program to implement the DES algorithm logic.

5. Write a C/JAVA program to implement the Blowfish algorithm logic.

6. Write a C/JAVA program to implement the Rijndael algorithm logic.

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10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.

11. Calculate the message digest of a text using the MD5 algorithm in JAVA

EC-351	MICROPROCESSORS & MICROCONTROLLER LAB	L T P	CR
		0 0 2	1

LIST OF EXPERIMENTS

1. Familiarization with the operation of 8085 Microprocessor kit.
2. Write a program using 8085 for: a) Addition of two 8-bit numbers. b) Addition of two 16-bit numbers
3. Write a program using 8085 for : a) 8-bit subtraction   b) 16-bit subtraction
4. Write a program using 8085 for   a) Multiplication of two 8- bit numbers
                                     b)Division of two 8- bit numbers
5. Write a program using 8085 to arrange an array of 10 Nos in-
        a) Ascending order b) Descending order
6. Familiarization with the operation of 8086 microprocessor kit
7. Write a program using 8086 for copying 12 bytes of data from source to destination.
8. Write a program using 8086 for:
        a) Finding the largest number from an array.
        b) Finding the smallest number from an array.
9. Write a program using 8086 for arranging an array of numbers in descending order and ascending order
10. Write a program for finding square of a number using look-up table and verify.
11. Write a program to interface a two digit number using seven-segment LEDs. Use 8085 microprocessor and 8255 PPI.

CS-381	MINOR PROJECT-II/TRAINING	L T P	Cr
		0-0-4	2

OBJECTIVE

The student shall be capable of identifying a problem related to the program of study and carry out wholesome research on it leading to findings which will facilitate development of a new/improved product, process for the benefit of the society.

B.Tech projects should be socially relevant and research oriented ones. Student is expected to do an individual project or in group of 3 members. The minor project work is carried out in three phases – Minor Project in IV, V & VI semesters. Major project proposed in VII & VIII semesters and the project work shall be in continuation of Minor Project only. At the completion of a project the student will submit a project report, which will be evaluated (end semester assessment) by duly appointed examiner(s). This evaluation will be based on the project report and a viva voce examination on the project. Student will be allowed to appear in the final viva voce examination only if he / she has submitted his / her project work in the form of paper for presentation / publication in a conference / journal and produced the proof of acknowledgement of receipt of paper from the organizers / publishers.

PEP-301	LEADERSHIP & MANAGEMENT SKILLS	L T P	Cr
		1-0-2	2

Pre-requisites/Exposure: K12 level of English Language
Co-requisites: Knowledge of Word processing using MS Word, basic IT skills

odule Outline

Module 1- Leadership Skills 4 Hours

a. Understanding Leadership and its Importance

- What is leadership?

- Why Leadership required?

- Whom do you consider as an ideal leader?

b. Traits and Models of Leadership

- Are leaders born or made?

- Key characteristics of an effective leader

- Leadership styles

- Perspectives of different leaders

c. Basic Leadership Skills

- Motivation

- Team work

- Negotiation

- Networking

Module 2 - Managerial Skills 6 Hours

a. Basic Managerial Skills

- Planning for effective management

- How to organise teams?

- Recruiting and retaining talent

- Delegation of tasks

- Learn to coordinate

• Conflict management

b. Self-Management Skills

• Understanding self-concept

• Developing self-awareness

• Self-examination

• Self-regulation

Module 3 - Entrepreneurial Skills 4 Hours

a. Basics of Entrepreneurship

• Meaning of entrepreneurship

• Classification and types of entrepreneurships

• Traits and competencies of entrepreneur

b. Creating Business Plan

• Problem identification and idea generation

• Idea validation

• Pitch making

Module 4 - Innovative Leadership and Design Thinking 6 Hours

a. Innovative Leadership

• Concept of emotional and social intelligence

• Synthesis of human and artificial intelligence

• Why does culture matter for today's global leaders

b. Design Thinking

• What is design thinking?

• Key elements of design thinking:

- Discovery

- Interpretation

- Ideation

- Experimentation

- Evolution.

• How to transform challenges into opportunities?

• How to develop human-centric solutions for creating social good?

Module 5- Ethics and Integrity 4 Hours

a. Learning through Biographies

- What makes an individual great?

- Understanding the persona of a leader for deriving holistic inspiration

- Drawing insights for leadership

- How leaders sail through difficult situations?

b. Ethics and Conduct

- Importance of ethics

- Ethical decision making

- Personal and professional moral codes of conduct

- Creating a harmonious life

Pedagogy

Pedagogy for the modules is as follows:

1. Leadership Skills - Lectures (augmented with videos); role-plays for leadership models; team building games

2. Managerial Skills - Lectures (augmented with videos), case studies (AMUL, TESLA, Toyota, DMRC, Tata Group, Google, The Mumbai Dabbawala), SWOT analysis, Johari window

3. Entrepreneurial Skills - Lectures (augmented with videos), case studies and practicing business plans

4. Innovative Leadership and Design Thinking- Concept discussion through lecture and videos followed by role-plays and exercises for each set of intelligence, activities using 5 steps – discovery, interpretation, ideation, experimentation, and evolution (Ref.: Workbook of Design Thinking by IDEO)

5. Ethics and Integrity- Experiential learning through stories suggested list (Ahilya Bai, Holkar, Abdul Kalam, Raja Harishchandra, Mahatma Gandhi, Abraham Lincoln), audio visual augmented role plays and storytelling (leaders from varied fields like academics, corporate, social, sports, art, etc.)

Bibliography and Suggested Readings

Books

- Ashokan, M. S. (2015). *Karmayogi: A Bbiography of E. Sreedharan*. Penguin, UK.
- Brown, T. (2012). *Change by Design.* Harper Business
- Elkington, J., & Hartigan, P. (2008). *The Power of Unreasonable People: How Social Entrepreneurs Create Markets that Change the World*. Harvard Business Press.
- Goleman D. (1995). *Emotional Intelligence*. Bloomsbury Publishing India Private Limited
- Kalam A. A. (2003). *Ignited Minds: Unleashing the Power within India*. Penguin Books India
- Kelly T., Kelly D. (2014). *Creative Confidence: Unleashing the Creative Potential Within Us All.* William Collins
- Kurien V., & Salve G. (2012). *I Too Had a Dream*. Roli Books Private Limited
- Livermore D. A. (2010). *Leading with cultural intelligence: The New Secret to Success*. New York: American Management Association
- McCormack M. H. (1986). *What They Don't Teach You at Harvard Business School: Notes From A Street-Smart Executive*. RHUS
- O'Toole J. (2019) *The Enlightened Capitalists: Cautionary Tales of Business Pioneers Who Tried to Do Well by Doing Good.* Harpercollins
- Sinek S. (2009). *Start with Why: How Great Leaders Inspire Everyone to Take Action*. Penguin
- Sternberg R. J., Sternberg R. J., & Baltes P. B. (Eds.). (2004). *International Handbook of Intelligence*. Cambridge University Press.

E-Resources

- Fries, K. (2019). 8 Essential Qualities That Define Great Leadership. *Forbes*. Retrieved 2019- 02-15 from https:/www.forbes.com/sites/ kimberlyfries/ 2018/02/08/8-essentialqualities-that-define-great-leadership/#452ecc963b63.
- How to Build Your Creative Confidence, Ted Talk by David Kelly - https://www.ted.com/ talks/david_kelley_how_to_build_your_creative_confidence
- India's Hidden Hot Beds of Invention Ted Talk by Anil Gupta - https://www.ted.com/talks/ anil_gupta_india_s_hidden_hotbeds_of_invention
- Knowledge@Wharton Interviews Former Indian President APJ Abdul Kalam - ."A Leader Should Know How to Manage Failure" https://www.youtube.com/watch?v=laGZaS4sdeU
- Martin, R. (2007). How Successful Leaders Think. *Harvard Business Review*, *85*(6): 60.
- NPTEL Course on Leadership - https://nptel.ac.in/courses/122105021/9

Syllabus
of
B.Tech

(Cyber Security)

3rd Year

6th Semester

f

CS-302	STATISTICAL LEARNING THEORY	L T P	Cr
		3-0-0	3

COURSE OUTCOMES

CO1: To learn existing statistical algorithms of Machine Learning (ML) and Pattern Recognition (PR).
CO2: To understand the difference between Classification and Regression
CO3: To have hands-on experience in implementing various ML and PR techniques on different datasets.
CO4: To learn to compare the performance of two learning systems.
CO5: To study few optimization methods used to estimate the parameters of a model during training.

UNIT I

Probabilistic formulations of prediction problems, Plug-in estimators, empirical risk minimization linear threshold functions, perceptron algorithm

UNIT II

Risk bounds, Concentration inequalities, Uniform convergence, Rademacher averages; combinatorial dimensions, Convex surrogate losses for classification

UNIT III

Game-theoretic formulations of prediction problems, Minimax strategies for log loss, linear loss, and quadratic loss, Universal portfolios, Online convex optimization

UNIT IV

Neural network, Stochastic gradient methods, Combinatorial dimensions and Rademacher averages,Hardness results for learning,Efficient learning algorithms

UNIT V

Kernel methods, Reproducing kernel Hilbert spaces, Mercer's theorem, Convex optimization for kernel methods, Representer theorem, Ensemble methods, AdaBoost, AdaBoost as I-projection, Convergence and consistency of AdaBoost

REFERENCES
1. A Probabilistic Theory of Pattern Recognition, Devroye, Gyorfi, Lugosi, Springer
2. The Elements of Statistical Learning, Hastie, et al, Springer
3. Combinatorial methods in density estimation, Devroye and Lugosi, Springer
4. Statistical Learning Theory, Vapnik, Wiley
5. An Introduction to Computational Learning Theory, Kearns and Vazirani, MIT Press

CS-304	SOFTWARE ENGINEERING	L T P	Cr
		3 0 0	3

COURSE OBJECTIVE

To provide basic knowledge of properties of software and its development processes, software quality, CASE tools, etc.

PRE-REQUISITES

Knowledge of computer programming, principles of management

COURSE OUTCOMES

The students undergoing this course will be able to:
CO1: Plan a software engineering process life cycle, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements
CO2: Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project
CO3: Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.
CO4: Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice

CO5: Able to use modern engineering tools necessary for software project management, time management and software reuse.

UNIT I
INTRODUCTION: Definition and Emergence of Software Engineering, Evolving Role of Software, Software Life Cycle Models, Software Characteristics, Applications, Software Product, Software Process, Software Crisis, Software Myths.

UNIT II
SOFTWARE PROJECT MANAGEMENT: Project management concepts, software process and project metrics project planning, project size estimation metrics, project estimation techniques, empirical estimation techniques, COCOMO- a heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management, project scheduling and tracking.

UNIT III
REQUIREMENTS ANALYSIS AND SPECIFICATION: Requirements engineering, system modeling and simulation, analysis principles: modeling, partitioning, software, prototyping: methods and tools; specification principles, representation, the software requirements specification and reviews analysis modeling: data modeling, functional modeling and information flow: data flow diagrams, behavioral modeling; the mechanics of structured analysis: creating entity/ relationship diagram, data flow model, control flow model, the control and process specification.

UNIT IV
SYSTEM DESIGN AND COMPUTERAIDEDSOFTWARE ENGINEERING: Design Process: design and software quality, design principles; design concepts: abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, software procedure, information hiding; functional independence, cohesion, coupling; design heuristics for effective modularity; design model; design documentation, architectural design: software architecture, CASE, building blocks; integrated case environments and architecture, repository.

UNIT V
TESTING AND MAINTENANCE: Software testing techniques, software testing fundamentals: objectives, principles, testability; test case design, white box testing, basis path testing: control structure testing: black box testing, testing for specialized environments, architectures and applications. software testing strategies: verification and validation, unit testing, integration testing, validation testing, alpha and beta testing; system testing, acceptance testing debugging approaches; software re-engineering, reverse engineering, restructuring, forward engineering, Software maintenance, Adaptive , corrective and perfective, software reliability: measures of reliability and availability, software safety.

TEXT BOOK
Pressman Roger S., ―Software Engineering – A Practitioner's Approach‖ , McGraw Hill, 2004

REFERENCE BOOKS

1. Jalote P ankaj, ―An Integrated Approach to Software Engineering‖, 3rd edition, Narosa Book Distributors Private Ltd, 2005
2. Mall R a j i b, ―Fundamentals ofSoftware Eng ineering ‖, Prentice Hall of India,2003
3. Sommerville Ian, ―Software Engineering‖, 8th edition, Addison Wesley, 2007
4. Gustafson David, ―Software Eng ineering ‖, Tata McGraw Hill, 2002
5. Behforooz Ali and Hudson Frederick J., ―Software Engineering Fundamentals‖, Oxford University press, John Wiley & Sons, 2005.

CS-306	CRYPTOGRAPHY AND NETWORK SECURITY	L T P	Cr
		3-0-0	3

OBJECTIVES

The main objective behind this course is to learn about the various network attacks and preventing attacks. This course is designed to cover Application security, Network security, Web security etc.

PREREQUISITE

Data Communications and Computer Networks, Computer Programming, Data Structures, Prime Number Theory

COURSE OUTCOMES

The students undergoing this course will be able to:

CO1: Understand and analyze public-key cryptography, RSA and other public-key cryptosystems

CO2: Analyze and design hash and MAC algorithms, and digital signatures.

CO3: Design network application security schemes, such as PGP, S/ MIME, IPSec, SSL, TLS, HTTPS, SSH, etc.

CO4: Understand key management and distribution schemes and design User Authentication Protocol

CO5: Know about Intruders and Intruder Detection mechanisms, Types of Malicious software, Firewall Characteristics, Types of Firewalls, Firewall Location and Configurations.

UNIT I

ATTACKS ON COMPUTERS & COMPUTER SECURITY: Introduction; The need of Security ; Security Approaches; Principal of Security; Types of Attacks,

CRYPTOGRAPHY : Introduction; Plain Text & Cipher Text; Substitution Techniques; Transposition Techniques; Types of Cryptography; Steganography; Symmetric Key Algorithm: Algorithm Types and Modes, DES; Asymmetric Key Algorithm: RSA, Digital Signatures

UNIT II

DIGITAL CERTIFICATES AND PUBLIC KEY INFRASTRUCTURE: Digital Certificates ; Private Key Management; The PKIX Model ; Public Key Cryptography Standards; Creating Digital certificates using Java

UNIT III

INTERNET SECURITY PROTOCOLS: Introduction; Secure Socket Layer(SSL); Secure Electronic Transaction (SET); Electronic Money; Email security; Wireless application protocol (WAP); Security in GSM: Security in 3G

UNIT IV

USER AUTHENTICATION AND KERBEROS: Introduction, Authentication Basics; Passwords; Authentication Tokens; Certificate Based Authenticaton; Biometric Authentication; Kerberos

UNIT V

NETWORK SECURITY, FIREWALL AND VPN: Introduction, Firewalls: Types of Firewalls ; IP Security; Virtual Private Network; Intrusion,

CASE STUDIES ON NETWORK SECURITY : Introduction ; secure Inter branch payment transactions; Denial of Service attacks; IP Spoofing attacks; Contract Signing; Secret Splitting ; Virtual elections

TEXT BOOKS

1. Stallings William, "Cryptography and Network Security", 4th Edition, Prentice-Hall, Englewood Cliffs, 2006
2. Behrouz A. Forouzan "Cryptography and Network Security", TMH

REFERENCE BOOKS

1. Atul Kahate , "Cryptography and Network Security", 3rd Edition, Tata Mcgraw Hill.
2. Mani Subramanian, "Network Management Principles & Practices", Addison Wesley, 1999
3. Kauffman C., Perlman R. and Spenser M., "Network Security", 2nd Edition, Prentice Hall, 2002.
4. Menezes Alfred, van Oorschot Paul, and Vanstone Scott, "Handbook of Applied Cryptography", CRC Press, NY, 2004.
5. Bellovin S. and Chesvick W., "Internet Security and Firewalls", 2nd Edition, Addison Wesley, 1998.
6. Schneier Bruce, "Applied Cryptography", Wiley Student Edition, 2nd Edition

CS-308	COMPILER DESIGN	L T P	Cr
		3-0-0	3

COURSE OBJECTIVE

To make the student to understand the process involved in a compiler, create an overall view of various types of translators, linkers, loaders, and phases of a compiler, understand what is syntax analysis, various types of parsers especially the top down approach, awareness among students the various types of bottom up parsers, understand the syntax analysis and, intermediate code generation, type checking, the role of symbol table and its organization, Code generation, machine independent code optimization and instruction scheduling.

PRE-REQUISITES

Knowledge of automata theory, context free languages, computer architecture, data structures and simple graph algorithms, logic or algebra.

COURSE OUTCOMES

The students undergoing this course will be able to:
CO1: Student will be familiar with the front-end as well as back-end stages of compiler design and Design Lexical analyzer for given language using LEX tools
CO2: understand the differences between constructing lexers/parsers by hand versus using automated generators
CO3: Hands-on experience with generating intermediate representations, which in turn will let them appreciate the importance of designing simpler languages
CO4: To appreciate the nuances of analyzing and transforming programs for performance
CO5: Experience of working with relatively large programming environments, which will also inculcate a sense of good software design

UNIT I

INTRODUCTION TO COMPILING & LEXICAL ANALYSIS: Introduction of Compiler, Major data Structure in compiler, BOOT Strapping & Porting, Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, Lexical analysis: Input buffering, Specification & Recognition of Tokens, LEX

UNIT II

SYNTAX ANALYSIS: Basic Parsing Techniques: Parsers, Shift reduce parsing, Operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables.

UNIT III

SYNTAX DIRECTED TRANSLATION: Syntax directed definitions: Construction of Syntax trees, Bottom up evaluation of S-attributed definition, L-attribute definition, Top down translation, Bottom Up evaluation of inherited attributes Recursive Evaluation, Analysis of Syntax directed definition.

UNIT IV

CODE GENERATION: Intermediate code generation: Declarations, Assignment statements, Boolean expressions, Case statements, Procedure calls Code Generation: Issues in the design of code generator, Basic block and flow graphs, Register allocation and assignment, DAG representation of basic blocks, peephole optimization, generating code from DAG.

UNIT V

CODE OPTIMIZATION: Introduction to Code optimization: sources of optimization of basic blocks, loops in flow graphs, dead code elimination, loop optimization, Introduction to global data flow analysis, Code Improving transformations ,Data flow analysis of structure flow graph Symbolic debugging of optimized code.

REFERENCES:

1. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques andTools , Pearson Education
2. Raghavan, Compiler Design, TMH Pub.
3. Louden. Compiler Construction: Principles and Practice, Cengage Learning
4. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
5. Mak, writing compiler & Interpreters, Willey Pub.

| CS-318 | NETWORK ARCHITECTURE AND DESIGN | L-T-P | Cr |

		3-0-0	3

OBJECTIVES

- Analyze the working principles and attack surface of Layer 1 to 7 protocols and apply best practices for securing networking equipment and network closets.
- Configure routers, mitigate Layer 3 attacks, and utilize benchmarks and auditing tools for Layer 2 and 3 securities.
- Understand network-centric security technologies such as NGFW, NIDS/NIPS, and network security monitoring, and apply encryption and secure remote access mechanisms.
- Implement data-centric security measures including application (reverse) proxies, web application firewalls, DLP, data governance, and mobile device management.
- Implement a Zero-Trust Architecture, manage credential rotation, secure compromised internal assets, and deploy effective defenses such as Tripwire and red herrings.

COURSE OUTCOMES

After completing the course, the students will be able to

CO1: Implement effective hardening techniques and segmentation strategies to enhance network security, including VLANs and private VLANs.

CO2: Secure SNMP and NTP protocols, implement IPv6 security measures, and utilize VPNs and Layer 3/4 stateful firewalls for network protection.

CO3: Implement effective network traffic analysis techniques, and sandboxing methods, and ensure secure remote access to enhance network security.

CO4: Apply database firewalls, file classification, and ensure secure mobile device management to protect data in various environments such as private cloud, public cloud, and containers.

CO5: Demonstrate the ability to scale endpoint log collection, storage, and analysis, and effectively patch vulnerabilities in a network environment while utilizing endpoints as hardened security sensors.

UNIT I

LAYERS 1 TO 7:

Layer 1 to 7 protocols working principles and attack surface, Networking equipment – switches, routers, bridges – best practices, Network Closets, Wireless, Zigbee and RFID badges, VLANs, Hardening, Private VLANs. Segmentation - Network vs Access Segmentation, Segmentation Principles, Firewall Architecture, DMZ Design, Router ACLs.

UNIT II

LAYER 3:

Router Configuration; Layer 3 Attacks and Mitigation; Layer 2 and 3 Benchmarks and Auditing Tools; Securing SNMP; Securing NTP; Bogon Filtering, Blackholes, and Darknets; IPv6; Securing IPv6; VPN; Layer 3/4 Stateful Firewalls; Proxy, Application proxies.

UNIT III

NETWORK-CENTRIC SECURITY:

NGFW; NIDS/NIPS; Network Security Monitoring - Alert-Driven and Data-Driven Workflows, Network Visibility, Network Metadata, SPAN ports, TAPs, Sensor Placement, Network Traffic Analysis; Sandboxing; Encryption; Secure Remote Access;

UNIT IV

DATA-CENTRIC SECURITY:

Application (Reverse) Proxies; Full Stack Security Design; Web Application Firewalls; Database Firewalls/Database Activity Monitoring; File Classification; Data Loss Prevention (DLP); Data Governance; Mobile Device Management (MDM) and Mobile Application Management (MAM); Private Cloud Security; Public Cloud Security; Container Security

UNIT V

ZERO-TRUST ARCHITECTURE

Zero-Trust Architecture; Credential Rotation; Compromised Internal Assets; Securing the Network; Tripwire and Red Herring Defenses; Patching; Deputizing Endpoints as Hardened Security Sensors; Scaling Endpoint Log Collection/Storage/Analysis

TEXT BOOKS:

1. Network Security Architecture: Best Practices and Techniques, Sean Convery (Latest Edition).
2. Practical Network Security: The Essentials of Effective Network Defense, Chris Sanders (Latest Edition).

REFERENCE BOOKS:

1. Data-Centric Security: Protecting Data Against Insider Threats and External Attacks, Bhavani Thuraisingham (Latest Edition).

CS-320	ETHICAL HACKING	L-T-P	Cr
		3-0-0	3

OBJECTIVES

● Illustrate Ethical hacking methodology and its different stages which includes foot printing, scanning, enumeration and system hacking techniques and a broad knowledge about white box and black box testing

● Explains a wide range of attacks that can cause adverse effects on IT systems that include denial of service, session hijacking and severe vulnerabilities that can be seen in Web Applications.

● Demonstrations of hacking attacks caused in other operating system environments like Linux and the secret techniques to evade firewalls.

● Examines valuable information on vulnerabilities and threats and lso covers an effective way of report making methodology that can help the top level management to take immediate decisions on mitigating the threats.

COURSE OUTCOMES

After completing the course, the students will be able to

CO1: Illustrate the ethical hacking concepts which will provide them with in–depth understanding of the web application vulnerabilities and exploitation techniques.

CO2: Identify wide range of attacks in a Networking environment.

CO3: Create a security assessment and penetration testing report

CO4: Describe Wireless hacking.

CO5: Prepare a well-defined vulnerability report along with remediation techniques

UNIT I

INTRODUCTION TO ETHICAL HACKING

Ethical Hacking Fundamental concepts, Threat actors, Methodology : Reconnaissance, Footprinting, Scanning, Enumeration techniques, exploitation, record cleaning and post incident report. DNS and subdomain Enumeration, Credential and uncredentialed scan. Security threats : Virus, worm, trojan, remote access trojan and malwares. Threat models. Zero day and security policies. OSINT and SOINT basics. Cyber threat intelligence(CTI) and Threat hunting . Testing methodologies : White box, black box and Grey box. Teaming concept : Red team and Blue team. Rootkit, Common and control unit. CWE, CVE,OWASP and SANS. Introduction to Hacking Distros.

UNIT II

SOFTWARE ATTACK AND PERSISTENT THREATS

Password Attacks: Bruteforce attack, Pass the hash, rainbow table and password spraying. Cryptographic attacks. XSS, CSRF, Buffer overflow, Common injection attacks: SQL injection, LDAP injection, code injection, XML and Directory traversal attack. Privilege escalation : Vertical and Horizontal. Malware based attack: Ransomware, adware, spyware, keylogger, logic bombs, RAT, Polymorphic and armored virus. Advanced persistent threats (APT)**.**

UNIT III

NETWORK AND WEB BASED HACKING

Network hacking: Spoofing, ARP spoofing, DNS spoofing, DNS cache poisoning, DNS hijacking, Port Scanning, Sniffing, MIMT, DOS and DDOS, Clickjacking, Session hijacking , URL jacking and typosquatting.

Web-application Scanning and attacking techniques: Rate limiting, SPF record and mail server misconfiguration, local and remote file inclusion, URL redirection, Server side request forgery, remote code injection and common authentication bypass techniques and attacks based on Physical Security. Linux and Windows system hacking

UNIT IV

WIRELESS HACKING

Introduction: Wireless technologies, Communication over Bluetooth, Wifi, NFC. Wireless monitoring, Packet analysis, WiFi Sniffing techniques, WEP/WPA cracking, Tools for wireless hacking. Wireless attacks : Rogue AP, Eviltrin , jamming, Bluejacking and bluesnarfing. Social engineering attacks : Phishing, whishing, whaling, spear phishing, smsing , skimming, dumpster diving, tailgating, piggybacking and bating..

UNIT V

REPORT WRITING and MITIGATION

Introduction to Report Writing and Mitigation, requirements for low level reporting and high level reporting of Penetration testing results, proof of concepts, expert summary, scope of attacks, disclaimers, declarations, Non-disclosure agreement (NDA), and Mitigation of issues identified including tracking.

TEXT BOOKS:

1. Baloch, R., Ethical Hacking and Penetration Testing Guide, CRC Press, 2015.
2. Beaver, K., Hacking for Dummies, 3rded. John Wiley and sons., 2013.
3. McClure S., Scambray J., and Kurtz G, Hacking Exposed. Tata McGraw-Hill Education,6the Edition, 2009
4. International Council of E-Commerce Consultants by Learning, Penetration Testing.

REFERENCE BOOKS:

1. Network and Perimeter Testing Ec-Council/ Certified Security Analyst Vol. 3 of Penetration Testing, Cenage Learning, 2010.
2. Davidoff, S. and Ham, J., Network Forensics Tracking Hackers through Cyberspace,Prentice Hall, 2012

CS-370	ETHICAL HACKING LAB	L-T-P	Cr
		0-0-2	1

PRACTICAL

List of Experiments:

1. Recogninnence using passive Reconnaissance with the help of "Who is" and Online tools as well as Active Reconnaissance using "Sampad" and web site details
2. Manual and automated sub domain enumeration using tools like Knockpy, DNSdumster and sublist3r.
3. Full Scan, Half Open Scan, Stealth scan using "nmap" and UDP, Ping Scanning using "Advanced Lan Scanner" and "Superscan"
4. Packet crafting using "Packet creator" tools and packet analysis using packet analyzer like wireshark tool and TCP dump.
5. Spoofing and sniffing attacks.
6. Exploiting NetBIOS vulnerability
7. Password Revelation : browsers based, social networking application and brute force attack .
8. Creating and Analyzing spoofed emails
9. Creating and Analyzing Trojans
10. OS password cracking
11. SQL injection attacks using logical and automated SQL.
12. Cross site scripting (XSS) attack using executable scripts.
13. Cross side request forgery attack using web vulnerability enumeration tools.
14. Directory traversal and reflective URL attacks.
15. Perform a detailed enumeration of the selected network, including gathering information about connected devices (MAC addresses, IP addresses, etc.) and identifying vulnerable services. Provide a report of the gathered information and any potential vulnerabilities found.

CS-368	NETWORK ARCHITECTURE AND DESIGN LAB	L T P	Cr
		0-0-2	1

List of Experiments

1.   Design a network with a star topology using Packet Tracer.
2.   Configuration of a Router using Packet Tracer.
3.   Implementation of a VLAN using Packet Tracer.
4.   Performing an Initial Switch Configuration.
5.   Configuring IPSec VPN Tunnel Mode using Packet Tracer.
6.   Configure Numbered Access control list for a network topology.
7.   Configure the firewall to provide network security and set Firewall Security in windows.
8.   Configure Firewall Policies to Manage Network Traffic.
9.   Configuring a pfSense Firewall on the Client.
10.   Write code to simulate a buffer overflow attack.
11.   Using Wireshark and NetWitness Investigator to Analyze Wireshark Traffic
12.   Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

CS-352	STATISTICAL LEARNING THEORY LAB	L T P	Cr
		0-0-2	1

LIST OF PROGRAMS

1. Excel for data management
2. Basic data analysis and visualization in Excel
3. Intro to SPSS platform & data mgmt.
4. Basic descriptive & inferential statistics in SPSS
5. Visualizing data in SPSS
6. Intro to SAS platform & data mgmt
7. Basic descriptive & inferential statistics in SAS

8. Visualizing data in SAS
9. Qualitative data analysis (QDA) programs

REFERENCES

1. The Little SAS Book
2. Basic Introduction to R (Harden, 2010)
3. Saunders & Brown, 2008, Ch. 3; Lewis-Beck, 1995, Ch. 1-3; Agresti & Finlay, 2009
4. Patton, Carl V. and David S. Sawicki, Basic Methods of Policy Analysis and Planning. 2nd Edition, Prentice-Hall, 1993.

CS-356	CRYPTOGRAPHY & NETWORK SECURITY LAB	L T P	Cr
		0-0-2	1

LIST OF PROGRAMS

1. To implement Ceaser Cipher Encryption-Decryption.

2. To implement Monoalphabetic Substitution.

3. To implement Polyalphabetic Substitution.

4. To implement Play fair Cipher.

5. To implement Hill Cipher Encyption-Decryption

6. To implement Diffie Hellman Key Exchange.

7. To implement RSA Encryption-Decryption.

8. To implement DES Encryption-Decryption

9. Implementation of SSL

10. Authentication through passwords

11. Configuration of firewall and VPN

CS-382	MINOR PROJECT-III	L T P	Cr
		0-0-4	2

OBJECTIVE
The student shall be capable of identifying a problem related to the program of study and carry out wholesome research on it leading to findings which will facilitate development of a new/improved product, process for the benefit of the society.

B.Tech projects should be socially relevant and research oriented ones. Student is expected to do an individual project or in group of 3 members. The minor project work is carried out in three phases – Minor Project in IV, V & VI semesters. Major project proposed in VII & VIII semesters and the project work shall be in continuation of Minor Project only. At the completion of a project the student will submit a project report, which will be evaluated (end semester assessment) by duly appointed examiner(s). This evaluation will be based on the project report and a viva voce examination on the project. Student will be allowed to appear in the final viva voce examination only if he / she has submitted his / her project work in the form of paper for presentation / publication in a conference / journal and produced the proof of acknowledgement of receipt of paper from the organizers / publishers.

Syllabus
Of
B.Tech
(Cyber Security)
4th Year

7ᵗʰ Semester

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

COURSE OUTCOMES
CO1: Understand the difference between Security Metrics and Audits.
CO2: Knowledge on Vulnerability Management
CO3: Know the Information Security Audit Tasks, Reports and Post Auditing Actions
CO4: Understand Information Security Assessments-I
CO5: Understand Information Security Assessments-II

UNIT I
AUDITING: Accountability; Compliance

UNIT II
AUDIT TRAILS: Audit Trails; Reporting timeline; Record Retention; External Auditors; Laws

UNIT III
MONITORING: Monitoring tools; Warning banner ;Traffic analysis; Trend analysis

UNIT IV
PENETRATION TESTING & VULNERABILITY ASSESSMENT-I: Customers and Legal Agreements; Rules of Engagement; Penetration Testing Planning and Scheduling; Pre Penetration Testing Checklist; Information Gathering; Vulnerability Analysis; External Penetration Testing

UNIT V
PENETRATION TESTING & VULNERABILITY ASSESSMENT-II: Internal Network Penetration Testing; Penetration testing for Denial of Service; Password Cracking; Social Engineering, Stolen Laptop, PDAs and Cell phones, Application; Physical Security, Database; VoIP, VPN; War Dialing, Virus and Trojan Detection; Log Management, File, Integrity Checking, Blue Tooth and Hand held Device ;Telecommunication and Broadband Communication; Email Security, Security Patches, Data Leakage; Penetration Testing

Deliverables and Conclusion; Penetration Testing Report and Documentation Writing, Penetration Testing Report Analysis; Post Testing Actions; Ethics of a Penetration Tester, Standards and Compliance

TEXT BOOK
Cyber security for Beginners by Raef Meeuwisse

REFERENCE BOOKS
1. Extrusion Detection: Security Monitoring for Internal Intrusions By Matt Pascucci
2. Offensive Countermeasures: The Art of Active Defense by John Strand and Paul Asadoorian
3. Visible Ops Security: Achieving Common Security And IT Operations Objectives In 4 Practical Steps by Gene Kim, Paul Love, and George Spafford

CS-413	DIGITAL FORENSICS	L T P	Cr
		3 0 0	3

COURSE OUTCOMES
CO1: Describe Forensic science and Digital Forensic concepts
CO2: Determine various digital forensic Operandi and motive behind cyber attacks
CO3: Interpret the cyber pieces of evidence, Digital forensic process model and their legal perspective.
CO4: Demonstrate various forensic tools to investigate the cybercrime and to identify the digital pieces of evidence
CO5: Analyze the digital evidence used to commit cyber offences.

UNIT I
COMPUTER FORENSICS: Standard Procedure; Incident Verification; System identification; Recovery of Erased and damaged data; Disk imaging and preservation; Data encryption and compression; Automated search techniques; Forensic software

UNIT II
NETWORK FORENSICS AND INTERNET FORENSICS: Tracking network traffic; Reviewing Network Logs; Tools, Performing Live Acquisitions, Order of volatility; Standard Procedure; Internet & World Wide Web threats (Email, Chat-rooms, Search Engines; Hacking & illegal access, Obscene and indecent transmission, Extortion & threats) ; Domain Name Ownership Investigation; Reconstructing Past Internet Activities and Events; Email Forensics: E-mail Analysis; Email Forensics: Email Headers and Spoofing; Email Forensics: Laws against Email Crime; Messenger Forensics: AOL, Yahoo, MSN, and Chats; Browser Forensics: Analyzing Cache and Temporary Internet Files; Browser Forensics: Cookie Storage and Analysis; Browser Forensics: Web Browsing Activity Reconstruction

UNIT III
FORENSIC INVESTIGATION AND EVIDENCE PRESENTATION, LEGAL ASPECTS OF DIGITAL FORENSICS: Authorization to collect the evidence; Acquisition of evidence; Authentication of the evidence; Analysis of the evidence; Reporting on the findings; Testimony; Laws & regulations - Information Technology Act ; Giving evidence in court

UNIT IV
MOBILE FORENSICS & STEGANOGRAPHY:NCollecting and Analyzing Cell Phone, PDA, Blackberry, iPhone, iPod, iPad,and MP3 Evidence; Analyzing CD, DVD, Tape Drives, USB, Flash Memory, and other

Storage Devices; Digital Camera Forensics ; Reconstructing Users Activities; Recovering and Reconstructing Deleted Data; Steganography Tools and Tricks; Data Hiding; Data Recovery.

UNIT V
MALWARE ANALYSIS: Analyzing Live Windows System for Malware**;** Analyzing Live Linux System for Malware**;** Analyzing Physical and Process Memory Dumps for Malware**;** Discovering and Extracting Malware from Windows Systems**;** Discovering and Extracting Malware from Linux Systems**;** Rootkits and Rootkit Detection and Recovery**;** Reverse Engineering Tools and Techniques

TEXT BOOK
Digital Forensic- The Fascinating World of Digital Evidence by Nilakshi Jain, Wiley Publications

REFERENCE BOOKS
1. Internet Security: Cryptographic Principles, Algorithms and Protocols by Man Young Rhee
2. Computer Forensics and Investigations by Nelson, Phillips, Enfinger, and Steuart
3. The Third Edition of Internet Cryptography" by Richard E.Smith
4. Computer Forensics by John R.Vacca
5. The Third Edition of Computer Forensics and Cyber Crime: An Introduction by Marjie T.Britz
6. Digital Forensics and Cyber Crime by Joshua I James and Frank Breitinger
7. Fundamentals of Digital Forensics: Theory, Methods, and Real-Life Applications by Joakim Kävrestad
8. The Second Edition of Digital Forensics with Kali Linux by Shiva V. N. Parasram
9. Digital Forensics and Cyber Crime by R K Jha
10. Digital Forensics Basics: A Practical Guide Using Windows OS by Nihad A. Hassan
11. Cyber Security, Cyber Crime and Cyber Forensics: Applications and Perspectives by Raghu Santanam
12. Guide to Computer Forensics and Investigations by Christopher Steuart, Bill Nelson, and Amelia Phillips
13. Cyber Forensics: From Data to Digital Evidence by Albert J. Marcella JR.
14. Digital Forensics by Anders Flaglien, Inger Marie Sunde, Ausra Dilijonaite, Jeff Hamm, Jens
15. Petter Sandvik, Petter Bjelland, Katrin Franke, and Stefan Axelsson
16. Cyber Forensics by Dejey and S. Murugan

CS-415	IT APPLICATION SECURITY	L T P	Cr
		3 0 0	3

COURSE OUTCOMES
CO1: Understand the need of Information Security, polices, standards and security blue print
of an organization
CO2: Apply cryptographic algorithms in real time applications
CO3: Analyze different types of physical security techniques
CO4: Assess the behavior of different threats and attacks
CO5: Propose solutions for cybersecurity issues using various models

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

UNIT II
AUTHENTICATION & AUTHORIZATION: Network eavesdropping, Brute force attack, Dictionary attacks, Cookie replay, Credential theft, Elevation of privilege, Disclosure of confidential data, Data tampering; luring attacks, Phishing.

UNIT III
CONFIGURATION MANAGEMENT & SESSION MANAGEMENT: Unauthorized access to administration interfaces, Unauthorized access to configuration stores, Retrieval of clear text configuration data, Lack of individual accountability, Over-privileged process and service accounts, Hijacking; session replay, man in the middle.

UNIT IV
CRYPTOGRAPHY, PARAMETER MANIPULATION & EXCEPTION MANAGEMENT: Cryptography, Poor key generation or key management, Weak or custom encryption, Parameter manipulation ,Query string manipulation, Form field manipulation, Cookie manipulation, HTTP header manipulation Exception management Information disclosure, Denial of service.

UNIT V
AUDITING AND LOGGING, COUNTERMEASURES: Auditing and logging, User denies performing an operation, Attacker exploits an application without trace, Attacker covers his or her tracks, Countermeasures.

TEXT BOOK
1. Information Security: An Integrated Collection of Essays. Los Alamitos, CA: IEEE Computer Society Press.
2. Fundamentals of Computer Security Technology. Englewood Cliffs, NJ: PTR Prentice-Hall.ISBN 0- 13-108929-3.
3. Invidation to Cryptology. Upper Saddle River, NJ: Prentice Hall.

CS-417	PHYSICAL SECURITY	L T P	Cr
		3 0 0	3

COURSE OUTCOMES
CO1: To Provide physical security to devices.
CO2: Have a basic knowledge on vulnerabilities and how to overcome them.
CO3: To Know the best time to conduct security surveys and the Audit
CO4: Helps to understand the evolving threats affecting the critical infrastructure
CO5: Evaluate the ability of an organization against critical conditions.

UNIT I

PHYSICAL SECURITY OVERVIEW: Importance of Physical Security; Relationship between Physical and Cyber Security; Guard against Disgruntled Employees and Angry Former Employees; How Activists and Corporate Foes Can Hurt You : Vandals Who Damage For Fun, Saboteurs Who Work For Profit, Thieves and Spies Are Everywhere; Domestic Terrorists Are Still a Threat ;International Terrorist Are a Growing Threat; Physical Security for Natural Disasters ; Security for Random Incidents; Steps to Improve Physical It Security; Influence of Physical Design: Defensible Space, Crime Prevention through Environmental Design.

UNIT II

VULNERABILITY ASSESSMENT: Risk Management and the Vulnerability Assessment; Risk Assessment and the Vulnerability Assessment Process; Statistics and Quantitative Analysis; Vulnerability Process Overview; Reporting and Using Of Vulnerability Assessment; System Engineering and Vulnerability Assessment.

UNIT III

SECURITY SURVEYS AND THE AUDIT: Overview : The Best Time to Conduct the Survey, Why Conduct a Security Review; Classification of Survey Recommendations : Developing Security Points, Nine Points of Security Concern, Personality of the Complex, Positive and Negative Aspects of Making Recommendations ; Crime Analysis, Key Control: Digital Closed-Circuit Television, Intrusion Alarms, Lighting and Security; Other Security Aspects; Security Survey Follow-Up: Residential Security, Home Security Checklist, Top Ten Security Threats, The Audit, Site Survey and Risk Assessment,

UNIT IV

VIDEO TECHNOLOGY OVERVIEW, BIOMETRICS CHARACTERISTICS, ACCESS CONTROL AND BADGES, FENCE STANDARDS: Video System, Camera Function; Scene Illumination, Scene Characteristics: Lenses, Cameras, Transmission, Switchers, quads and Multiplexers, Monitors, Recorders, Hard-Copy Video Printers; Ancillary Equipment: CCTV Biometrics Characteristics Access Control, Designated Restricted Areas; Degree of Security, Considerations; Employee Screening, Identification System, Id Methods; Mechanized/Automated Systems: Card/Badge Specifications, Visitor Identification and Control, Visitors, Enforcement Measures, Sign/Countersign and Code Word,

UNIT V

FIRE AND FIRE SAFETY INSPECTION, STANDARDS, REGULATIONS, AND GUIDELINES— COMPLIANCE AND YOUR SECURITY PROGRAM, INCLUDING GLOBAL RESOURCES & SECURITY PERSONNEL: How Fire Spreads? , Four Ways to Put Out a Fire; Classifying Fire, Ul Standard 217, Water Supply for Sprinklers and Tanks; Fire Safety Inspection – Administrative and Planning Phase, General Physical Inspection Phase, Extinguisher Inspection Phase, Stand Pipe, Fire Hose, And Control Valve Inspection Phase, Sprinkler System Inspection Phase, Hazardous Materials Inspection Phase, Alarm System Inspection Phase; Introduction, Standards, Regulations, Guidelines, Managing Compliance, Resources; Number and Function of Guards, Uniform, Firearms, Vehicles, Guardhouses, Communication, Rounds, Logbooks; Hazard Assessment, Command Structure; Emergency Drills & Crisis Management.

TEXT BOOK

Physical Security Principles (Kindle Edition) by Michael E. Knoke CPP

REFERENCE BOOKS

1. Implementing Physical Protection Systems: A Practical Guide (Paperback) by David G. Patterson
2. Effective Physical Security by Lawrence Fennelly

CS-461	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-463	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-465	IT APPLICATION SECURITY LAB	L T P	Cr
		0 0 2	1

LIST OF PRACTICALS

1. **Eavesdropping Attacks and its prevention using SSH**
   Exercise 1 – Design and implementation of a simple client/server model and running
            application using sockets and TCP/IP
   Exercise 2 – view insecurity of default passwords, printed passwords and password transmitted in plain text
   Exercise 3 – use SSH for secure file transfer or for accessing local computer using port forwarding
   technique.
2. **Virtual Private Network Over WAN**
   Exercise 4 – To Create a Virtual Private Network (VPN) over WAN
   Exercise 5 – To evaluate application response time in the presence and absence of a firewall.
3. **Scanning and Probing**
   Exercise 6 – Find an SSL VPN server running on TCP port.
   Exercise 7 – Find all opened UDP ports.
4. **SQL injections**

Exercise 8 – Injecting into string variables
Exercise 9 – Injecting into numerical variables
5. **Security Group Policies Management**
   Exercise 10- Implement group policy
   Exercise 11-allow users for network settings
6. **IMB Rational AppScan**
   Exercise 12- Code Scanning
   Exercise 13- Introduction to Code Analysis using IBM Rational AppScan
   Exercise 14 - installation of AppScan
   Exercise 15– Understand AppScan functions and running Procedure for downloading the
             application source code
   Exercise 16- AppScan run procedure (Web Services Explorer)

CS-485	MAJOR PROJECT-I	L-T-P	Cr
		0-0-8	4

OBJECTIVES
1. Identify and discuss the role and importance of research in the emerging Technology and Engineering
2. Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem
3. Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.
4. Ability to present the findings of their technical solution in a written report.
5. Presenting the work in International/ National conference or reputed journals

COURSE OUTCOMES
After undergoing this course, the students will be able to:
CO1: Develop aptitude for research and independent learning.
CO2: Demonstrate the ability to carry out literature survey and select unresolved problems in the domain of the selected project topic
CO3: Gain the expertise to use new tools and techniques for the design and development.
CO4: Acquire the knowledge and awareness to carry out cost-effective and environment friendly designs.
CO5: Develop the ability to write good technical report, to make oral presentation of the work, and to publish the work in reputed conferences/journals.

The Major project topic should be selected / chosen to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study.

The Major research Project should have the following

- Relevance to social needs of society
- Relevance to value addition to existing facilities in the institute
- Relevance to industry need
- Problems of national importance
- Research and development in various domain
- Literature survey Problem Definition
- Motivation for study and Objectives
- Preliminary design / feasibility / modular approaches
- Implementation and Verification
- Report and presentation
- Experimental verification / Proof of concept
- Design, fabrication, testing of Communication System.

PEP-401	PROFESSIONAL SKILLS	L-T-P	Cr
		1-0-2	2

Prerequisites/Exposure: Min. B1/B2 level of English Language
Co-requisites: Knowledge of word processing using MS-Word, Basic IT skills

Course Outcomes

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

- Prepare their Resume/CV in an appropriate template without grammatical and other errors using proper syntax

- Demonstrate understanding of Cross-Cultural communication and requisites

- Participate in a simulated interview to gain insight on interviewing skills by analysing the common errors generally made by candidates in an interview

- Demonstrate personal grooming skills

- Demonstrate digital literacy and personal branding.

- Actively & effectively participate in group discussions towards gainful employment

- Identify career opportunities (offline & online) in consideration of their own potential and aspirations

Catalog Description

The objective of this course is to make students confident in presenting themselves and be industry ready. Preparation and managing their Personal Dossier along with Resume building activities help them to be more Industry ready. Training on Employability related communication to enhance the students' performance during their group discussions and Personal Interviews. We will combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, analysis of video scenes and debates. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation. Students will be expected to interact with media resources, such as, web sites, videos, DVDs, and newspapers etc.

Mode of Evaluation: *Continuous Evaluation*

It can be combination of written evaluation, Presentations, Simulations, Assignments, case studies and business plan.

Module 1 – Preparing for the Transition – 12 hours

🎬 Social & Cultural Graces

- Meaning, Social Grace at Work, Acquiring Social Graces.
- Need for etiquette (impression, image, earn respect, appreciation, etc)
- Aspects of social and cultural/corporate etiquette in promoting teamwork
- Importance of time, place, propriety and adaptability to diverse cultures

🎬 Table Manners

- Meaning – Table Etiquettes in Multicultural Environment
- Dos and Don'ts of Table Etiquettes.

🎬 Dress Code & Personal Grooming

- Dress Code for selected Occasions
- Dress Code for an Interview.

🎬 Trust & Collaboration

- Importance of trust in creating a collaborative team
- Agree to Disagree and Disagree to Agree – Spirit of Team work
- Understanding fear of being judged and strategies to overcome fear

🎬 Brainstorming

- Use of group and individual brainstorming techniques to promote idea generation.
- Learning and showcasing the principles of documentation of team session outcomes

Module 2: Career Skills – 12 hours

- Resume & CV Writing: Difference between a CV, Resume and Bio data
- Essential components of a good resume

o   Group Discussion Skills

o   Exploring Career Opportunities

o   Personal Branding & Digital Literacy

o   Oral Presentations

o   Presentation Aids and their usage

🎬 Interview Skills

o   Definition, Types of skills – Employer Expectations –Planning for the Interview –

Interview Questions Critical Interview Questions

o   Meaning and types of interviews (F2F, telephonic, video, etc.)
o   Dress Code, Background Research, Do's and Don'ts
o   Situation, Task, Approach and Response (STAR Approach) for facing an
o   interview
o   Interview procedure (opening, listening skills, closure, etc.)
o   Important questions generally asked in a job interview (open and closed

    ended questions)

🎬 Exploring Career Opportunities

o   Exploring Career Opportunities: The Process of getting hired

o   Personal Branding

o   Importance of digital literacy

o   Knowledge about the world of work, requirements of jobs including self-
    employment.

o   Sources of career information

o   Preparing for a career based on their potentials and availability of opportunities

REFERENCE BOOKS:

● 10 Things Employers Want You to Learn in College, Revised: The Skills
  You Need to Succeed by Bill Coplin July 31, 2012

● Self-Esteem by Dr. Joe Rubino

● 73 Rules of Influencing the Interview by Chris Delaney, July 2012

● Developing Transferable Skills: Enhancing Your Research and Employment
  Potential by Pam Denicolo and Julie Reeves Dec 2013

BA-271 A	HUMAN RESOURCE MANAGEMENT	L-T-P 3-0-0

OBJECTIVE

The course aims to provide the insights into effective management of human resources to enable the students to meet the HR challenges in the present scenario.

1. **INTRODUCTION:** Meaning, scope, objective, functions, policies & roles and importance of Human Resource Management; HRM & HRD - a comparative analysis, personal management vs, HRM, evaluation of HRM, emerging challenges of HRM

2. **HUMAN RESOURCE PLANNING:** Definition, objectives; process and importance, factors effecting job analysis; job evaluation, Recruitment; selection; placement and introduction process; employee training & development, career planning & development process, method induction & orientation training career planning vis, HRP succession planning .

3. **PERFORMANCE MANAGEMENT:** concept and process, performance appraisal, Potential appraisal. Job Compensation; concept and significance; Promotions, demotions, transfers. separation, absenteeism and turnover; Quality of work life (QWL), Quality circle, stress in the workplace.

4. **JOB SATISFACTION AND MORALE:** Health, safety & employee welfare; Employee Participation & Empowerment: Concept, Relevance, Techniques, human resource development: definition, objectives & approaches to human relations; Employee grievances and discipline

5. **HR in KNOWLEDGE OVERVIEW:** Audit, IHRM. (A brief discussion) (global staffing, expatriate staffing) HRM practices in India-emerging trends in IHRM

TEXT BOOK

Rao V. 8. P., "Human Resource Management", Excel Publications

REFERENCE BOOKS

1. C. B. Memoria "Personal Management", Himalaya Publications, New Delhi

2. Edwin B. Flippo, "Personal Management" Tata McGraw Hill

3. Aswathappa K., "Human Resource Management", Tata McGraw H ill

4. Dale Yoder, "Personnel Management & Industrial Relations", Tata McGraw Hill

Syllabus

Of

B.Tech

(Cyber Security)

4th Year

8th Semester

CS-406	CYBER SECURITY TOOLS AND APPLICATIONS	L T P	Cr
		3-0-0	3

OBJECTIVE

The objective of this course is to create architectural, algorithmic and technological foundations for ensuring cyber security, maintenance of the privacy of individuals, the confidentiality of organizations, and the protection of sensitive information, despite the requirement that information be released publicly or semi-publicly.
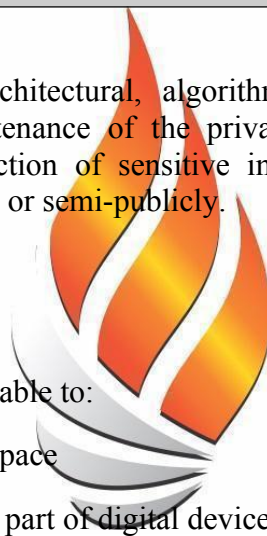
COURSE OUTCOMES

The students after undergoing this course will be able to:

CO1: Know about the crimes occurred in cyber space

CO2: Learn about the devices as well as analysis part of digital devices

CO3: Investigate the various cyber as well as web attacks and techniques used

CO4: Manage the different evidences fetched for a crime

CO5: Learn about different laws as well as authorities involved in the cyber crimes

UNIT I

CYBER CRIME: Cyber Space – Cyber Crime – Criminal Behaviour – Jurisdictional Concerns - Jurisprudential Inconsistency – eCash Security – Prepaid Cards – Stored Values Cards – Mobile Payments – Internet Payment Services - Cyber stalking - Cyber extortion – Cyber terrorism - Cyber warfare –Cyber weapons -ATM frauds – Phreaking – Internet Gambling.

PRACTICAL COMPONENT: 1. Key logger 2. Email Fraud (Suggested Reading: Telecommunication Fraud - Software piracy)

UNIT II

CYBER FORENSICS: Digital device – Hard disk –Disk characteristics - Disk imaging - Data Carving – Techniques - commercial piracy - soft lifting – Steganography – Network components - Port scans - Wireshark - pcap analysis - Trojans and Backdoors – Botnets - DoS – DDoS Attacks - Honey Pots – Malware – Virus and Worms.

PRACTICAL COMPONENT: 1. Pcab file Analysis – Case Study 2. Network Port Scan – Forensics (Suggested Readings: Active and Passive Sniffing)

UNIT III

CYBER INVESTIGATION: Concepts of Investigation - cyber investigation, Network Investigation - Investigating audit logs - Investigating Web attacks - Investigating Computer Intrusions - Profiling – Cyber Criminal profiling – Stylometric Techniques – Warranted searches – Warrantless searches – Undercover Techniques .

PRACTICAL COMPONENT: 1. Investigating Audit Logs 2. Investigating Web attacks (Suggested Readings: Surveying and preserving digital crime scene)

UNIT IV

EVIDENCE MANAGEMENT: Evidence – Digital Evidence - Types – physical evidence – Real evidence – Circumstantial evidence – network evidence - Evidence collection – Evidence Analysis - Contextual Information –Evidence Management – pre search activities – On Scene activities – Report Preparations
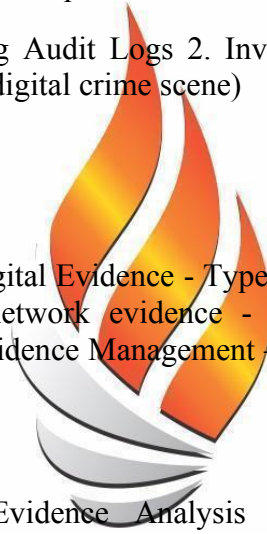
PRACTICAL COMPONENT: 1. Digital Evidence Analysis 2. Network Analysis (Suggested Readings: Investigative Reconstruction with Digital Evidence)

UNIT V

CYBER LAWS AND AUTHORITIES: Information Technology Act 2000 – Digital signature - Electronic Governance - Secure electronic records - Regulation of certifying authorities – CERNTin - Electronic signature certificates - Penalties compensation - Future Trends and Emerging Concerns

PRACTICAL COMPONENT: 1. Digital Signature

REFERENCES

1. "Cyber Security: Threats and Responses for Government and Business"by Caravelli
2. "Cyber Security: Law and Guidance" by Helen Wong
3. "Ghost in the Wires: My Adventures as the World's Most Wanted Hacker" by Kevin Mitnick.

CS-490	MAJOR PROJECT-II/PROJECT BASED ON INTERNSHIP	L-T-P	Cr
		0-0-24	12

OBJECTIVES

6. Identify and discuss the role and importance of research in the emerging Technology and Engineering
7. Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem
8. Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.
9. Ability to present the findings of their technical solution in a written report.
10. **Presenting the work in International/ National conference or reputed journals**

COURSE OUTCOMES

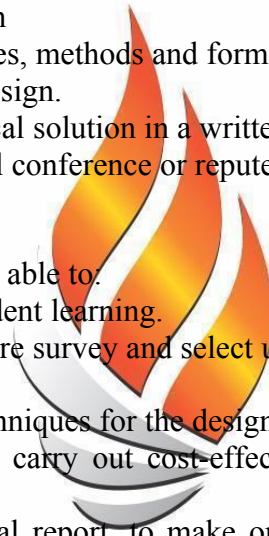After undergoing this course, the students will be able to:

CO1: Develop aptitude for research and independent learning.

CO2: Demonstrate the ability to carry out literature survey and select unresolved problems in the domain of the selected project topic

CO3: Gain the expertise to use new tools and techniques for the design and development.

CO4: Acquire the knowledge and awareness to carry out cost-effective and environment friendly designs.

CO5: Develop the ability to write good technical report, to make oral presentation of the work, and to publish the work in reputed conferences/journals.

The Major project topic should be selected / chosen to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study.

The Major research Project should have the following

- Relevance to social needs of society
- Relevance to value addition to existing facilities in the institute
- Relevance to industry need
- Problems of national importance
- Research and development in various domain
- Literature survey Problem Definition
- Motivation for study and Objectives
- Preliminary design / feasibility / modular approaches
- Implementation and Verification
- Report and presentation
- Experimental verification / Proof of concept
- Design, fabrication, testing of Communication System.

CS-492	SEMINAR	L-T-P	Cr
		0-0-2	1

OBJECTIVES

The objective of the seminar is to impart training to the students in collecting materials on a specific topic in the broad domain of Engineering/Science from books, journals and other sources, compressing and organizing them in a logical sequence, and presenting the matter effectively both orally and as a technical report.

COURSE OUTCOMES

After undergoing this course, the students will be able to:

CO1: Organize and illustrate technical documentation with scientific rigor and adequate literal standards on the chosen topic strictly abiding by professional ethics while reporting results and stating claims

CO2: Demonstrate communication skills in conveying the technical documentation via oral presentations using modern presentation tools.

CO3: To impart training to students to face audience and present their ideas and thus creating in them self esteem and courage that are essential for engineers.

CO4: To assess the debating capability of the student to present a technical topic.

CO5: To learn real working condition and technologies of Industry.
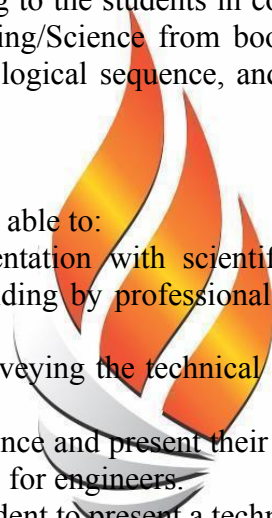
Individual students are required to choose a topic of their interest. A committee consisting of at least three faculty members preferably Expertise in respective fields shall assess the presentation of the seminar and award marks to the students.

Each student shall submit two copies of a write up of his/her seminar topic. One copy shall be returned to the student after duly certifying it by the chairman of the assessing committee and the other will be kept in the departmental library. Internal continuous assessment marks are awarded based on the relevance of the topic, presentation skill, quality of the report and participation.

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