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UGC AUTONOMOUS

B. Tech in Computer Science and Engineering

(Cyber Security)

Course Structure (2021-2022 Admitted Batch)

I YEAR I SEMISTER

S.No.	Course Code	Course Title	Periods Per weak			Credits	Scheme Of Examination Max.Marks		
			L	T	P		CIE	SEE	Total
THEORY									
1	MA1101BS	LINEAR ALGEBRA & CALCULUS	3	1	0	4	30	70	100
2	CH1102BS	CHEMISTRY	3	1	0	4	30	70	100
3	ME1103ES	ENGINEERING GRAPHICS	1	0	4	3	30	70	100
4	EE1104ES	BASIC ELECTRICAL ENGINEERING	3	0	0	3	30	70	100
PRACTICALS									
5	CH1105BS	CHEMISTRY LAB	0	0	3	1.5	30	70	100
6	ME1106ES	ENGINEERING WORKSHOP	1	0	3	2.5	30	70	100
7	EE1107ES	BASIC ELECTRICAL ENGINEERING LAB	0	0	2	1	30	70	100
MANDATORY/VALUE ADDED COURSES									
8		INDUCTION PROGRAMME	0	0	0	0			
		Total Credits	11	2	12	19	270	630	800

I YEAR II SEMISTER

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S.No.	Course Code	Course Title	Periods Per weak			Credits	Scheme Of Examination Max.Marks		
			L	T	P		CIE	SEE	Total
THEORY									
1	MA1201BS	ADVANCED CALCULUS	3	1	0	4	30	70	100
2	AP1202BS	APPLIED PHYSICS	3	1	0	4	30	70	100
3	CS1203ES	PROGRAMMING FOR PROBLEM SOLVING	3	1	0	4	30	70	100
4	EN1204HS	ENGLISH	2	0	0	2	30	70	100
PRACTICALS									
5	AP1205BS	APPLIED PHYSICS LAB	0	0	3	1.5	30	70	100
6	CS1206ES	PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	1.5	30	70	100
7	EN1207HS	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	0	0	2	1	30	70	100
8	MC1001ES*	ENVIRONMENTAL SCIENCE	3	0	0	0	30	70	100
MANDATORY/VALUE ADDED COURSES									
9	MC1001ES*	ENVIRONMENTAL SCIENCE	3	0	0	0			
		Total Credits	14	3	8	18	270	630	800

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II YEAR I SEMESTER

S.No.	Course Code	Course Title	Periods Per weak			Credits	Scheme Of Examination Max.Marks		
			L	T	P		CIE	SE E	Total
THEORY									
1	EC2101ES	Analog and Digital Electronics	3	0	0	3	30	70	100
2	CY2102PC	Data Structures	3	1	0	4	30	70	100
3	MA2103BS	Computer Oriented Statistical Methods	3	1	0	4	30	70	100
4	CY2104PC	Computer Organization and Architecture	3	0	0	3	30	70	100
5	CY2105PC	Python Programming	2	0	0	2	30	70	100
PRACTICALS									
6	EC2106ES	Analog and Digital Electronics Lab	0	0	2	1	30	70	100
7	CY2107PC	Data Structures Lab	0	0	3	1.5	30	70	100
8	CY2108PC	IT Workshop Lab	0	0	3	1.5	30	70	100
9	CY2109PC	Python Programming Lab	0	0	2	1	30	70	100
MANDATORY/VALUE ADDED COURSES									
9	MC2002*	Gender Sensitization Lab	0	0	2	0	Ref:8.4 Academic Regulations,UG. 20		
		Total Credits	14	2	12	21	270	630	800

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II YEAR II SEMESTER

S. No.	Course Code	Course Title	Periods Per weak			Credits	Scheme Of Examination Max.Marks		
			L	T	P		CIE	SEE	Total
THEORY									
1	CY2201PC	Discrete Mathematics	3	0	0	3	30	70	100
2	SM2202MS	BusinessEconomics&FinancialAnalysis	3	0	0	3	30	70	100
3	CY2203PC	OperatingSystems	3	0	0	3	30	70	100
4	CY2204PC	ComputerNetworks	3	1	0	4	30	70	100
5	CY2205PC	ObjectOrientedProgrammingusing Java	3	1	0	4	30	70	100
PRACTICALS									
6	CY2206PC	OperatingSystemsLab	0	0	3	1.5	30	70	100
7	CY2207PC	ComputerNetworksLab	0	0	3	1.5	30	70	100
8	CY2208PC	JavaProgrammingLab	0	0	2	1	30	70	100
MANDATORY/VALUE ADDED COURSES									
9	MC2001*	ConstitutionofIndia	3	0	0	0	Ref:8.4 Academic Regulations,UG. 20		
		Total Credits	18	2	8	21	240	560	800

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III YEAR I SEMESTER

S.No.	Course Code	Course Title	Periods Per weak			Credits	Scheme Of Examination Max.Marks		
			L	T	P		CIE	SEE	Total
THEORY									
1	CY3101PC	Information Security	3	0	0	3	30	70	100
2	CY3102PC	Design and Analysis of Algorithms	3	0	0	3	30	70	100
3	CY3103PC	Data Base Management Systems	3	0	0	3	30	70	100
4	CY3104PC	Introduction to Cyber Security	3	0	0	3	30	70	100
5		Professional Elective-I	3	0	0	3	30	70	100
6		Professional Elective-II	3	0	0	3	30	70	100
PRACTICALS									
6	CY3105PC	DBMS& Information Security Lab	0	0	3	1.5	30	70	100
7	CY3106PC	Design and Analysis of Algorithms Lab	0	0	3	1.5	30	70	100
8	EN3107HS	AdvancedCommunicationSkillsLab	0	0	2	1	30	70	100
		Total Credits	18	0	8	22	270	630	900

Professional Elective-I

Course Code	CourseTitle
CY3108PE	InformationTheory & Coding
CY3109PE	AdvancedComputerArchitecture
CY3110PE	DataAnalytics
CY3111PE	ImageProcessing
CY3112PE	PrinciplesofProgrammingLanguages

Professional Elective-II

Course Code	CourseTitle
CY3113PE	ComputerGraphics
CY3114PE	AdvancedOperating Systems
CY3115PE	InformationalRetrievalSystems
CY3116PE	DistributedDatabases
CY3117PE	Natural LanguageProcessing

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III YEAR II SEMESTER

S.No.	Course Code	Course Title	Periods Per weak			Credits	Scheme Of Examination Max.Marks		
			L	T	P		CIE	SEE	Total
THEORY									
1	CY3201PC	Ethical Hacking	3	1	0	4	30	70	100
2	CY3202PC	CompilerDesign	3	1	0	4	30	70	100
3	CY3203PC	Software Engineering	3	1	0	4	30	70	100
4		ProfessionalElective–III	3	0	0	3	30	70	100
5		OpenElective-I	3	0	0	3	30	70	100
PRACTICALS									
6	CY3204PC	Ethical Hacking Lab	0	0	2	1	30	70	100
7	CY3205PC	CompilerDesignLab	0	0	3	1.5	30	70	100
8	CY3206PC	Software Engineering Lab	0	0	3	1.5	30	70	100
MANDATORY /VALUE ADDED COURSES									
9	MC3002*	Artificial Intelligence	3	0	0	0	Ref:8.4 Academic Regulations,UG.20		
		Total Credits	18	3	8	22	240	560	800

Professional Elective-III

Course Code	CourseTitle
CY3207PE	Biometric Security
CY3208PE	Web Security
CY3209PE	Database Security
CY3210PE	Wireless and Mobile Security
CY3211PE	Secure Protocol Design

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Open Elective-I

COURSE CODE	COURSE TITLE	DEPARTMENT OFFERING COURSE
CS3211OE	Introduction to Data Science	Computer Science and Engineering
CS3212OE	Data mining	Computer Science and Engineering
CS3213OE	Computer Forensics	Computer Science and Engineering
EE3211OE	Electrical Installation and Costing	Electrical and Electronics Engineering
EE3212OE	Electrical Engineering Material	Electrical and Electronics Engineering
EC3211OE	Fundamentals of Internet of Things	Electronics and Communication Engineering
ME3211OE	Operation Research	Mechanical Engineering
ME3212OE	Fundamentals of Mechanical Engineering	Mechanical Engineering
ME3213OE	Metallurgy of non-metallurgists	Mechanical Engineering
CE3211OE	Basics of Civil Engineering	Civil Engineering
CE3212OE	Building Materials and Construction	Civil Engineering

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IV YEAR I SEMESTER

S.No.	Course Code	Course Title	Periods Per weak			Credits	Scheme Of Examination Max.Marks		
			L	T	P		CIE	SEE	Total
THEORY									
1	CY4101PC	Machine Learning	3	0	0	3	30	70	100
2	CY4102PC	Cyber Laws and Security Policies	2	0	0	2	30	70	100
3		ProfessionalElective–IV	3	0	0	3	30	70	100
4		ProfessionalElective-V	3	0	0	3	30	70	100
5		Open Elective-II	3	0	0	3	30	70	100
PRACTICALS									
6	CY4103PC	Machine Learning Lab	0	0	2	1	30	70	100
7	CY4104PC	IndustrialOrientedMiniProject/ SummerInternship	0	0	0	2	30	70	100
8	CY4105PC	Seminar	0	0	2	1	30	70	100
9	CY4106PC	Project stage- I	0	0	6	3	30	70	100
10	MC4001*	IntellectualPropertyRights	3	0	0	0			
		Total Credits	17	0	10	21	270	630	900

*Mandatory Non Credit Course

Note: Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summervacation between 6th and 7th semesters. Students should submit report of Industrial Oriented MiniProject/ Summer Internship for evaluation.

Professional Elective-IV

Course Code	CourseTitle
CY4107PE	Graph Theory
CY4108PE	Introduction toEmbeddedSystems
CY4109PE	E-Commerce
CY4110PE	Cloud Computing
CY4111PE	Ad-hoc&SensorNetworks

Professional Elective-V

Course Code	CourseTitle
CY4112PE	Cyber Crime and Investigation
CY4113PE	Google Dorks & Penetration Testing
CY4114PE	Privacy Preserving and Data Publishing
CY4115PE	Public Key Infrastructure and Trust Management

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CY4116PE	Intrusion Detection Systems

Open Elective-II

COURSE CODE	COURSE TITLE	DEPARTMENT OFFERING COURSE
CS4121OE	Python Programming	Computer Science and Engineering
CS4122OE	R Programming	Computer Science and Engineering
CS4123OE	JAVA Programming	Computer Science and Engineering
EE4121OE	Renewable Energy Sources	Electrical and Electronics Engineering
EE4122OE	Reliability Engineering	Electrical and Electronics Engineering
EC4121OE	Principles of Computer Communications and Networks	Electronics and Communication Engineering
ME4121OE	Fabrication Processes	Mechanical Engineering
ME4122OE	Total Quality Management	Mechanical Engineering
ME4123OE	Energy Management and Conservation	Mechanical Engineering
CE4121OE	Environmental Impact Assessment	Civil Engineering
CE4122OE	Industrial Waste Water Treatment	Civil Engineering

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S.No.	Course Code	Course Title	Periods Per weak			Credits	Scheme Of Examination Max.Marks		
			L	T	P		CIE	SEE	Total
THEORY									
1	SM4201MS	OrganizationalBehavior	3	0	0	3	30	70	100
2		ProfessionalElective- VI	3	0	0	3	30	70	100
3		Open Elective- III	3	0	0	3	30	70	100
4	CY4202PC	ProjectStage-II	0	0	14	7	30	70	100
		TotalCredits	09	0	14	16	120	280	400

Professional Elective-VI

Course Code	CourseTitle
CY4203PE	Computational Complexity
CY4204PE	Distributed Systems
CY4205PE	Neural Networks & Deep Learning
CY4206PE	Human Computer Interaction
CY4207PE	Cyber Forensics

Open Elective-III

COURSE CODE	COURSE TITLE	DEPARTMENT OFFERING COURSE
CS4231OE	Machine Learning	Computer Science and Engineering
CS4232OE	Cloud Computing	Computer Science and Engineering
CS4233OE	Natural Language Processing	Computer Science and Engineering
EE4231OE	Instrumentation and Control	Electrical and Electronics Engineering
EE4232OE	Energy Storage Systems	Electrical and Electronics Engineering
EC4231OE	Electronic Measuring Instruments	Electronics and Communication Engineering
ME4231OE	Reliability Engineering	Mechanical Engineering
ME4232OE	Industrial Management	Mechanical Engineering
ME4233OE	Renewable Energy Sources	Mechanical Engineering
CE4231OE	Remote Sensing and GIS	Civil Engineering
CE4232OE	Disaster Management	Civil Engineering

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MA1101BS :LINEAR ALGEBRA & CALCULUS

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P	4	CIE	SEE	TOTAL
MA1101BS	Basic Sciences	3	1	0		30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives: To learn
1. Types of matrices and their properties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3. Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
4. Concept of Fourier Series.
5. Concept of nature of the series.
6. Geometrical approach to the mean value theorems and their application to the mathematical problems
7. Evaluation of surface areas and volumes of revolutions of curves.
8. Evaluation of improper integrals using Beta and Gamma functions.
9. Partial differentiation, concept of total derivative
10. Finding maxima and minima of function of two and three variables.

Course Outcomes: After learning the contents of this paper the student must be able to
1. Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
2. Find the Eigen values and Eigen vectors
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Analyse the nature of sequence and series.
5. Solve the applications on the mean value theorems.
6. Evaluate the improper integrals using Beta and Gamma functions
7. Find the extreme values of functions of two variables with/ without constraints.

UNIT-1: Matrices

Matrices: Introduction. Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration method, LU Decomposition Method.

UNIT-2: Eigen values and Eigen vectors

Vectors Linear Transformation and Orthogonal Transformation: Eigen values and Eigen vectors and their properties. Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding the inverse an d power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of Quadratic forms; Reduction of Quadratic form to Canonical form by Orthogonal Transformation.

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UNIT-3: Fourier series

Definition of periodic function, Fourier expansion of periodic function in $(0,2\pi) and (-\pi,\pi)$. Determination of Fourier coefficients – Fourier series of even and odd functions – Half – Range Fourier Sine and Cosine expansions.

UNIT-IV: Calculus

Mean value theorems : Rolle's theorem , Lagrange's Mean value theorem with their Geometrical Interpretation and applications , Cauchy's Mean value theorem. Definition of Improper Integral : Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)

Definitions of limit and continuity. Partial Differentiation ; Euler's Theorem ; Total derivative ; Jacobian ; Functional dependence & independence , Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint, 2002.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010

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CH1102BS :CHEMISTRY

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CH1102BS	**Basic Sciences**	**L**	**T**	**P**	**4**	**CIE**	**SEE**	**TOT AL**
		3	**1**	**0**		**30**	**70**	**100**
Contact Classes: 48	**Tutorial Classes: 16**	**Practical Classes: Nil**				**Total Classes:64**		

Course objectives:

1. To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
2. To develop specialized knowledge in the analysis of water and waste water which are essential for the engineers and in industry.
3. Learn about the fundamentals of electrode reactions and electrochemical cells
4. To provide an understanding of the corrosion principles and engineering methods used to minimize and prevent corrosion.
5. To familiarize students about the characteristics and applications of different polymers and engineering materials in every day life.
6. To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

Course outcomes:

1. The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
2. Apply knowledge and understanding of water treatment process to real world problems.
3. Interpret the knowledge of electrochemical phenomenon involved in developing batteries and understanding fuel cells fundamentals.
4. Ability to determine appropriate method of protection against corrosion for a metal based on its applications in different fields.
5. Classify and characterize different polymers engineering materials and apply its knowledge to select suitable materials for specific applications.
6. The required skills to get clear concepts on basic spectroscopy and applications to medical and other fields.

UNIT - I:

Molecular structure and Theories of Bonding:

Atomic and molecular orbitals. Linear combination of atomic orbitals (LCAO), molecular orbitals of diatomic orbitals, molecular orbital energy level diagrams for N_2, O_2 and F_2 molecules. Crystal field theory (CFT): Salient features of CFT- Crystal Field Splitting of transition metal ion d-orbitals in Tetrahedral, Octahedral and

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Square planar geometries. Band structure of solids and effect of doping on conductance.

UNIT-II

Water and its treatment: Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent -expression and units of hardness. Numerical problems. Disadvantages of hard water.

Boiler troubles: Scales and Sludges, caustic embrittlement, boiler corrosion, Softening of water by internal treatment of Boiler feed water and ion- exchange processes. Desalination of water – Reverse osmosis. Sewage water treatment. Potable water treatment - Disinfection of potable water by chlorination and Ozonization.

UNIT-III

Electrochemistry, Batteries and Corrosion:

Electrochemistry: Electrochemical cells- Electrode, electrode potential, standard electrode potential, types of electrodes- Calomel and glass electrodes. Nernst equation, electrochemical series and its applications. Batteries: Cell and battery - Primary (Lithium cell) and secondary batteries (Lead – acid storage battery, Lithium ion battery, advantages and applications of solid state battery) Fuel cells: Hydrogen-oxygen, solid polymer electrolytic fuel cell, Bio chemical fuel cells------- Advantages and Applications. Corrosion and its control –Concept of corrosion, Types of corrosion, mechanism of Chemical & Electro chemical corrosion. Types of electro chemical corrosion (Galvanic corrosion, Pitting, Water line corrosion, stress corrosion). Factors affecting corrosion. Corrosion control methods -Principle of cathodic protection- Sacrificial Anodic Protection (SAP), Impressed Current Cathodic Protection (ICCP) . Protective coatings: Metallic coatings- Hot dipping, metal cladding, cementation, electroplating of copper, electro less plating of nickel**, paints.**

UNIT-IV

Engineering materials:

Ceramics: Properties & types of ceramics. Engineering applications of ceramics. **Polymers:** Defnition, classification, properties of polymers. Plastics-Compounding of plastics, Engineering applications of plastics (PVC, Teflon, Bakelite), Fibres - Applications of Nylon 6. FRP- Types, advantages and applications. Natural rubber and its vulcanization. Elastomers- Applications. Conducting polymers and its applications-Mechanism of conduction and doping in poly acetylene. Applications of bio degradable polymers. **Composites:** Classification, Constituents, advantages, applications. **Lubricants:** Classification, properties and mechanism of lubrication.

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UNIT-V

Spectroscopic techniques and applications:

Principles of Spectroscopy, Selection rules and applications of electronic spectroscopy. Vibrational and rotational spectroscopy. Basic concepts of Nuclear Magnetic resonance spectroscopy, Chemical shift. Introduction to Magnetic Resonance Imaging.

Suggested Text Books:
1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan
6. R. V. E. Gadag & A. Nityananda Shetty, Engineering Chemistry, I K International Publishing House Private Limited, New Delhi, 2015 Edition

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ME1103ES :ENGINEERING GRAPHICS

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
ME1103ES	Engineering Sciences	L	T	P	3	CIE	SEE	TOTAL
		1	0	4		30	70	100
Contact Classes: 16	Tutorial Classes: Nil	Practical Classes: 64				Total Classes:80		

Course objectives:

1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw sectional views and pictorial views of solids.

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

1. Preparing working drawings to communicate the ideas and information.
2. Read, understand and interpret engineering drawings.

UNIT – I
Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II
Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes.

UNIT – III
Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids –Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

UNIT – IV
Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone,Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

UNIT – V
Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion ofIsometric Views to Orthographic Views and Vice-versa –Conventions

Introduction to CAD: (For Internal Evaluation Weightage only):
Introduction to CAD Software Package Commands. - Free Hand Sketches of

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2D- Creation of 2DSketches by CAD Package

TEXT BOOKS:
Engineering Drawing N.D. Bhatt / Charotar
Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

REFERENCE BOOKS:
1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

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EE1104ES :BASIC ELECTRICAL ENGINEERING

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
EE1104ES	**Engineering Sciences**	**L**	**T**	**P**	**1**	**CI E**	**SEE**	**TOTAL**
		0	**0**	**2**		**30**	**70**	**100**
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 32**			**Total Classes:32**			

Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.•

Course Outcomes:

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits
3. To study the working principles of Electrical Machines
4. To introduce components of Low Voltage Electrical Installations•

UNIT-I:

D.C. Circuits Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems and maximum power transfer thorem. Time-domain analysis of first-order RL and RC circuits.

UNIT-II:

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

UNIT-III:

TransformersIdeal and practicaltransformer,equivalentcircuit,losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV:

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Electrical Machines Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Construction and working principle of Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

UNIT-V:

Electrical Installations Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Power factor measurement using 2 wattmeter method, Elementary calculations for energy consumption,

TEXT BOOKS/ REFERENCE BOOKS:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
5. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 198

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CH1105BS :CHEMISTRY LAB

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CH1105BS	Basic Sciences	L	T	P	1.5	CIE	SEE	TOTAL
		0	0	3		30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:48		

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:
1. Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as an function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course Outcomes: The experiments will make the student gain skills on:
1. Determination of parameters like hardness and chloride content in water.
2. Estimation of rate constant of a reaction from concentration – time relationships.
3. Determination of physical properties like adsorption and viscosity.
4. Calculation of Rf values of some organic molecules by TLC technique.

List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of Rf values. eg ortho and para nitro phenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n- butanol and water.
14. Determination of surface tension of a give liquid using stalagmometer.

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References

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

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ME1106ES :ENGINEERING WORKSHOP

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
ME1106ES	**Engineering Sciences**	**L**	**T**	**P**	**2.5**	**CI E**	**SEE**	**TOTAL**
		1	**0**	**3**		**30**	**70**	**100**
Contact Classes: 16	**Tutorial Classes: Nil**	**Practical Classes: 48**				**Total Classes:64**		

Course Objectives:

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineeringproducts.
3. To provide hands on experience about use of different engineering materials, tools,equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, equipmentand machines.
6. To study commonly used carpentry joints.
7. To have practical exposure to various welding and joining processes.
8. Identify and use marking out tools, hand tools, measuring equipment and to work toprescribed tolerances.

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

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including pluming, fitting,carpentry, foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes includingdrilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:
At least two exercises from each trade:

1. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
2. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
3. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
4. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)

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5. Welding Practice – (Arc Welding & Gas Welding)
6. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
7. Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:
Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and WoodWorking

TEXT BOOKS:
1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:
1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP

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EE1107ES: BASIC ELECTRICAL ENGINEERING LAB

Course Code	Category	Hours/Week			Credits	Maximum Marks		
EN1107HS	**Humanities & Sciences**	**L**	**T**	**P**	1	CIE	SEE	TOTAL
		0	**0**	**2**		30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32			Total Classes:32			

Course Objectives:

1. To analyze a given network by applying various electrical laws and network theorems
2. To know the response of electrical circuits for different excitations
3. To calculate, measure and know the relation between basic electrical parameters.
4. To analyze the performance characteristics of DC and AC electrical machines

Course Outcomes:

1. Get an exposure to basic electrical laws.
2. Understand the response of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters
4. Understand the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:

1. Verification of Ohms Law

2. Verification of KVL and KCL

3. Transient Response of Series RL , RC and RLC circuits using DC excitation

4. Resonance in series RLC circuit

5. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits

6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a SinglePhase Transformer

7. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)

8. Three Phase Transformer: Verification of Relationship between Voltages and Currents (StarDelta, Delta-Delta, Delta-star, Star-Star)

9. Measurement of Active and Reactive Power in a balanced Three-phase circuit

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10. Open circuit Characteristics of a Separately/Self Excited DC Shunt/Compound Generator

11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor

12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor

13. Performance Characteristics of a Three-phase Induction Motor

14. Torque-Speed Characteristics of a Three-phase Induction Motor

15. No-Load Characteristics of a Three-phase Alternator

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MA1201BS: ADVANCED CALCULUS

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P	4	CIE	SE E	TOTA L
MA1201BS	Basic Sciences	3	1	0		30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives: To learn
1. Methods of solving the differential equations of first and higher order.
2. Evaluation of multiple integrals and their applications
3. The physical quantities involved in engineering field related to vector valued functions
4. The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes: After learning the contents of this paper the student must be able to
1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems
3. Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped
4. Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I: First Order Ordinary Differential Equations

Exact, linear and Bernoulli's equations ; Applications : Newton's law of cooling , Law of natural growth and decay ; Equations not of first degree : equations solvable for p, Applications: LR circuit problems.

UNIT-II: Ordinary Differential Equations of Higher Order

Second order linear differential equations with constant coefficients : Non-Homogeneous terms of the type e^{ax},sin ax, cos ax, polynomials in x, e^{ax}V(x) and xV(x); method of variation of parameters, Applications: LCR circuit problems.

UNIT-III: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian coordinates) ; change of order of Integration (only Cartesian form) ; Evaluation of triple Integrals : Change of variables (Cartesian to polar) for double and (Cartesian to Spherical And Cylindrical polar coordinates) for triple integrals.Applications: Areas (double integrals) and volumes (by double integrals and triple integrals).

UNIT-IV: Vector Differentiation

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Vector oint functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vectors Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Greens, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.

REFERENCES:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984

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AP1202BS: APPLIED PHYSICS

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
AP1202BS	**Basic Sciences**	**L**	**T**	**P**	**4**	CIE	SEE	TOTAL
		3	**1**	**0**		**30**	**70**	**100**
Contact Classes: 48	**Tutorial Classes: 16**	**Practical Classes: Nil**				**Total Classes:64**		

Course Objectives:
1. Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
2. Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and Electromagnetic theory and a broad base of knowledge in physics.
3. The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
4. To study applications in engineering like memory devices, transformer core and superconductors.

Course Outcomes: Upon graduation:
1. The student would be able to learn the fundamental concepts on Quantum behaviour of matter in its micro state.
2. The knowledge of fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
3. Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
4. The course also helps the students to be exposed to the phenomena of superconductivity and also to have exposure on magnetic materials and dielectric materials.

UNIT-I

Principles of Quantum Mechanics: Introduction to quantum physics, Black body radiation, Planck's law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, G-P Thomson experiment, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT-II

Semiconductor Physics: Origin of Energy Band Formation in Solids, Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier transport: diffusion and drift, Hall effect, Formation of PN junction, Open circuit PN junction, Energy diagram of PN diode, I-V Characteristics of PN junction diode, Zener diode –breakdown mechanism and characteristics

UNIT-III

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Physics of Semiconductor Devices:, Generation & recombination mechanisms in semiconductors, LED and semiconductor lasers: Device structure, Materials, Characteristics and figures of merit, Photo diode(PIN diode) & Solar cell - their structure, Materials, working principle and Characteristics.

UNIT-IV
Lasers: Introduction to interaction of radiation with matter, Coherence, Principle and working of Laser, Population inversion, Pumping, Types of Lasers: Ruby laser, He-Ne laser, Applications of laser-Scientific & Medical applications.

Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Absorption & Bending Losses associated with optical fibres, Applications of optical fibres-Sensor & Medical Field.

UNIT-V

Dielectric Properties: Polarisation, Permittivity and Dielectric constant, Types of Polarisation, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectrics.

Magnetic Properties: Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Hard & Soft Magnetic materials, Applications of magnetic materials.

TEXT BOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learing.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand

REFERENCES:

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL

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CS1203ES: PROGRAMMING FOR PROBLEM SOLVING

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CS1203ES	**Engineering Sciences**	**L**	**T**	**P**	**4**	**CIE**	**SEE**	**TOTAL**
		3	**1**	**0**		**30**	**70**	**100**
Contact Classes: 48	**Tutorial Classes: 16**	**Practical Classes: Nil**				**Total Classes:64**		

Course Objectives:

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student will learn

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs.
6. Searching and sorting problems.

UNIT - I: Introduction to Programming

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code , Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments
Bitwise operations: Bitwise AND, OR, XOR and NOT operators
Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops
I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr. Command line arguments

UNIT - II: Arrays, Strings, Structures and Pointers:

Arrays: one- and two-dimensional arrays, creating, accessing and manipulating

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elements of arrays Strings: Introduction to strings, handling strings as array of characters, basic string functions availablein C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type

UNIT - III: Preprocessor and File handling in C:

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data toexisting files, Writing and reading structures using binary files, Random access using fseek, ftell andrewind functions.

UNIT - IV: Function and Dynamic Memory Allocation:

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursivefunctions

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of differentdata types

UNIT - V: Introduction to Algorithms:

Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a givenset, finding if a number is prime number, etc. Basic searching in an array of elements (linear and binary search techniques),

Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms),Basic concept of order of complexity through the example programs

TEXT BOOKS:
1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)

REFERENCE BOOKS:
1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice
2. Hall of India
3. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
4. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
5. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

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B.Tech. I Year II Semester.Course Code	Category	Hours/ Week			Credits	Maximum Marks		
EN1204HS	**Humanities & Sciences**	**L**	**T**	**P**	**2**	**CI E**	**SEE**	**TOTAL**
		2	**0**	**0**		**30**	**70**	**100**
Contact Classes: 32	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:32		

INTRODUCTION In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students. In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

Learning Objectives: The course will help to a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. b. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus. c. Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to
1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

SYLLABUS
UNIT –I 'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press. Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.
Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions. **Reading:** Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely –

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Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II 'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Synonyms and Antonyms.
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
Reading: Improving Comprehension Skills – Techniques for Good Comprehension
Writing: Format of a Formal Letter-

Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III 'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses. **Reading:** Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples or Evidence

UNIT –IV ' KING LEAR ' a tragedy story by William Shakespeare, play synopsis of Act 1 & 2 published by Bloom, Harold. "King Lear." Shakespeare : The Invention of the Human. New York: Riverhead, 1998.

Vocabulary: Standard Abbreviations in English Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

UNIT –V 'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage

Grammar: Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

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Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports

Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing aReport.

Textbook:
1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.
2. Nahum Tate's 1681 Adaption of King Lear

References:
1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

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CS1206ES: PROGRAMMING FOR PROBLEM SOLVING LAB

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CS1206ES	**Engineering Sciences**	**L**	**T**	**P**	**1.5**	**CI E**	**SEE**	**TOTAL**
		0	**0**	**3**		**25**	**75**	**100**
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 48**			**Total Classes:48**			

Course Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in Clike operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts likefunctions, arrays etc.
- To write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures
- use pointers of different types
- create, read and write to and from simple text and binary files
- modularize the code with functions so that they can be reused

Practice sessions:
a. Write a simple program that prints the results of all the operators available in C (including pre/ post increment , bitwise and/or/not , etc.). Read required operand values from standard input.
b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

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Simple numeric problems:

a. Write a program for fiend the max and min from the three numbers.

b. Write the program for the simple, compound interest.

c. Write program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.

d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:

e. 5 x 1 = 5

f. 5 x 2 = 10

g. 5 x 3 = 15

h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula $s = ut+(1/2)at^2$ where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).

b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

c. Write a program that finds if a given number is a prime number

d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.

e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

g. Write a C program to find the roots of a Quadratic equation.

h. Write a C program to calculate the following, where x is a fractional value. i. $1-x/2 +x^2/4-x^3/6$

j. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+ +x^n$. For example: if n is 3 and x is

5, then the program computes 1+5+25+125.

Arrays and Pointers and Functions:

a. Write a C program to find the minimum, maximum and average in an array of integers.

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  b. Write a functions to compute mean, variance, Standard Deviation, sorting of nelements in single dimension array.
  c. Write a C program that uses functions to perform the following:
  d. Addition of Two Matrices
  e. ii. Multiplication of Two Matrices
  f. iii. Transpose of a matrix with memory dynamically allocated for the new matrix asrow and column counts may not be same.
  g. Write C programs that use both recursive and non-recursive functions
  h. To find the factorial of a given integer.
  i. ii. To find the GCD (greatest common divisor) of two given integers.
  j. iii. To find x^n
  k. Write a program for reading elements using pointer into array and display the valuesusing array.
  l. Write a program for display values reverse order from array using pointer.
  m. Write a program through pointer variable to sum of n elements from array.

  Files:
  a. Write a C program to display the contents of a file to standard output device.
  b. Write a C program which copies one file to another, replacing all lowercase characterswith their uppercase equivalents.
  c. Write a C program to count the number of times a character occurs in a text file. Thefile name and the character are supplied as command line arguments.
  d. Write a C program that does the following:

It should first create a binary file and store 10 integers, where the file name and 10values are given in the command line. (hint: convert the strings using atoi function) Now the program asks for an index and a value from the user and the value at thatindex should be changed to the new value in the file. (hint: use fseek function)

The program should then read all 10 values and print them back.

  e. Write a C program to merge two files into a third file (i.e., the contents of the firs t filefollowed by those of the second are put in the third file).

  Strings:
  a. Write a C program to convert a Roman numeral ranging from I to L to its decimalequivalent.
  b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
  c. Write a C program that uses functions to perform the following operations:
  d. To insert a sub-string in to a given main string from a given position.
  e. ii. To delete n Characters from a given position in a given string.
  f. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam,

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    civic, noon, abcba, etc.)

g. Write a C program that displays the position of a character ch in the string S or – 1 ifS doesn't contain ch.

h. Write a C program to count the lines, words and characters in a given text.

Miscellaneous:

a. Write a menu driven C program that allows a user to enter n numbers and then choosebetween finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Displayan error message if an invalid choice is entered.

b. Write a C program to construct a pyramid of numbers as follows:

```
   1            *          1          1          *
  1 2          * *        2 3        2 2        * *
 1 2 3        * * *      4 5 6      3 3 3      * * *
                                  4 4 4 4      * *
                                                *
```

Sorting and Searching:

a. Write a C program that uses non recursive function to search for a Key value in agiven

b. List of integers using linear search method.

c. Write a C program that uses non recursive function to search for a Key value in agiven

d. Sorted list of integers using binary search method.

e. Write a C program that implements the Bubble sort method to sort a given list of

f. Integers in ascending order.

g. Write a C program that sorts the given array of integers using selection sort indescending order

h. Write a C program that sorts the given array of integers using insertion sort inascending order

i. Write a C program that sorts a given array of names

Suggested Reference Books for solving the problems:

i. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

ii. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, CengageLearning, (3rd Edition)

iii. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice

iv. Hall of India

v. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)

vi. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson

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Education.

vii. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

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EN1207HS: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Course Code	Category	Hours/ Week			Credit s	Maximum Marks		
EN1207HS	**Humanities & Sciences**	**L**	**T**	**P**	**1**	**CI E**	**SEE**	**TOTAL**
		0	**0**	**2**		**30**	**70**	**100**
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 32**				**Total Classes:32**		

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:
1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence
5. To train students to use language appropriately for public speaking and interviews

Learning Outcomes: Students will be able to attain
1. Better understanding of nuances of English language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus
English Language and Communication Skills Lab (ELCS) shall have two parts:
a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

Listening Skills
Objectives
1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

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Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills
Objectives
1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice: Just A Minute (JAM) Sessions
- Describing objects/situations/people
- Role play – Individual/Group activities

The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)

Exercise – I

CALL Lab: *Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab: *Understand:* Communication at Work Place- Spoken vs. Written language. *Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab: *Understand:* Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context. *Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab: *Understand:* Features of Good Conversation – Non-verbal Communication. *Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab: *Understand:* Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

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Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab: *Understand:* How to make Formal Presentations. *Practice:* Formal Presentations.

Exercise – IV

CALL Lab: *Understand:* Listening for General Details. *Practice:* Listening Comprehension Tests.

ICS Lab: *Understand:* Public Speaking – Exposure to Structured Talks. *Practice:* Making a Short Speech – Extempore.

Exercise – V

CALL Lab: *Understand:* Listening for Specific Details. *Practice:* Listening Comprehension Tests.

ICS Lab: *Understand:* Interview Skills. *Practice:* Mock Interviews.

<div align="center">*************</div>

Minimum Requirement of infrastructural facilities for ELCS Lab:
1. Computer Assisted Language Learning (CALL) Lab:
The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.
System Requirement (Hardware component): *Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:*
i) Computers with Suitable Configuration
ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:
The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

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MC1001ES*: ENVIRONMENTAL SCIENCE
(MANDITORY NON CREDIT COURSE)

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
MC1001ES*	Humanities & Sciences	L	T	P	1	CIE	SEE	TOTAL
		0	0	2		30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

Course Objectives:
1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

Course Outcomes:
> Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

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Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

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EC2101ES: ANALOG AND DIGITAL ELECTRONICS

II-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
EC2101ES	**Core**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:								

Course Objectives:
- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To give understanding of various types of amplifier circuits.
- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand the concepts of combinational logiccircuitsand sequential circuits.

Course Outcomes: Upon completion of theCourse the students will be able to:

- Know the characteristics of various components.
- Understand the utilization of components.
- Design and analyze smallsignal amplifier circuits.
- Learn Postulates of Booleanalgebraand to minimize combinational functions.
- Design and analyze combinational and sequentialcircuits.
- Know about the logicfamiliesand realization of logic gates.

UNIT-I
Diodes and Applications: Junction diode characteristics: Open circuited p-n junction, p-n junction asa rectifier, V-I characteristics, effect of temperature, diode resistance, diffusion capacitance, diodeswitchingtimes, breakdowndiodes, Tunneldiodes, photodiode, LED.
Diode Applications - clipping circuits, comparators, Halfwave rectifier, Full wave rectifier, rectifier withcapacitorfilter.

UNIT-II
BJTs:Transistorcharacteristics:Thejunctiontransistor,transistorasandamplifier,CB,CE,CCconfigurations,comparisonoftransistorconfigurations, theoperatingpoint,selfbiasorEmitterbias,

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biascompensation,thermalrunawayandstability,transistoratlowfrequencies, CEamplifierresponse,gainbandwidthproduct, Emitter follower, RC coupled amplifier, two cascaded CE and multistageCEamplifiers.

UNIT-III

FETs and Digital Circuits: FETs: JFET, V-I characteristics, MOSFET, low frequency CS and CDamplifiers, CSand CD amplifiers.
Digital Circuits: Digital (binary) operations of a system, OR gate, AND gate, NOT, EXCLUSIVE ORgate, De Morgan Laws, NAND and NOR DTL gates, modified DTL gates, HTL and TTL gates, outputstages,RTL and DCTL,CMOS,Comparison oflogicfamilies.

UNIT-IV

Combinational Logic Circuits: Basic Theorems and Properties of Boolean Algebra, Canonical andStandard Forms, Digital Logic Gates, The Map Method, Product-of-Sums Simplification,Don't-CareConditions,NANDandNORImplementation,Exclusive-ORFunction,BinaryAdder-
Subtractor,DecimalAdder,BinaryMultiplier,MagnitudeComparator,Decoders, Encoders,Multiplexers.

UNIT-V

Sequential Logic Circuits: Sequential Circuits, Storage Elements: Latches and flip flops, Analysis of Clocked SequentialCircuits,StateReduction and Assignment,ShiftRegisters,RippleCounters,SynchronousCounters,Random-AccessMemory,Read-OnlyMemory.

TEXTBOOKS:

1. IntegratedElectronics: Analog andDigitalCircuitsandSystems, 2/e, JaccobMillman, ChristosHalkiasandChethanD.Parikh, *TataMcGraw-HillEducation*, India, 2010.

2. DigitalDesign, 5/e, MorrisManoandMichaelD. Cilette, *Pearson,* 2011.

REFERENCEBOOKS:

1. ElectronicDevicesandCircuits, JimmyJCathey, *Schaum'soutlineseries*, 1988.
2. DigitalPrinciples, 3/e, RogerL.Tokheim, *Schaum'soutlineseries*, 1994.

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CY2102PC: DATA STRUCTURES

II-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY2102PC	Core	L	T	P	C	CIE	SEE	Total
		3	1	0	4	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: A course on"Programmingfor Problem Solving".								

Prerequisites: A course on"Programmingfor Problem Solving".

Course Objectives:
- Exploring basic datastructures such as stacks and queues.
- Introduces avariety of datastructures such as hashtables, searchtrees,trees, heaps,graphs.
- Introduces sorting and pattern matchingalgorithms.

CourseOutcomes:
- Abilityto select the datastructures that efficiently model the informationin aproblem.
- Ability to assess efficiencytrade-offsamong differen datastructure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using avarietyofdatastructures includinghashtables, binaryandgeneraltreestructures, search trees, trees, heaps, graphs, and AVL-trees.

UNIT-I
Introduction to Data Structures, abstract data types, linear list – singly linkedlistimplementation,insertion,deletionandsearchingoperations onlinearlist,StackOperations,array and linked representations of stacks, stackapplications,Queues-perations, arrayandlinkedrepresentations.

UNIT-II
Dictionaries: linear list representation, skip list representation, operations - insertion, deletion andsearching.
HashTableRepresentation:hashfunctions,collisionresolution-separatechaining,openaddressing-linearprobing,quadraticprobing,doublehashing,rehashing,extendiblehashing.

UNIT-III
Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching,InsertionandDeletion,AVLTrees,Definition,Heightof anAVLTree,Operations–Insertion,DeletionandSearching,Red Black,SplayTrees.

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UNIT-IV

Graphs: GraphImplementationMethods. GraphTraversalMethods.
Sorting: HeapSort, ExternalSorting- Modelforexternalsorting,MergeSort.

UNIT-V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the
Boyer –Moore algorithm the Knuth-Morris-Prattalgorithm, StandardTries,
Compressed Tries, Suffix tries.

TEXTBOOKS:
1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S.
   Sahni and Susan AndersonFreed,UniversitiesPress.
2. DataStructures usingC–
   A.S.Tanenbaum,Y.Langsam,andM.J.Augenstein,PHI/PearsonEducat
   ion.

REFERENCEBOOK:
1. DataStructures: APseudo codeApproachwithC, 2ndEdition,
   R.F.GilbergandB.A.Forouzan, Cengage Learning.

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Computer Oriented Statistical Methods

B.Tech. II Year I Semester

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CI A	SEE	TOTAL
MA2103BS	Basic Sciences	3	1	0	4	30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives: To learn
1. The theory of Probability, and probability distributions of single and multiple random variables
2. The sampling theory and testing of hypothesis and making inferences

Course Outcomes: After learning the contents of this paper the student must be able to
1. Apply the concepts of probability and distributions to some case studies
2. Correlate the material of one unit to the material in other units
3. Resolve the potential misconceptions and hazards in each topic of study.

UNIT I: Probability

Sample space, Events, Counting Sample points, probability of an event, additive rules, conditional probability, independent events, product rule and Bayes theorem. Random variables: Discrete and continuous random variables, Expectation of random variables, Moments, variance of random variables.

UNIT II: Mathematical Expectation

Mean of a Random variable, variance and covariance of Random variables, Means and variances of linear combinations of random variables, Chebyshevs theorem.

Discrete Probability Distributions: Introduction and motivation, Binomial distribution, Geometric distribution and Poisson distribution.

UNIT III: Continuous Probability Distributions:

Continuous uniform distribution, Normal distribution, areas under the normal curve, applications of the normal distribution, normal approximation to the Binomial, Gamma and exponential distributions.

Fundamental sampling distributions: Random sampling, some important statistics, sampling distributions, sampling distribution of Means and the central limit theorem, sampling distribution of S2, t- distribution, F- distribution.

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UNIT IV: Testing of Hypothesis - Large sample

Tests of hypothesis - null hypothesis, alternate hypothesis, type I, type II errors, critical region. Inferences concerning means and proportions- Large samples- test of hypothesis for single mean and difference between the means. Test of hypothesis for the proportions- single and difference between the proportions, confidence interval for the mean and proportions.

UNIT V: Correlation and Regression

Coefficient of correlation, regression coefficient, the lines of regression, rank correlation

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

REFERENCE BOOKS:

1. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & Sons Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.

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CY2104PC: COMPUTER ORGANIZATION AND ARCHITECTURE

II-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY2104PC	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites: A Course on"DigitalLogicDesignandMicroprocessors".								

Co-requisite: A Course on"DigitalLogicDesignandMicroprocessors".

Course Objectives:
- The purpose of the course is to introduce principles of computerorganization and the basic architectural concepts.
- It begins with basicorganization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design,microprogrammed controlunit,pipelining and vector processing,memoryorganization and I/Osystems,and multiprocessors

Course Outcomes:
- Understand the basics ofinstructions sets and the ir impact on processordesign.
- Demonstrate an understanding of the design of the functionalunits of a digital computersystem.
- Evaluate cost performance and designtrade-offsindesigning and constructingacomputer processor includingmemory.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Recognize and manipulate representations of numbers stored in digitalcomputers

UNIT-I

DigitalComputers: IntroductionBlockdiagramofdigitalComputer, DefinitionofComputerOrganization, ComputerDesignand ComputerArchitecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logicmicrooperations, shiftmicrooperations.Arithmeticlogicshiftunit.

BasicComputerOrganizationandDesign: Instructioncodes, computerRegistersComputerinstructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output andInterrupt.

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UNIT-II

Microprogrammed Control: Control memory, Address sequencing, micro program example, designofcontrolunit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, DataTransfer and Manipulation, ProgramControl.

UNIT-III

DataRepresentation: Datatypes,Complements,FixedPointRepresentation, FloatingPointRepresentation.

ComputerArithmetic: AdditionandsubtractionmultiplicationAlgorithms, DivisionAlgorithms,Floating–pointArithmeticoperations.DecimalArithmeticunit,Decimal Arithmeticoperations.

UNIT-IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, PriorityInterruptDirectmemoryAccess.
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT-V

ReducedInstructionSetComputer: CISCCharacteristics, RISCCharacteristics.

PipelineandVectorProcessing: ParallelProcessingPipelining,

ArithmeticPipeline, InstructionPipeline, RISCPipeline, VectorProcessing, ArrayProcessor.

MultiProcessors: CharacteristicsofMultiprocessors, Interconnection Structures,Interprocess orarbitration,   Interprocessor communication andsynchronization, Cache Coherence.

TEXTBOOK:
1. ComputerSystemArchitecture–M.MorisMano, ThirdEdition, Pearson/PHI.

REFERENCEBOOKS:
1.ComputerOrganization–CarHamacher,ZvonksVranesic,SafeaZaky,VthEdition,McGrawHill.

2. ComputerOrganizationandArchitecture–WilliamStallingsSixthEdition, Pearson/PHI.
3. StructuredComputerOrganization–AndrewS.Tanenbaum,4thEdition, PHI/Pearson.

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CY2105PC: PYTHON PROGRAMMING

II-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY2105PC	Core	L	T	P	C	CIE	SEE	Total
		2	0	0	2	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: A course on"ProgrammingforProblemSolvingusingC".								

Prerequisites: A course on"ProgrammingforProblemSolvingusingC".

Course Objectives:
- Learn Syntax and Semantics and create Functions in Python.
- Handle StringsandFilesinPython.
- UnderstandLists, Dictionaries and Regularexpressions in Python.
- Implement ObjectOrientedProgrammingconcepts in Python.
- Build WebServices and introduction to Networkand DatabaseProgramminginPython.

Course Outcomes:
- Examine Python syntax andsemantics and be fluent in the use of Python flowcontrol and functions.
- Demonstrate proficiency in handling Strings and FileSystems.
- Create and manipulate PythonProgramsusing core datastructureslinkedLists, Dictionariesand use RegularExpressions.
- InterprettheconceptsofObject-OrientedProgramming asused inPython.
- Implement exemplaryapplications related to NetworkProgramming, WebServices andDatabasesin Python.

UNIT-I
Python Basics, Objects- Python Objects, Standard Types, Other Built-in Types, InternalTypes, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, UnsupportedTypes
Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers,Operators,Built-inFunctions,Related Modules
Sequences- Strings, Lists, andTuples, MappingandSetTypes

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UNIT-II

FILES: File Objects, File Built-in Function [open ()], File Built-in Methods, File Built-in Attributes, StandardFiles, Command-lineArguments, FileSystem, FileExecution, PersistentStorageModules, Related Modules
Exceptions: Exceptions in Python, DetectingandHandlingExceptions, ContextManagement,

*Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, *Creating Exceptions, Why Exceptions (Now)? Why Exceptions at All?, Exceptions and the sys Module, Related ModulesModules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, ModuleBuilt-inFunctions,Packages,OtherFeaturesofModules

UNIT-III

RegularExpressions: IntroductionSpecialSymbolsandCharacters, ResandPython MultithreadedProgramming: IntroductionThreads   and   Processes,Python, Threads, andtheGlobalInterpreterLock,ThreadModule,ThreadingModule,Related Modules

UNIT-IV

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, RelatedModulesand OtherGUIs
WEB Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, AdvancedWebClientsCGI-HelpingServersProcessClientData, BuildingCGIApplication AdvancedCGI, Web (HTTP) Servers

UNIT-V

DatabaseProgramming: Introduction, Python Database Application Programmer'Interface (DB-API), ObjectRelationalManagers (ORMs), RelatedModules

TEXTBOOK:
1. Core Python Programming, WesleyJ.Chun,SecondEdition,Pearson.

REFERENCEBOOKS:
1. ThinkPython,AllenDowney,GreenTeaPress
2. Introduction toPython,KennethA.Lambert,Cengage
3. PythonProgramming:AModernApproach, VamsiKurama,Pearson
4. LearningPython,Mark Lutz,O'Really

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EC2106ES:

ANALOG AND DIGITAL ELECTRONICS LAB

II-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
EC2106ES	Core	L	T	P	C	CIE	SEE	Total
		0	0	2	1	30	70	100
Contact Classes:NIL	Tutorial classes:NIL	Practical classes: 36				Total Classes:36		
Prerequisites:								

Course Objectives

- To introduce componentssuch asdiodes, BJTs and FETs.
- To know the applications of components.
- To give understanding ofvarious types of amplifiercircuits
- T o Learn Basic techniques for the design of digitalcircuit sand fundamental concepts used in the design of digitalsystems.
- To understand the concepts of combinational logiccircuits and sequentialcircuits.

Course Outcomes: Upon completion of the Course the students will be able to:

- Know the characteristics of various components.
- Understand the utilization of components.
- Design and analyze smallsignalamplifiercircuits.
- Postulates ofBooleanalgebra and to minimize combinationalfunctions
- Design and analyze combinational and sequentialcircuits
- Known about the logicfamilies and realization of logic gates.

ListofExperiments
1. FullWave Rectifierwith &withoutfilters
2. CommonEmitterAmplifierCharacteristics
3. CommonBaseAmplifier Characteristics
4. CommonSource amplifierCharacteristics
5. Measurementofh-parametersoftransistorinCB,CE,CCconfigurations
6. InputandOutputcharacteristicsofFETinCSconfiguration
7. RealizationofBooleanExpressionsusingGates
8. Designandrealizationlogicgatesusinguniversalgates
9. Generation of clock using NAND/NORgates

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10. Designa4–bitAdder/Subtractor
11. Design and realization a Synchronous and Asynchronous counter using flip-flops
12. Realization of logicgates using DTL, TTL, ECL,etc.

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CY2107PC: DATASTRUCTURES LAB

II-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY2107PC	Core	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes:NIL	Tutorial classes:NIL	Practical classes: 36				Total Classes:36		
Prerequisites: ACourse on"Programmingforproblemsolving".								

Prerequisites: A Course on"Programmingforproblemsolving".

Course Objectives:
- It covers various concepts of Cprogramminglanguage
- It introduces searching and sorting algorithms
- It provides an understanding of datastructures such as stacks and queues.

Course Outcomes:
- AbilitytodevelopCprogramsforcomputingandreal-lifeapplicationsusingbasicelementslike control statements, arrays, functions, pointers and strings, and data structures like stacks,queues and linkedlists.
- AbilitytoImplementsearchingandsortingalgorithms

List of Experiments
1. Write a program that uses functions to perform the following operations on singlylinked list:

    i) Creation ii)Insertion iii)Deletion iv)Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list:

    i) Creation ii)Insertion iii)Deletion iv)Traversal
3. Write a program that uses functions to perform the following operations on

    Circularlinked list:

    i) Creation ii)Insertion iii)Deletion iv)Traversal
4. Write a program that implement stack(itsoperations)using

    i) Arrays ii)Pointers
5. Write a program that implement Queue(itsoperations)using

    i) Arrays ii)Pointers
6. Write a program that implements the following sortingmethods to sort a given list of integers in ascending order

    i) Bubblesort ii)Selectionsort iii)Insertionsort

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7. Write a program that use both recursive and non-recursivefunctions to perform the following searching operations for aKey value in a given list of integers:
  - ii) Linearsearchii)Binarysearch
  8. Write a program to implement the treetraversalmethods.

  9. Write a program to implement the graphtraversalmethods.

TEXTBOOKS:
  1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan AndersonFreed,*UniversitiesPress.*
  2. DataStructuresusingC–A.S.Tanenbaum,Y.Langsam,andM.J.Augenstein, *PHI/PearsonEducation.*

REFERENCEBOOK:
  1. DataStructures: APseudocodeApproachwithC, 2nd Edition, R.F.GilbergandB.A.Forouzan, Cengage *Learning.*

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CY2108PC: IT WORKSHOPLAB

II-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY2108PC	Core	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes:NIL	Tutorial classes:NIL	Practical classes: 36				Total Classes:36		
Prerequisites: ACourse on"Programmingforproblemsolving".								

Course Objectives:

The IT Workshop for engineers is a training lab course spread over 60 hours. The modules includetraining on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel,Power Pointand Publisher.

PC Hardware introduces the students to a personalcomputer and its basic peripherals, the processof assembling a personal computer, installation of system software like MS Windows, Linux and therequired device drivers. In addition hardware and software level troubleshooting process, tips andtricks would be covered. The students should work on working PC to disassemble and assembleto working condition and install Windows and Linux on the same PC. Students are suggestedto work similar tasks in the Laptop scenario wherever possible. Internet & World Wide Webmodule introduces the different ways of hooking the PC on to the internet from home and workplaceand effectively usage of the internet. Usage of web browsers, email, newsgroups and discussionforums would be covered. In addition, awareness ofcyber hygiene, i.e., protecting the personalcomputer from getting infected with the viruses, worms and other cyber attacks would be introduced.Productivity tools module would enable the students in crafting professional word documents, excelspread sheets, power point presentations and personal web sites using the Microsoft suite of officetoolsand LaTeX.

PC Hardware

Task 1: Identify the peripherals ofacomputer, components in a CPUand its functions.Draw theblockdiagramoftheCPUalongwiththeconfigurationofeachperipheralandsubmittoyourinstructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Labinstructors should verify the work and follow it up with a Viva. Also students need to go through thevideo which shows the process of assembling a PC. A video would be given as part of the

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coursecontent.

Task3: EverystudentshouldindividuallyinstallMSwindowsonthepersonalcom puter.Labinstructorshouldverifytheinstallation andfollowitupwith a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windowsinstalled. The system should be configured as dual boot with both windows and Linux. Lab instructorsshouldverifytheinstallation andfollowitup withaViva

Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get thecomputer back to working condition. The work done should be verified by the instructor and followedup witha Viva.

Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to systemsoftware problems. They should identify the problem and fix it to get the computer back to workingcondition.The workdone shouldbeverified bytheinstructor andfollowed up with aViva.

Internet&WorldWideWeb
Task1: **Orientation & Connectivity Boot Camp:** Students should get connected to their Local AreaNetworkandaccesstheInternet.IntheprocesstheyconfiguretheTCP/IPsetti ng.Finallystudentsshould demonstrate, to the instructor, how to access the websites and email. If there is no internetconnectivitypreparationsneed to bemade bytheinstructorsto simulate theWWWon theLAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LANproxysettings, bookmarks, search toolbars and popup blockers.Also,plug-inslikeMacromediaFlashand JREforappletsshould be configured.

Task 3: **Search Engines & Netiquette:** Students should know what search engines are and how touse the search engines. A few topics would be given to the students for which they need to search onGoogle.Thisshould be demonstrated totheinstructorsbythe student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and wouldbe asked to configure their computer to be safe on the internet. They need to first install an antivirussoftware, configure their personal firewall and windows update on their computer. Then they needtocustomizetheirbrowserstoblockpopups,block activexdownloadstoavoidvirusesand/orworms.

LaTeX andWORD
Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX

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and Microsoft (MS)office 2007/ equivalent (FOSS) tool word: Importance ofLaTeX and MS office 2007/ equivalent(FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered ineach,UsingLaTeXandword–

Accessing,overviewoftoolbars,savingfiles,Usinghelpandresources,rulers,form atpainterin word.

Task 2: Using LaTeX and Word to create project certificate. Features to be covered: FormattingFontsinword,DropCapinword,ApplyingTexteffects, UsingCharacterSpacing,BordersandColors,Inserting HeaderandFooter,Using Dateand Timeoptionin both LaTeXandWord.

Task3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bulletsand Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper

columns,Imagesfromfilesandclipart,DrawingtoolbarandWordArt,FormattingI mages,Textboxes,Paragraphsand MailMergein word.

Excel

ExcelOrientation: The mentor needs to tellthe importance ofMS office 2007/equivalent(FOSS)tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be coveredineach.UsingExcel– Accessing,overviewoftoolbars, savingexcelfiles,Usinghelpandresources.

Task1: Creating a Scheduler-Featurestobecovered: Gridlines, FormatCells, Summation, auto fill,Formatting Text

Task2: CalculatingGPA-Features to be covered: - Cell Referencing, Formulaeinexcel–average,std.deviation,Charts, RenamingandInsertingworksheets, Hyperlinking,Countfunction,LOOKUP/VLOOKUP

Task3: PerformanceAnalysis-Featurestobecovered:-Splitcells,freezepanes, groupand outline,Sorting,Boolean andlogical operators,Conditional formatting

LaTeXandMS/equivalent (FOSS) toolPowerPoint

Task 1: Students will be working on basic power point utilities and tools which help them create basicpower point presentation. Topic covered during this week includes: - PPT Orientation, Slide Layouts,Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows inboth LaTeX and PowerPoint. Students will be given modelpower point presentation which needs tobereplicated (exactlyhowit'sasked).

Task 2: Second week helps students in making their presentations interactive. Topic covered duringthisweekincludes,Hyperlinks,Inserting– Images,ClipArt,Audio,Video,Objects, TablesandCharts.

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Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helpsthem learn best practices in designing and preparing power point presentation. Topic covered duringthis week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slideslotter, notesetc) and Inserting–Background, textures, DesignTemplates,Hidden slides.

REFERENCEBOOKS:

1. ComdexInformationTechnologycoursetoolkitVikasGupta, *WILEY Dreamtech*
2. TheCompleteComputerupgradeandrepairbook,3rdeditionCherylASch midt, *WILEYDreamtech*
3. IntroductiontoInformationTechnology, ITLEducationSolutionslimited, Pearson *Education.*
4. PCHardware- AHandbook–KateJ.Chase*PHI*(Microsoft)
5. LaTeXCompanion–LeslieLamport, *PHI/ Pearson.*
6. ITEssentialsPCHardwareandSoftwareCompanionGuideThirdEditionb yDavidAnfinsonandKen Quamme. *CISCOPress,Pearson Education.*
7. ITEssentialsPCHardwareandSoftwareLabsandStudyGuideThirdEditio nbyPatrickRegan– CISCOPress, *Pearson Education.*

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CY2109PC: PYTHON PROGRAMMING LAB

II-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY2109PC	**Core**	L	T	P	C	CIE	SEE	Total
		0	0	2	1	30	70	100
Contact Classes:NIL	**Tutorial classes:NIL**	**Practical classes: 36**				**Total Classes:36**		
Prerequisites: A Course on"Programming for problem solving".								

Prerequisites: A courseon"ProgrammingforProblem Solving".

Course Objectives

- To be able to introduce core programming basics and program design with functions using Pythonprogramming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programsdesignedtostrengthenthepracticalexpertise.

Course Outcome

- Student should be able to understand the basic concepts scripting and the contributions ofscriptinglanguage
- Abilitytoexplorepythonespeciallytheobject-orientedconcepts,and thebuiltinobjectsofPython.
- Abilityto createpracticaland contemporaryapplicationssuch asTCP/IPnetworkprogramming,Web applications,discrete eventsimulations

List of Experiments:

1. Write a program todemonstrate different number datatypes in Python.
2. Write a program to perform different ArithmeticOperationson numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from agiven string.
4. Write a python script to print the current date in the following format "Sun May 29 02:26:23IST2017"
5. Write a programtocreate, append,and removelistsinpython.
6. Write a program to demonstrateworking withtuplesinpython.
7. Write a program todemonstrate working with dictionaries in python.
8. Write a python program tofind largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula :c/5=f-32/9]
10. Write a Python program to construct the following pattern,using a

-
  nested forloop
  ```
      *
      **
      ***
      ****
      *****
      ****
      ***
      **
      *
  ```

11. Write a Python script that prints primenumberslessthan 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write aprogram that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from thePythagorean Theorem that in a right triangle, the square of one side equals the sum of thesquaresofthe othertwo sides).
14. Write a python program to define a module to find Fibonacci Numbers and import the moduletoanotherprogram.
15. Write a python program to define a module and import a specific function in that module toanother program.
16. Writeascriptnamedcopyfile.py.Thisscriptshouldprompttheuserforth enamesoftwotextfiles.Thecontentsofthefirstfile should beinputand written tothe secondfile.
17. Write a program that inputs a text file. The program should print all of the unique words in thefilein alphabeticalorder.
18. Write aPython classto convertanintegerto aromannumeral.
19. Write a Python class to implementpow(x,n)
20. Write a Python class to reverse astringwordbyword.

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MC2002: GENDER SENSITIZATION LAB
(AnActivity-basedCourse)

II-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
MC2002	**Core**	L	T	P	C	CIE	SEE	Total
		0	0	2	0	30	70	100
Contact Classes:NIL	**Tutorial classes:NIL**	**Practical classes: 36**				**Total Classes:36**		
Prerequisites:								

COURSEDESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks criticalquestions about the meanings of sex and gender in society. The primary goal of this course is tofamiliarize students with key issues, questions and debates in Gender Studies, both historical andcontemporary.Itdrawsonmultipledisciplines–such as literature, history, economics,psychology,sociology,philosophy,politicalscience, anthropologyandmediastudies–

toexamineculturalassumptionsaboutsex,gender,and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women and of the multiple waysthat sex and gender interact with race, class, caste, nationality and other social identities. This coursealso seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-basedviolence on education, health and development.

Objectives of the Course:

- To developstudents'sensibility with regard to issues of gender in contemporaryIndia.
- To provide acritical perspective on the socialization of men and women.
- To introduce students to information about somekeybiological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on genderviolence.
- To expose students to more egalitarianinteractions between men and women.

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Learning Outcomes:
- Students will have developed a better understanding of important issues related to gender incontemporaryIndia.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derivedfromresearch, facts, everydaylife, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how tocounter it.
- Students will acquire insight into the gendered division of labour and its relation to politics andeconomics.
- Men and women students and professionals will be better equipped to work and live togetherasequals.
- Studentswilldevelopasenseofappreciationofwomeninallwalksof life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understandand respond to genderviolence.

UNIT-I: UNDERSTANDINGGENDER
Introduction: Definition of Gender-BasicGenderConceptsandTerminology-ExploringAttitudestowardsGender-ConstructionofGender-Socialization: MakingWomen, MakingMen-PreparingforWomanhood.Growing upMale.First lessons in Caste.

UNIT–II: GENDERROLES ANDRELATIONS
Two or Many?-Struggles with Discrimination-Gender Roles and Relations-TypesofGender Roles-GenderRolesandRelationshipsMatrix-MissingWomen-SexSelectionandItsConsequences-DecliningSexRatio.Demographic Consequences-Gender Spectrum: BeyondtheBinary

UNIT–III: GENDERANDLABOUR
Division and Valuation of Labour-Housework: The Invisible Labor- "My Motherdoesn'tWork"."SharetheLoad".-Work: Its Politics andEconomics-FactandFiction.UnrecognizedandUnaccountedwork.
-GenderDevelopmentIssues-Gender,Governanceand SustainableDevelopment-GenderandHumanRights-Genderand Mainstreaming

UNIT–IV: GENDER-BASEDVIOLENCE
The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a HumanRights Perspective-Sexual Harassment: Say No! - Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment-FurtherReading:"*Chupulu".*
Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. RebuildingLives.ThinkingaboutSexual ViolenceBlamingthe Victim-"IFoughtformyLife…."

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UNIT–V: GENDERANDCULTURE

GenderandFilm-GenderandElectronicMedia-GenderandAdvertisement-GenderandPopularLiterature-GenderDevelopmentIssues-GenderIssues-GenderSensitiveLanguage-genderandPopularLiteratureJustRelationships: BeingTogetherasEquals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-TheBrave Heart.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the field's ofEnglish Literature or Sociology or Political Science or anyotherqualifiedfacultywhohasexpertiseinthis fieldfromengineeringdepartments.

➢ *Classeswillconsistofacombinationofactivities: dialogue-basedlectures,discussions,collaborative learning activities, group workandin-class assignments.Apartfromtheaboveprescribedbook,Teacherscanmakeuse ofanyauthenticmaterialsrelatedtothe topicsgiveninthe syllabuson"Gender".*

 ESSENTIAL READING: The Textbook, "*Towards a World of Equals: A Bilingual Textbook onGender"written*byA.Suneetha,UmaBhrugubanda,DuggiralaVasanta,Rama Melkote,Vasudha Nagaraj,Asma Rasheed,GoguShyamala, Deepa Sreenivas and Susie TharupublishedbyTeluguAkademi,TelanganaGovernmentin2015**.**

ASSESSMENTANDGRADING:
- Discussion&ClassroomParticipation:20%
- Project/Assignment: 30%
- EndTerm Exam:50%

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CY2201PC: DISCRETE MATHEMATICS

II-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY2201PC	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: An understanding of Mathematics in generalissufficient.								

Prerequisites: An understanding of Mathematics in generalis sufficient.

Course Objectives
- Introduces the elementary discretemathematics for computerscience and engineering.
- Topics include formal logic notation, methods of proof, induction, sets,relations,graphtheory,permutationsandcombinations, countingprinciples; recurrencerelationsandgeneratingfunctions.

Course Outcomes:
- Ability to understand and construct precise mathematicalproofs
- Ability to use logic and set theory to formula teprecisestatements
- Ability to analyze and solve counting problems on finiteand discrete structures
- Ability todescribe and manipulate sequences
- Ability to apply graphtheory in solving computing problems

UNIT-I

TheFoundations:LogicandProofs: PropositionalLogic,ApplicationsofPropositionalLogic,PropositionalEquivalence,PredicatesandQuantifiers,NestedQuantifiers,RulesofInference,IntroductiontoProofs,ProofMethodsand Strategy.

UNIT-II

BasicStructures,Sets,Functions,Sequences,Sums,MatricesandRelationsSets,Functions,Sequences&Summations,CardinalityofSetsandMatricesRelations,RelationsandTheirProperties, n-arrayRelationsandTheirApplications,RepresentingRelations,ClosuresofRelations,EquivalenceRelations,Partial Orderings.

UNIT-III

Algorithms,Induction and Recursion: Algorithms, TheGrowth of Functions, Complexity of Algorithms

Induction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering,RecursiveDefinitionsandStructuralInduction,

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RecursiveAlgorithms, ProgramCorrectness

UNIT-IV
Discrete Probability and Advanced Counting Techniques: An IntroductiontoDiscreteProbability,ProbabilityTheory,Bayes'Theorem, ExpectedValue and Variance

AdvancedCountingTechniques: RecurrenceRelations,SolvingLinearRecurrenceRelations,Divide-and-ConquerAlgorithmsandRecurrenceRelations,GeneratingFunctions,Inclusion-Exclusion,ApplicationsofInclusion-Exclusion

UNIT-V
Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, RepresentingGraphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, PlanarGraphs, Graph Coloring.
Trees: IntroductiontoTrees,ApplicationsofTrees,TreeTraversal, SpanningTrees,MinimumSpanning Trees

TEXTBOOK:
1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory- Kenneth HRosen,7thEdition,TMH.

REFERENCESBOOKS:
1. Discrete Mathematical Structures with Applications to ComputerScience-J.P.Tremblayand
R.Manohar, TMH
2. DiscreteMathematics for ComputerScientists&Mathematicians: JoeLMott, AbrahamKandel, Teodore P.Baker, 2nded,PearsonEducation.
3. DiscreteMathematics-RichardJohnsonbaugh, 7ThEdn.PearsonEducation.
4. DiscreteMathematicswithGraphTheory-EdgarG.Goodaire, MichaelM.Parmenter.
5. DiscreteandCombinatorialMathematics-anappliedintroduction: Ralph.P.Grimald, 5thedition, Pearson Education.

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SM2202MS: BUSINESS ECONOMICS AND
FINANCIAL ANALYSIS

II-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
SM2202MS	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: None								

Prerequisites: None

Course Objective: To learn the basic Business types, impact of the Economy on Business and Firmsspecifically.To analyze theBusinessfromtheFinancialPerspective.

Course Outcome: The students will understand the various Forms of Business and the impactofeconomicvariablesontheBusiness.TheDemandSupply,Production, Cost,MarketStructure,Pricingaspects are learnt. The Students can study the firm's financial position by analysing theFinancialStatementsofa Company.

UNIT–I
IntroductiontoBusinessandEconomics:

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited LiabilityCompanies, Sources ofCapitalfor aCompany, Non-ConventionalSourcesofFinance.
Economics: SignificanceofEconomics,MicroandMacroEconomicConcepts,Co nceptsandImportance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features andPhases of Business Cycle. Nature andScopeofBusinessEconomics,RoleofBusinessEconomist, Multidisciplinary natureofBusinessEconomics.

UNIT-II
Demand andSupplyAnalysis:

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significanceof Elasticity of Demand, Factors affecting ElasticityofDemand,ElasticityofDemandindecisionmaking, DemandForecasting:CharacteristicsofGoodDemandForecasting, StepsinDemandForecasting,Methods ofDemand Forecasting.
SupplyAnalysis: DeterminantsofSupply, SupplyFunction& LawofSupply.

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UNIT-III
Production, Cost, MarketStructures&Pricing:

ProductionAnalysis: Factors of Production, ProductionFunction, ProductionFunction with one variable input, two variable inputs, ReturnstoScale, DifferentTypes of Production Functions.
Costanalysis: Typesof Costs, Short runandLongrunCostFunctions.
MarketStructures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition.
Pricing: Types of Pricing, ProductLifeCyclebased Pricing, BreakEvenAnalysis, and CostVolumeProfitAnalysis.

UNIT-IV
Financial Accounting: Accounting concepts and Conventions, Accounting Equation,Double-EntrysystemofAccounting,Rulesforma intainingBooksofAccounts,Journal,PostingtoLedger, PreparationofTrialBalance,ElementsoffinancialStatements, PreparationofFinalAccounts.

UNIT-V
FinancialAnalysisthroughRatios: Concept of RatioAnalysis, LiquidityRatios, TurnoverRatios, ProfitabilityRatios, Proprietary Ratios, Solvency, LeverageRatios (simpleproblems).
IntroductiontoFund Flowand CashFlowAnalysis (simple problems).

TEXTBOOKS:
1. D.D.Chaturvedi, S.L.Gupta, BusinessEconomics-Theory and Applications, InternationalBook House Pvt.Ltd.2013.
2. DhaneshKKhatri, FinancialAccounting, TataMcGrawHill,2011.
3. GeethikaGhosh, PiyaliGosh, PurbaRoyChoudhury, ManagerialEconomics, 2e, TataMcGrawHillEducation Pvt.Ltd.2012.

REFERENCEBOOKS:
1. PareshShah, FinancialAccountingforManagement 2e, OxfordPress2015.
2. S.N.Maheshwari, SunilKMaheshwari, SharadKMaheshwari, FinancialAccounting, 5e, VikasPublications, 2013.

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CY2203PC: OPERATING SYSTEMS

II-II:CSE(CS)

Course Code	Category	Hours/Weak			Credits	Max Marks		
CY2203PC	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: A course on"ComputerProgrammingandDataStructures". Acourse on"ComputerOrganizationandArchitecture".								

Prerequisites:

- A course on"ComputerProgrammingandDataStructures".
- A course on"ComputerOrganizationandArchitecture".

Course Objectives:

- Introduce operatingsystemconcepts

(i.e.processes, threads, scheduling, synchronization, deadlocks, memorymanagementfile and I/Osubsystemsand protection)

- Introduce the issues to be considered in the design and development of operatingsystem
- Introduce basicUnixcommands,system call interface for processmanagement,interprocesscommunication andI/O in Unix

Course Outcomes:

- Will be able to control access to a computer and the files that maybe shared
- Demonstrate the knowledge of the components of computer and their respective roles in computing.
- Abilitytorecognizeandresolveuser problemswithstandardoperatingenvironments.
- Gainpracticalknowledgeofhowprogramminglanguages,
- Operatingsystems and architectures interact and how to use each effectively.

UNIT-I

OperatingSystem-Introduction,Structures-SimpleBatch,Multiprogrammed,Time-shared,PersonalComputer,Parallel,DistributedSystems,Real-TimeSystems,Systemcomponents,OperatingSystemservices,SystemCalls

UNIT-II

ProcessandCPUScheduling-Processconceptsandscheduling, Operations Onprocesses, CooperatingProcesses, Threads, andInterposes Communication, SchedulingCriteria, SchedulingAlgorithms,and Multiple-ProcessorScheduling.

Systemcallinterfaceforprocessmanagement-fork, exit, wait, waitpid, exec

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UNIT-III
Deadlocks-SystemModel, DeadlocksCharacterization, Methods forHandlingDeadlocks, DeadlockPrevention, DeadlockAvoidance, DeadlockDetection and RecoveryfromDeadlock

ProcessManagementandSynchronization-TheCriticalSectionProblem, Synchronization Hardware, Semaphores and ClassicalProblemsofSynchronization, Critical Regions, Monitors

InterprocessCommunicationMechanisms:
IPCbetweenprocessesonasinglecomputersystem IPC between processes on differentsystems using pipes, FIFOs, message mqueues, shared memory.

UNIT-IV
Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, PageReplacement,Page ReplacementAlgorithms.

UNIT-V
FileSystemInterfaceandOperations-
Accessmethods,DirectoryStructure,Protection,FileSystemStructure, Allocationmethods,Free-spaceManagement.Usageofopen,create,read, write,close,lseek,stat,ioctlsystemcalls.

TEXTBOOKS:
1. OperatingSystemPrinciples-AbrahamSilberchatz,PeterB.Galvin,GregGagne7[th]Edition,JohnWiley
2. AdvancedprogrammingintheUNIXenvironment, W.R.Stevens, Pearson education.

REFERENCEBOOKS:
1. OperatingSystems–InternalsandDesignPrinciplesStallings,FifthEdition–2005,PearsonEducation/PHI
2. OperatingSystemADesignApproach-Crowley,TMH.
3. ModernOperatingSystems,AndrewS.Tanenbaum2[nd]edition,Pearson/PHI
4. UNIXprogrammingenvironment,KernighanandPike,PHI/PearsonEducation
5. UNIXInternals-The NewFrontiers, U.Vahalia, Pearson Education.

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CY2204PC: COMPUTER NETWORKS

II-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY2204PC	**Core**	L	T	P	C	CIE	SEE	Total
		3	1	0	4	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites								

Prerequisites

1. Acourse on"Programmingfor problemsolving".
2. Acourse on"DataStructures".

Course Objectives:
- The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
- Familiarize the students with the standardmodels for the layered approach to communication between machines in a network and the protocols of the various layers.

Course Outcomes:
- Gain the knowledge of the basic computer network technology.
- Gain the knowledge of the functions of each layer in the OSIandTCP/IPreferencemodel.
- Obtain the skills of subnetting and routingmechanisms.
- Familiarity with the essential protocols of computernetworks, and how they can be applied in network design and implementation.

UNIT-I
Networkhardware, Networksoftware, OSI, TCP/IPReferencemodels, ExampleNetworks: ARPANET, Internet.
PhysicalLayer:GuidedTransmissionmedia:twistedpairs,coaxialcable, fiberoptics, Wirelesstransmission.

UNIT-II
Datalinklayer: Designissues, framing,Error detectionandcorrection.
Elementary data link protocols: simplex protocol, A simplex stop and wait protocolforanerror-freechannel,Asimplexstop andwaitprotocolfornoisychannel.
SlidingWindow protocols: A one-bit sliding window protocol, A protocol usingGo-Back-N,AprotocolusingSelectiveRepeat,Example datalinkprotocols.
MediumAccesssublayer:Thechannelallocationproblem, Multipleaccessprotocols:ALOHA,Carriersensemultipleaccess protocols,collision freeprotocols.Wireless LANs,Datalinklayerswitching.

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UNIT-III

NetworkLayer:Designissues,Routingalgorithms:shortestpathrouting,Flooding,Hierarchicalrouting,Broadcast,Multicast,distance vectorrouting,CongestionControlAlgorithms,QualityofService,Internetworking,The Networklayerintheinternet.

UNIT-IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCPandUDPprotocols.

UNIT-V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streamingaudio andvideo.

TEXTBOOK:

1. ComputerNetworks--AndrewSTanenbaum,David.j.Wetherall,5thEdition.PearsonEducation/PHI

REFERENCEBOOKS:

1. AnEngineeringApproachtoComputerNetworks-S.Keshav,2nd Edition,PearsonEducation
2. DataCommunicationsandNetworking–Behrouz A.Forouzan.ThirdEditionTMH.

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CS2205PC: OBJECT ORIENTED PROGRAMMING USING JAVA

II-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CS2205PC	Core	L	T	P	C	CIE	SEE	Total
		3	1	0	4	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:

- To introduce the object-orientedprogrammingconcepts.
- To understand object-orientedprogrammingconcepts and apply the min solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstractclasses
- To introduce the implementation of packages and interfaces
- To introduce theconcepts of exceptionhandling and multithreading.
- To introduce the design of GraphicalUser Interface using applets and swingcontrols.

Course Outcomes:

- Able to solve realworld problems using OOPtechniques.
- Able to understand the use of abstractclasses.
- Able to solve problems using javacollection framework andI/oclasses.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for webapplications.
- Able to design GUIbased applications

UNIT-I

Object-Oriented Thinking- Awayof viewing world – Agents and Communities, messages andmethods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding,Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An OverviewofJava, Datatypes,VariablesandArrays,operators,expressions, controlstatements,Introducingclasses,Methodsand Classes,String handling.
Inheritance–
Inheritanceconcept,Inheritancebasics,Memberaccess,Constructors,Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-adhoc polymorphism, purepolymorphism, methodoverriding, abstractclasses,Objectclass,formsofinheritance-specialization, specification, construction, extension, limitation, combination, benefits of

-

inheritance,costsofinheritance.

UNIT-II

Packages-DefiningaPackage,CLASSPATH,Accessprotection, importingpackages. Interfaces-defininganinterface,implementinginterfaces,Nestedinterfaces, applyinginterfaces,variablesininterfacesand extendinginterfaces.

Stream based I/O (java.io)– The Stream classes-Byte streams and Character streams, Readingconsole Input and Writing Console Output, File class, Reading and writing Files, Random access fileoperations,TheConsoleclass,Serialization,Enumerations,autoboxing,generics.

UNIT-III

Exceptionhandling- Fundamentalsofexceptionhandling,Exceptiontypes,Terminationorresumptive models, Uncaught exceptions, using try and catch, multiple catch clauses,nestedtrystatements,throw,throwsandfinally,built- inexceptions,creatingownexceptionsubclasses. **Multithreading**-Differencesbetweenthread-basedmultitaskingandprocess- basedmultitasking,Javathreadmodel,creatingthreads,threadpriorities,synchronizingthreads,interthread communication.

UNIT-IV

The Collections Framework (java.util)- Collections overview, Collection Interfaces,TheCollectionclasses- ArrayList,LinkedList,HashSet,TreeSet,PriorityQueue,ArrayDeque.Accessinga

Collection via an Iterator, Using an Iterator, The For-Each alternative, Map InterfacesandClasses,Comparators,Collectionalgorithms,Arrays TheLegacyClassesandInterfaces- Dictionary,Hashtable,Properties,Stack,Vector MoreUtilityclasses,StringTokenizer,BitSet,Date,Calendar,Random Formatter,Scanner

UNIT-V

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, GridBag Layout. **EventHandling**-TheDelegationeventmodel-Events,Eventsources, EventListeners,Eventclasses, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Innerclasses. **ASimpleSwingApplication,Applets**– AppletsandHTML,SecurityIssues,AppletsandApplications,passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paintexample,ExploringSwingControls-JLabelandImageIcon, JTextField,The **SwingButtons**-JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JComboBox,Swing Menus,Dialogs.

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TEXTBOOKS:

1. JavaThecompletereference, 9thedition, HerbertSchildt, McGrawHillEducation (India) Pvt.Ltd.
2. UnderstandingObject-OrientedProgrammingwithJava, update dedition,T.Budd, PearsonEducation.

REFERENCEBOOKS:

1. AnIntroductiontoprogrammingandOOdesignusingJava,J.NinoandF.A.Hosch,JohnWiley& sons
2. IntroductiontoJavaprogramming, Y.DanielLiang, PearsonEducation.
3. ObjectOrientedProgrammingthroughJava, P. RadhaKrishna, UniversityPress.
4. ProgramminginJava, S.Malhotra, S.Chudhary, 2ndedition, OxfordUniv.Press.
5. JavaProgrammingandObject-orientedApplicationDevelopment, R.A.Johnson,CengageLearning.

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CY2206PC: OPERATING SYSTEMS LAB (UsingUNIX/LINUX)

II-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY2206PC	**Core**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		0	**0**	**3**	**1.5**	**30**	**70**	**100**
Contact Classes:NIL	**Tutorial classes:NIL**	**Practical classes: 36**				**Total Classes:36**		
Prerequisites: A course on "ProgrammingforProblemSolving". Acourse on"ComputerOrganizationandArchitecture".								

Prerequisites:

- A course on "ProgrammingforProblemSolving".
- A courseon"ComputerOrganizationandArchitecture".

Co-requisite:

- A courseon"OperatingSystems".

Course Objectives:
- To provide an understanding of the design aspects of operatingsystem concepts through simulation
- Introduce basic Unixcommands, system call interface for processmanagement, interprocesscommunication andI/Oin Unix

Course Outcomes:
- Simulate and implement operatingsystem concepts such as scheduling,deadlock management,filemanagement and memorymanagement.
- Able to implement Cprograms using Unixsystemcalls

List of Experiments:
1. Write a Cprograms to simulate the following CPUSchedulingalgorithms
     a) FCFS   b)SJF   c)Round Robin   d)priority
2. Write programs using the I/Osystemcalls of UNIX/LINUXoperatingsystem(open,read,write,close,fcntl,seek,stat,opendir,readdir)
3. Write a Cprogram to simulate BankersAlgorithm for DeadlockAvoidance and Prevention.
4. Write a Cprogram to implement the Producer–Consumerproblem using semaphores using UNIX/LINUXsystemcalls.

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5. Write Cprograms to illustrate the following IPCmechanisms
   a) Pipes   b)FIFOs   c)MessageQueues   d)SharedMemory
6. Write Cprograms to simulate the following memorymanagement techniques
   a) Paging   b)Segmentation

TEXTBOOKS:
1. OperatingSystemPrinciples-AbrahamSilberchatz, PeterB.Galvin, GregGagne7thEdition, John Wiley.
2. AdvancedprogrammingintheUnix environment, W.R.Stevens, Pearson education.

REFERENCEBOOKS:
1. OperatingSystems–InternalsandDesignPrinciples, WilliamStallings, FifthEdition–2005, Pearson Education/PHI.
2. OperatingSystem-A DesignApproach-Crowley, TMH.
3. ModernOperatingSystems, AndrewSTanenbaum, 2ndedition, Pearson/PHI.
4. UNIXProgrammingEnvironment, KernighanandPike, PHI/PearsonEducation.
5. UNIXInternals: TheNewFrontiers, U.Vahalia, PearsonEducation.

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CY2207PC: COMPUTER NETWORKS LAB

II-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY2207PC	**Core**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		0	**0**	**3**	**1.5**	**30**	**70**	**100**
Contact Classes:NIL	**Tutorial classes:NIL**	**Practical classes: 36**				**Total Classes:36**		
Prerequisites								

Course Objectives:

- To understand the working principle of various communication protocols.
- To understand the network simulator environment and visualize a network topology and observe its performance.
- To analyze the traffic flow and the contents of protocol frames.

Course Outcomes:
- Implement datalinklayer farming methods.
- Analyze error detection and error correctioncodes.
- Implement andanalyzer outing and congestion issues in networkdesign.
- Implement EncodingandDecoding techniques used in presentationlayer.
- To be able to work with differentnet work tools.

List of Experiments
1. Implement the datalinklayer framing methods such as character, character-stuffingandbitstuffing.
2. Write a program to computeCRCcode for the polynomialsCRC-12,CRC-16and CRCCCIP
3. Develop a simple datalinklayer that performs the flow control using the slidingwindowprotocol and loss recovery using theGo-Back-Nmechanism.
4. Implement Dijsktra'salgorithm tocompute the shortestpath through a network
5. Take an example subnet of hosts and obtain a broadcasttree for the subnet.
6. Implement distancevectorroutingalgorithm for obtaining outing ables at eachnode.
7. Implementdataencryptionanddatadecryption
8. Write a program for congestioncontrolusingLeakybucketalgorithm.
9. Write a program for framesorting technique used in buffers.

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10. Wireshark
    i. PacketCapture UsingWire shark
    ii. StartingWireshark
    iii. Viewing CapturedTraffic
    iv. Analysisand Statistics&Filters.
11. How to runNmap scan
12. OperatingSystemDetectionusingNmap

13. Dothefollowing using NS2 Simulator
    i. NS2Simulator-Introduction
    ii. Simulate toFindthe NumberofPacketsDropped
    iii. Simulate toFindthe Number ofPacketsDropped byTCP/UDP
    iv. Simulate toFindtheNumberofPacketsDroppedduetoCongestion
    v. Simulate to Compare DataRate&Throughput.
    vi. Simulate toPlotCongestionfor DifferentSource/Destination
    vii. Simulate to Determinethe Performancewith respecttoTransmission ofPackets

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CY2208PC: JAVA PROGRAMMING LAB

II-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY2208PC	Core	L	T	P	C	CIE	SEE	Total
		0	0	2	1	30	70	100
Contact Classes:NIL	Tutorial classes:NIL	Practical classes: 36				Total Classes:36		
Prerequisites								

CourseObjectives:

- To write programs using abstract classes.
- To write programs for solving realworld problems usingj a vacollection frame work.
- To write multithreaded programs.
- To writeGUIprogramsusingswing controlsinJava.
- To introducejavacompiler and eclipseplatform.
- To imparthands on experience with java programming.

Course Outcomes:

- Able to write programs for solving realworld problems usingjavacollectionframework.
- Able to write programs using abstractclasses.
- Able to write multithreadedprograms.
- Able towriteGUIprogramsusingswing controlsinJava.

Note:

1. Use LINUX and MySQL fo r the LabExperiments. Thoughnotmandatory, encourage the use of Eclipse platform.
2. Thelistsuggeststheminimumprogramset.Hence, the concerned staff is requested to add more problems to the list as needed.

List of Experiments:

1. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, adda test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter andcode refactoring like renaming variables, methods, and classes. Try debugstepbystepwithasmallprogram of about 10to15lines which contains atleast one ifelsecondition and afor loop.

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2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons forthe digits and for the +, -,*,% operations.Add a text field to display the result.Handle anypossible exceptionslikedivided byzero.

3. a) DevelopanappletinJavathatdisplaysasimplemessage.
   b) DevelopanappletinJava thatreceivesanintegerinonetextfield and computes its factorialValue and returns it in another textfield when the buttonnamed "Compute"isclicked.
   c)
4. Write a Java program that creates a user interface to perform integer divisions. The user enterstwo numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed inthe Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, theprogram would throw a Number Format Exception. If Num2 were Zero, the program would throw an ArithmeticException. Displaytheexception inamessage dialog box.

5. Write a Java program that implements a multi-thread application that hasthreethreads. First thread generates random integer every1second and if the value is even second thread computes the square of the number and prints. If the value is odd, the third thread will print thevalueofcube ofthe number.

6. Write a Java program for the following: Create a doubly linked list of elements.Delete a given element from the above list.Displaythecontentsofthelistafterdeletion.

7. Write a Java program that simulates a traffic light. The program lets the user select one of threelights:red, yellow,or green with radio buttons.On selecting a button, an appropriate messagewith "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there isnomessage shown.

8. Write a Java program to create an abstract class named Shape that contains two integers and anempty method named print Area (). Provide three classes named Rectangle, Triangle, and Circlesuch that each one of the classes extends the class Shape. Each one of the classes contains onlythemethod printArea ()that prints the areaofthe givenshape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header and the remaining lines correspond to rows in the table. The elements are separated by commas.Writeajava programto displaythe table using Labelsin Grid Layout.

10. Write a Java program that handles all mouse events and shows the event name at the center ofthewindow when a mouse eventisfired (Use

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Adapterclasses).

11. Write a Java program that loads names and phone numbers from a text file where the data isorganized asone line per record and each field in a record are separated by a tab (\t). It takes aname or phone number as input and prints the corresponding other value from the hash table (hint:use hash tables).

12. Write a Java program that correctly implements the producer – consumer problem using theconceptofinterthread communication.

13. WriteaJavaprogramtolistallthefilesinadirectoryincludingthefilesp resentinallitssubdirectories.

14. Write a Javaprogram tha implements Quicksortalgorithm for sorting a lis tof names in a acendingorder

15. Write a Java program that implements Bubble sort algorithm for sorting in descending order andalsoshowsthe number ofinterchangesoccurredforthegivensetofintegers.

REFERENCEBOOKS
1. JavaforProgrammers, P.J.Deitel andH.M.Deitel, 10thEdition *Pearson* education.
2. Thinkingin Java, BruceEckel, PearsonEducation.
3. JavaProgramming,D. S. MalikandP.S. Nair*Cengage* Learning.
4. CoreJava, Volume1, 9thedition, CayS.HorstmannandGCornellPearson.

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MC2001: CONSTITUTIONOFINDIA

II-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY2204PC	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	0	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

The Constitution of India is the supreme law ofIndia. Parliament ofIndia cannot make anylaw which violates the Fundamental Rights enumerated under the Part III of the Constitution. TheParliament of India has been empowered to amend the Constitution under Article 368, however, itcannot use this power to change the "basic structure" of the constitution, which has been ruled andexplained by the Supreme Court of India in its historical judgments. The Constitution of India reflectsthe idea of "Constitutionalism" – a modern and progressive concept historically developed by thethinkers of "liberalism" – an ideology which has been recognized as one of the most popular politicalideology and result of historical struggles against arbitrary use of sovereign power by state. Thehistoricrevolutionsin France, England, America and particularly European Renaiss ance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism"in many countries. The Constitution of India was made by borrowing models and principles from manycountriesincluding UnitedKingdomandAmerica.

The Constitution of India is not only a legal document but it also reflects social, political andeconomic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been saidthat Indian constitution reflects ideals of its freedom movement; however, few critics have argued thatit does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static"and therefore the Constitution of India has also been amended more than one hundred times. Theseamendments reflect political, social and economic developments since the year 1950. The Indianjudiciary and particularly the Supreme Court of India has played an historic role as the guardian ofpeople. It has been protecting not only basic ideals of the Constitution but also strengthened the samethrough progressive interpretations of the text of the Constitution. The judicial activism of the SupremeCourt of India and its historic contributions has been recognized throughout the world and it graduallymadeit"asone ofthe strongestcourtinthe world".

Course content
1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of theFundamental Duties and its legalstatus
6. The DirectivePrinciples of StatePolicy–Its importance and implementation
7. Federalstructure and distribution of legislative and financial powers between theUnionandthe States
8. ParliamentaryFormofGovernmentinIndia– TheconstitutionpowersandstatusofthePresidentofIndia
9. Amendmentof theConstitutionalPowersandProcedure
10. The historical perspectives of the constitutional amendmentsinIndia
11. EmergencyProvisions: NationalEmergency, PresidentRule,FinancialEmergency
12. LocalSelfGovernment–ConstitutionalSchemeinIndia
13. Scheme of the FundamentalRighttoEquality
14. Scheme of the FundamentalRight to certain Freedomunder Article19
15. Scope of the Right to Life and PersonalLibertyunderArticle21

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CY3101PC: INFORMATION SECURITY

III-I:CSE(CS)							
Course Code	Category	Hours/Weak			Credits	Max Marks	
CY3101PC	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60	
Prerequisites							

Course Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication andavailability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

Course Outcomes:
- Student will be able to understand basic cryptographic algorithms, message and webauthentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

UNIT - I
Security Concepts: Introduction, The need for security, Security approaches, Principles of security,Types of Security attacks, Security services, Security Mechanisms, A model for Network Security **Cryptography Concepts and Techniques:** Introduction, plain text and cipher text, substitutiontechniques, transposition techniques, encryption and decryption, symmetric and asymmetric keycryptography, steganography, key range and key size, possible types of attacks.

UNIT - II
Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipheroperation, Stream ciphers, RC4.
Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, ElgamalCryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

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UNIT - III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512), **Message authentication codes:** Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure

UNIT - IV

Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)
Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN,IEEE 802.11i Wireless LAN Security

UNIT - V

E-Mail Security: Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload,Combining security associations,Internet Key Exchange
CaseStudies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

TEXT BOOKS:
1. Cryptography and Network Security - Principles and Practice: William Stallings, PearsonEducation, 6th Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition

REFERENCE BOOKS:
1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, WileyIndia, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

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CY3102PC: DESIGN AND ANALYSIS OF ALGORITHMS

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3102PC	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
- Introduces the notations for analysis of the performance of algorithms.
- Introduces the data structure disjoint sets.
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate;
- Describes how to evaluate and compare different algorithms using worst-, average-, and best-case analysis.
- Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

Course Outcomes:
- Ability to analyze the performance of algorithms
- Ability to choose appropriate data structures and algorithm design methods for a specifiedapplication
- Ability to understand how the choice of data structures and the algorithm design methodsimpact the performance of programs

UNIT - I
Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, AsymptoticNotations- Big oh notation, Omega notation, Theta notation and Little oh notation.
Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen'smatrix multiplication.

UNIT - II
Disjoint Sets: Disjoint set operations, union and find algorithms
Backtracking: General method, applications, n-queen's problem, sum of subsets problem, graphcoloring

UNIT - III
Dynamic Programming: General method, applications- Optimal binary search trees, 0/1 knapsackproblem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT - IV
Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem,Minimum cost spanning trees, Single source shortest path problem.

UNIT - V
Branch and Bound: General method, applications - Travelling sales person problem, 0/1

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knapsackproblem - LC Branch and Bound solution, FIFO Branch and Bound solution.
NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard andNP-Complete classes, Cook's theorem.

TEXT BOOK:
1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan,University Press.

REFERENCE BOOKS:
1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education.
3. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R.Tamassia, John Wiley and sons.

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CY3103PC: DATABASE MANAGEMENT SYSTEMS

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3103PC	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transactioncontrol, concurrency control, storage structures and access techniques.

Course Outcomes:
- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

UNIT - I
Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS
Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT - II
Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/alteringtables and views.
Relational Algebra**,** Tuple relational Calculus, Domain relational calculus.

UNIT - III
SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL,triggers and active data bases.

Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normalform.

UNIT - IV
Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

UNIT - V
Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and

- Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, *Tata Mc Graw Hill*
   3rd Edition
2. Database System Concepts, Silberschatz, Korth, *Mc Graw hill*, V edition.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7thEdition.
2. Fundamentals of Database Systems, Elmasri Navrate, *Pearson Education*
3. Introduction to Database Systems, C. J. Date, *Pearson Education*
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, *SPD*.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah, *PHI*.
6. Fundamentals of Database Management Systems, M. L. Gillenson, *Wiley Student* Edition.

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CY3104PC: INTRODUCTION TO CYBER SECURITY

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3104PC	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course objectives:

- To familiarize various types of cyber-attacks and cyber-crimes
- To give an overview of the cyber laws
- To study the defensive techniques against these attacks

Course Outcomes: The students will be able to understand cyber-attacks, types of cybercrimes, cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.

UNIT - I

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT - II

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy. Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

UNIT - III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT- IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

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UNIT - V

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

Cybercrime: Examples and Mini-Cases

Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.

Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley

2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

REFERENCES:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC Press T&F Group.

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CY3108PE: INFORMATION THEORY & CODING

(Professional Elective - I)

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3108PE	Professional Elective - I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
- To acquire the knowledge in measurement of information and errors.
- Understand the importance of various codes for communication systems
- To design encoder and decoder of various codes.
- To known the applicability of source and channel codes

Course Outcomes: Upon completing this course, the student will be able to

- Learn measurement of information and errors.
- Obtain knowledge in designing various source codes and channel codes
- Design encoders and decoders for block and cyclic codes
- Understand the significance of codes in various applications

UNIT - I
Coding for Reliable Digital Transmission and storage

Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies.
Source Codes: Shannon-fano coding, Huffman coding

UNIT - II
Linear Block Codes: Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

UNIT - III
Cyclic Codes: Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding, Cyclic Hamming Codes, shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

UNIT - IV
Convolutional Codes: Encoding of Convolutional Codes- Structural and Distance Properties, state, tree, trellis diagrams, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

UNIT - V
BCH Codes: Minimum distance and BCH bounds, Decoding procedure for BCH codes, Syndrome computation and iterative algorithms, Error locations polynomials for single and double error correction.

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TEXT BOOKS

1. Error Control Coding- Fundamentals and Applications –Shu Lin, Daniel J.Costello,Jr, PrenticeHall, Inc 2014.
2. Error Correcting Coding Theory-Man Young Rhee, McGraw – Hill Publishing 1989

REFERENCE BOOKS

1. Digital Communications- John G. Proakis, 5th ed., , TMH 2008.
2. Introduction to Error Control Codes-Salvatore Gravano-oxford
3. Error Correction Coding – Mathematical Methods and Algorithms – Todd K.Moon, 2006, WileyIndia.
4. Information Theory, Coding and Cryptography – Ranjan Bose, 2nd Edition, 2009, TMH.

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CY3109PE: ADVANCED COMPUTER ARCHITECTURE

(Professional Elective - I)

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3109PE	Professional Elective - I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives
- To impart the concepts and principles of parallel and advanced computer architectures.
- To develop the design techniques of Scalable and multithreaded Architectures.
- To Apply the concepts and techniques of parallel and advanced computer architectures todesign modern computer systems

Course Outcomes: Gain knowledge of

- Computational models and Computer Architectures.
- Concepts of parallel computer models.
- Scalable Architectures, Pipelining, Superscalar processors, multiprocessors

UNIT - I
Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

UNIT - II
Principals of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws, Scalability Analysis and Approaches, Hardware Technologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

UNIT - III
Bus Cache and Shared memory, Backplane bus systems, Cache Memory organizations, Shared- Memory Organizations, Sequential and weak consistency models, Pipelining and superscalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT - IV
Parallel and Scalable Architectures, Multiprocessors and Multicomputers, Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three Generations of Multicomputers, Message-passing Mechanisms, Multivetor and SIMD computers, Vector Processing Principals, Multivector Multiprocessors, Compound Vector processing, SIMD computer Organizations,The connection machine CM-5,

UNIT - V
Scalable,Multi threaded and Dataflow Architectures, Latency-hiding techniques, Principals

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of Multithreading, Fine-Grain Multicomputers, Scalable and multithreaded Architectures, Dataflow and hybrid Architectures.

TEXT BOOK:

1. Advanced Computer Architecture Second Edition, Kai Hwang, Tata McGraw Hill Publishers.

REFERENCE BOOKS:

1. Computer Architecture, Fourth edition, J. L. Hennessy and D.A. Patterson. ELSEVIER.Advanced Computer Architectures, S.G. Shiva, Special Indian edition, CRC, Taylor &Francis.
2. Introduction to High Performance Computing for Scientists and Engineers, G. Hager and G.Wellein, CRC Press, Taylor & Francis Group.
3. Advanced Computer Architecture, D. Sima, T. Fountain, P. Kacsuk, Pearson education.
4. Computer Architecture, B. Parhami, Oxford Univ. Press.

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CY3110PE: DATA ANALYTICS

(Professional Elective - I)

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3110PE	Professional Elective - I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
- To explore the fundamental concepts of data analytics.
- To learn the principles and methods of statistical analysis
- Discover interesting patterns, analyze supervised and unsupervised models and estimate theaccuracy of the algorithms.
- To understand the various search methods and visualization techniques.

Course Outcomes: After completion of this course students will be able to

- Understand the impact of data analytics for business decisions and strategy
- Carry out data analysis/statistical analysis
- To carry out standard data visualization and formal inference procedures
- Design Data Architecture
- Understand various Data Sources

UNIT - I
Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc.Data Management, Data Quality (noise, outliers, missingvalues, duplicate data) and Data Processing & Processing.

UNIT - II
Data Analytics: Introduction to Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of Data and variables, Data Modeling Techniques, Missing Imputationsetc. Need for Business Modeling.

UNIT - III
Regression – Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization,and Model Building etc.
Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT - IV
Object Segmentation: Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building – Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Trees etc. Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction

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UNIT - V

Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS:
1. Student's Handbook for Associate Analytics – II, III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers.

REFERENCE BOOKS:
1. Introduction to Data Mining, Tan, Steinbach and Kumar, Addision Wisley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford Univ.

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CY3111PE: IMAGE PROCESSING

(Professional Elective - I)

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3111PE	Professional Elective - I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives
- Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
- The topics include image acquisition; sampling and quantization; preprocessing; enhancement;restoration; segmentation; and compression.

Course Outcomes
- Demonstrate the knowledge of the basic concepts of two-dimensional signal acquisition,sampling, and quantization.
- Demonstrate the knowledge of filtering techniques.
- Demonstrate the knowledge of 2D transformation techniques.
- Demonstrate the knowledge of image enhancement, segmentation, restoration and compression techniques.

UNIT - I
Digital Image Fundamentals: Digital Image through Scanner, Digital Camera. Concept of GrayLevels.GrayLevelto Binary Image Conversion. Sampling and Quantization. Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD.

UNIT - II
Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering,Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

UNIT - III
Image Restoration Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, LeastMean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT - IV
Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding,Region Oriented Segmentation.

UNIT - V
Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image CompressionModels, Source Encoder and Decoder, Error Free Compression, Lossy Compression.

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TEXT BOOK:

1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education,2nd Ed, 2004.

REFERENCE BOOKS:

1. Fundamentals of Digital Image Processing: A. K. Jain, PHI.

2. Digital Image Processing using MAT LAB: Rafael C. Gonzalez, Richard E. Woods, Steven L.Eddins: Pearson Education India, 2004.

3. Digital Image Processing: William K. Pratt, John Wilely, 3rd Edition, 2004.

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CY3112PE: PRINCIPLES OF PROGRAMMING LANGUAGES

(Professional Elective - I)

III-I:CSE(CS)							
Course Code	Category	Hours/Weak			Credits	Max Marks	
CY3112PE	Professional Elective - I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60	
Prerequisites							

Course Objectives

- Introduce important paradigms of programming languages
- To provide conceptual understanding of high-level language design and implementation
- Topics include programming paradigms; syntax and semantics; data types, expressions and statements; subprograms and blocks; abstract data types; concurrency; functional and logic programming languages; and scripting languages

Course Outcomes

- Acquire the skills for expressing syntax and semantics in formal notation
- Identify and apply a suitable programming paradigm for a given computing application
- Gain knowledge of and able to compare the features of various programming languages

UNIT - I

Preliminary Concepts: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade-Offs, Implementation Methods, Programming Environments

Syntax and Semantics: General Problem of Describing Syntax and Semantics, Formal Methods of Describing Syntax, Attribute Grammars, Describing the Meanings of Programs

UNIT - II

Names, Bindings, and Scopes: Introduction, Names, Variables, Concept of Binding, Scope, Scope and Lifetime, Referencing Environments, Named Constants

Data Types: Introduction, Primitive Data Types, Character String Types, User Defined Ordinal Types, Array, Associative Arrays, Record, Union, Tuple Types, List Types, Pointer and Reference Types, TypeChecking, Strong Typing, Type Equivalence

Expressions and Statements: Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short Circuit Evaluation, Assignment Statements, Mixed-Mode Assignment

Control Structures – Introduction, Selection Statements,Iterative Statements, Unconditional Branching, Guarded Commands.

UNIT - III

Subprograms and Blocks: Fundamentals of Sub-Programs, Design Issues for Subprograms, Local Referencing Environments, Parameter Passing Methods, Parameters that Are Subprograms, Calling Subprograms Indirectly, Overloaded Subprograms, Generic Sub programs, Design Issues for Functions, User Defined Overloaded Operators, Closures, Coroutines

Implementing Subprograms: General Semantics of Calls and Returns, Implementing Simple Subprograms, Implementing Subprograms with Stack-Dynamic Local Variables, Nested Subprograms,Blocks, Implementing Dynamic Scoping

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Abstract Data Types: The Concept of Abstraction, Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Naming Encapsulations

UNIT - IV
Concurrency: Introduction, Introduction to Subprogram Level Concurrency, Semaphores, Monitors, Message Passing, Java Threads, Concurrency in Function Languages, Statement Level Concurrency. Exception Handling and Event Handling: Introduction, Exception Handling in Ada, C++, Java, Introduction to Event Handling, Event Handling with Java and C#.

UNIT - V
Functional Programming Languages: Introduction, Mathematical Functions, Fundamentals of Functional Programming Language, LISP, Support for Functional Programming in Primarily Imperative Languages, Comparison of Functional and Imperative Languages
Logic Programming Language: Introduction, an Overview of Logic Programming, Basic Elements ofProlog, Applications of Logic Programming.

Scripting Language: Pragmatics, Key Concepts, Case Study: Python – Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library. (Text Book 2)

TEXT BOOKS:
1. Concepts of Programming Languages Robert. W. Sebesta 10/E, Pearson Education.
2. Programming Language Design Concepts, D. A. Watt, Wiley Dreamtech, 2007.

REFERENCE BOOKS:
1. Programming Languages, 2nd Edition, A.B. Tucker, R. E. Noonan, TMH.
2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003

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C3113PE: COMPUTER GRAPHICS

(Professional Elective - II)

III-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
C3113PE	**Professional Elective - II**	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites								

Course Objectives
- The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics.
- Topics covered include graphics systems and input devices; geometric representations and 2D/3D transformations; viewing and projections; illumination and color models; animation; rendering and implementation; visible surface detection;

Course Outcomes
- Acquire familiarity with the relevant mathematics of computer graphics.
- Be able to design basic graphics application programs, including animation
- Be able to design applications that display graphic images to given specifications

UNIT - I
Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices,raster-scan systems, random scan systems, graphics monitors and work stations and input devices
Output primitives: Points and lines, line drawing algorithms (Bresenham's and DDA Algorithm), mid- point circle and ellipse algorithms
Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT - II
2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations betweencoordinate systems
2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland algorithms,
Sutherland –Hodgemanpolygon clipping algorithm.

UNIT - III
3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT - IV
3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations,composite transformations. **viewing**: Viewing pipeline, viewing coordinates, view volume and general projection transformsand clipping.

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UNIT - V

Computer animation: Design of animation sequence, general computer animation functions, rasteranimation, computer animation languages, key frame systems, motion specifications

Visible surface detection methods: Classification, back-face detection, depth-buffer, BSP-tree methods and area sub-division methods

TEXT BOOKS:

1. "Computer Graphics *C version*", Donald Hearn and M. Pauline Baker, Pearson Education
2. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner andHughes, Pearson Education.
3. Computer Graphics, Steven Harrington, TMH

REFERENCE BOOKS:

1. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.

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CY3114PE: ADVANCED OPERATING SYSTEMS

(Professional Elective - II)

III-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY3114PE	Professional Elective - II	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites								

Course Objectives

- To study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems)
- Hardware and software features that support these systems.

Course Outcomes
- Understand the design approaches of advanced operating systems
- Analyze the design issues of distributed operating systems.
- Evaluate design issues of multi processor operating systems.
- Identify the requirements Distributed File System and Distributed Shared Memory.
- Formulate the solutions to schedule the real time applications.

UNIT - I
Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. **Theoretical Foundations:** Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Orderingof Messages, Termination Detection.

UNIT - II
Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, **Non-Token – Based Algorithms:** Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, **Token-Based Algorithms:** Suzuki-Kasami's Broadcast Algorithm, Singhal's Heurisric Algorithm,Raymond's Heuristic Algorithm.

UNIT - III
Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized- Deadlock – Detection Algorithms, Distributed Deadlock Detection Algorithms, HierarchicalDeadlock Detection Algorithms

UNIT - IV
Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures **Multi Processor Operating Systems**: Introduction, Structures of Multiprocessor Operating Systems, Operating Design Issues, Threads, Process Synchronization, Processor Scheduling.

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Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

UNIT - V
Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Issues in task Migration
Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, MemoryCoherence, Coherence Protocols, Design Issues

TEXT BOOK:
1. Advanced Concepts in Operating Systems, Mukesh Singhal, Niranjan G. Shivaratri, TataMcGraw-Hill Edition 2001

REFERENCE BOOK:
1. Distributed Systems: Andrew S. Tanenbaum, Maarten Van Steen, Pearson Prentice Hall,Edition – 2, 2007

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CY3115PE: INFORMATION RETRIEVAL SYSTEMS

(Professional Elective - II)

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3115PE	Professional Elective - II	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
- To learn the important concepts and algorithms in IRS
- To understand the data/file structures that are necessary to design, and implement information retrieval (IR) systems.

Course Outcomes:
- Ability to apply IR principles to locate relevant information large collections of data
- Ability to design different document clustering algorithms
- Implement retrieval systems for web search tasks.
- Design an Information Retrieval System for web search tasks.

UNIT - I

Introduction to Information Retrieval Systems: Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses
Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities

UNIT - II

Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction
Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models

UNIT - III

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages
Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters

UNIT - IV

User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the INTERNET and Hypertext
Information Visualization: Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies

UNIT - V

Text Search Algorithms: Introduction to Text Search Techniques, Software Text Search

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Algorithms, Hardware Text Search Systems

Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, Video Retrieval

TEXT BOOK:

1. Information Storage and Retrieval Systems – Theory and Implementation, Second Edition, Gerald J. Kowalski, Mark T. Maybury, Springer

REFERENCE BOOKS:

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Information Storage & Retrieval By Robert Korfhage – John Wiley & Sons.
3. Modern Information Retrieval By Yates and Neto Pearson Education.

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CY3116PE: DISTRIBUTED DATABASES
(Professional Elective - II)

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3116PE	Professional Elective - II	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
- The purpose of the course is to enrich the previous knowledge of database systems and exposing the need for distributed database technology to confront with the deficiencies of the centralized database systems.
- Introduce basic principles and implementation techniques of distributed database systems.
- Equip students with principles and knowledge of parallel and object-oriented databases.
- Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database management systems.

Course Outcomes:
- Understand theoretical and practical aspects of distributed database systems.
- Study and identify various issues related to the development of distributed database system.
- Understand the design aspects of object-oriented database system and related development.

UNIT - I
Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs,Problem areas.
Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture. **Distributed Database Design**: Alternative Design Strategies,Distribution Design issues, Fragmentation, Allocation.

UNIT - II
Query processing and decomposition: Query processing objectives, characterization of queryprocessors, layers of query processing, query decomposition, localization of distributed data.
Distributed query Optimization: Query optimization, centralized query optimization, distributed queryoptimization algorithms.

UNIT - III
Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT - IV
DistributedDBMSReliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols,

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site failures and network partitioning.

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

UNIT - V

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS

TEXT BOOKS:
1. M. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

REFERENCE BOOK:
1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The Complete Book", Second Edition, Pearson International Edition

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CY3117PE: NATURAL LANGUAGE PROCESSING

(Professional Elective - II)

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3117PE	Professional Elective - II	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
- Introduce to some of the problems and solutions of NLP and their relation to linguistics andstatistics.

Course Outcomes:
- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluatingempirical NLP systems
- Able to manipulate probabilities, construct statistical models over strings and trees, andestimate parameters using supervised and unsupervised training methods.
- Able to design, implement, and analyze NLP algorithms
- Able to design different language modeling Techniques.

UNIT - I
Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models

Finding the Structure of Documents: Introduction,Methods,Complexity of the Approaches, Performances of the Approaches

UNIT - II
Syntax Analysis: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing,Multilingual Issues

UNIT - III
Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word SenseSystems, Software.

UNIT - IV
Predicate-Argument Structure, Meaning Representation Systems, Software.

UNIT - V
Discourse Processing: Cohension, Reference Resolution, Discourse Cohension and Structure **Language Modeling:** Introduction, N-Gram Models, Language Model Evaluation, ParameterEstimation, Language Model Adaptation, Types of Language Models, Language-Specific ModelingProblems, Multilingual and Crosslingual Language Modeling

TEXT BOOKS:

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1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M.Bikel and Imed Zitouni, Pearson Publication
2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary

REFERENCE BOOK:

1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, PearsonPublications

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CY3105PC: DBMS & INFORMATION SECURITY LAB

III-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY3105PC	**Core**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		0	0	3	1.5	30	70	100
Contact Classes:NIL	**Tutorial classes:NIL**	**Practical classes: 36**				**Total Classes:36**		
Prerequisites:								

Course Objectives:
- Introduce ER data model, database design and normalization
- Learn SQL basics for data definition and data manipulation
- Implement various security algorithms

Course Outcomes:
- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers
- Will be able to differentiate and implement encryption algorithms.

DBMS LAB:

List of Experiments:
1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS:
1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw Hill, V edition.

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REFERENCES BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7thEdition.
2. *Fundamentals of Database Systems, Elmasri Navrate, Pearson Education*
3. *Introduction to Database Systems, C.J. Date, Pearson Education*
4. Oracle for Professionals,The X Team, S. Shah and V. Shah, *SPD*.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, *PHI*.
6. *Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.*

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INFORMATION SECURITY LAB:

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 displays 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 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.

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CY3105PC: DESIGN AND ANALYSIS OF ALGORITHMS LAB

III-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3105PC	Core	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes:NIL	Tutorial classes:NIL	Practical classes: 36				Total Classes:36		
Prerequisites:								

Course Objectives:

- To write programs in java to solve problems using divide and conquer strategy.
- To write programs in java to solve problems using backtracking strategy.
- To write programs in java to solve problems using greedy and dynamic programmingtechniques.

Course Outcomes:

- Ability to write programs in java to solve problems using algorithm design techniquessuch as Divide and Conquer, Greedy, Dynamic programming, and Backtracking.

List of Experiments:

1. Write a java program to implement Quick sort algorithm for sorting a list of integersin ascending order
2. Write a java program to implement Merge sort algorithm for sorting a list of integersin ascending order.
3. i) Write a java program to implement the dfs algorithm for a graph.
4. ii) Write a. java program to implement the bfs algorithm for a graph.
5. Write a java programs to implement backtracking algorithm for the N-queensproblem.
6. Write a java program to implement the backtracking algorithm for the sum of subsetsproblem.
7. Write a java program to implement the backtracking algorithm for the HamiltonianCircuits problem.
8. Write a java program to implement greedy algorithm for job sequencing withdeadlines.
9. Write a java program to implement Dijkstra's algorithm for the Single source shortestpath problem.
10. Write a java program that implements Prim's algorithm to generate minimum costspanning tree.

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11. Write a java program that implements Kruskal's algorithm to generate minimum costspanning tree

12. Write a java program to implement Floyd's algorithm for the all pairs shortest pathproblem.

13. Write a java program to implement Dynamic Programming algorithm for the 0/1Knapsack problem.

14. Write a java program to implement Dynamic Programming algorithm for the OptimalBinary Search Tree Problem.

REFERENCE BOOKS

1. Data structures, Algorithms and Applications in java, 2nd Edition, S. Sahani,Universities Press.

2. Data structures and Algorithms in java, 3rd edition, A. Drozdek, Cengage Learning.

3. Data structures with Java, J. R. Hubbard, 2nd edition, Schaum's Outlines, TMH.

4. Data structures and algorithms in Java, 2nd Edition, R. Lafore, Pearson Education.

5. Data Structures using Java, D. S. Malik and P.S. Nair, Cengage Learning.

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EN3107HS: ADVANCED COMMUNICATION SKILLS LAB

III-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
EN3107HS	Core	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		0	0	2	1	30	70	100
Contact Classes:NIL	**Tutorial classes:NIL**	**Practical classes: 36**				**Total Classes:36**		
Prerequisites:								

1. INTRODUCTION:

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalized context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

2. OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

3. SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and**

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  Building Vocabulary - Starting a conversation – responding appropriately and relevantly – using the right body language

  – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading& effectivegoogling.

3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/Technical report writing/* – planning for writing – improving one's writing.

4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/   e-

5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation-Concept and process, pre-interview planning, opening

   Strategies, answering strategies, interview through tele-conference & video-conference and MockInterviews.

4. MINIMUM REQUIREMENT:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructuralfacilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

5. SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used.

- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dream tech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

TEXT BOOKS:

1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill

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Education (India) Pvt. Ltd. 2nd Edition
2. Academic Writing: A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

REFERENCE BOOKS:

1. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
2. Professional Communication by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. English Vocabulary in Use series, Cambridge University Press 2008.
6. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
7. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata McGraw-Hill 2009.

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B.Tech. III Year II Sem
CY3201PC: ETHICAL HACKING

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3201PC	core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:

- Explain the objectives of ethical hacking
- Understand various password attacks.
- Discuss the fundamental ideas of database attacks.

Course Outcomes:
- Student will be able to understand basic ethical hacking terminology.
- Ability to identify type of attack.
- Ability to understand the ways to secure password and databases.

UNIT-I

Ethical Hacking Overview, Hacking Life Cycle, Legal Issues in Ethical Hacking, Hacking Terminology,Gathering Facts, CP/IP Concepts Review, Network and Computer Attacks

UNIT-II

Network Enumeration and Foot Printing- DNS Query, WHOIS Query, OS Finger Printing, Banner
Grabbing, CERT-In Guidelines :CERT-In Guideline for Securing Wireless Access Points/Routers, Credit Card, Email, Web Server Security, Auditing and Logging, Securing Home Computers, SQL Server Security, Linux and Windows Server security, IDS - Intrusion Detection System, Anti Virus Policy

UNIT-III

Programming For Security Professionals- Web Application Vulnerabilities, Buffer Overflow Attack,
Session Hijacking, Code Injection Attacks-Cross Site Scripting (CSS) Attack, SQL injection Attack.
Required Lab goals: Basics of Ethical Hacking, Gathering Information Required in Order to Attack Target, Finding Critical Bugs in Servers.

UNIT-IV

Password Hacking, Windows Hacking, Logging by Pass, Network Hacking, and Anonymity and Email Hacking. Web Servers Hacking, Session Hijacking, Surveillance, Desktop, Server and OS Vulnerabilities, Required Lab. Goals: Methods of Password Encryption and Decryption learn to remain anonymous over the Internet.

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UNIT-V

Database Attacks, Hacking Wireless Networks, Cryptography, Network Protection Systems, Trojan and Backdoor Applications, Legal Resources, Virtualization and Ethical Hacking.Required LabGoals: ways to maintain access to a system using Trojan and backdoor, attacking database server and wirelessnetworks.

REFERENCE BOOKS:

1. Stuart McClure Joel Scambray, Solutions,George Kurtz -Hacking Exposed—Network Security Secrets &solutions.

2. Ethical Hacking and Network Defence, Michael T. Simpson, Kent Backman, James Corley

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CY3202PC: COMPILER DESIGN

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3202PC	core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
- Introduce the major concepts of language translation and compiler design and impart the knowledge of practical skills necessary for constructing a compiler.
- Topics include phases of compiler, parsing, syntax directd translation, type checking use of symbol tables, code optimization techniques, intermediate code generation, code generation and data flow analysis.

Course Outcomes:
- Demonstrate the ability to design a compiler given a set of language features.
- Demonstrate the the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lex tool & yacc tool for devleoping a scanner and parser.
- Design and implement LL and LR parsers
- Design algorithms to do code optimization in order to improve the performance of a program interms of space and time complexity.
- Design algorithms to generate machine code.

UNIT - I
Introduction: The structure of a compiler, the science of building a compiler, programming language basics
Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

UNIT - II
Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars and Parser Generators.

UNIT - III
Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders

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for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's.

Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Switch-Statements, Intermediate Code for Procedures.

UNIT - IV

Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.
UNIT - V

Machine-Independent Optimization: The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

TEXT BOOK:
1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam,Ravi Sethi, Jeffry D. Ullman.

REFERENCE BOOKS:
1. Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Compiler Construction, Louden, Thomson.

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CY3103PC: SOFTWARE ENGINEERING

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3103PC	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives

- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

Course Outcomes
- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

UNIT - I
Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.
Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT - II
Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

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Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System models: Context models, behavioral models, data models, object models, structured methods.

UNIT - III
Design Engineering: Design process and design quality, design concepts, the design model. **Creating an architectural design:** software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT - IV
TestingStrategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.
Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT - V
Metrics for Process and Products: Software measurement, metrics for software quality.

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, riskprojection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

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TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw HillInternational Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson,Pearson Education.

REFERENCE BOOKS:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-HillCompanies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

CY3207PE: BIOMETRIC SECURITY

(PROFESSIONAL ELECTIVE-III)

III-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY3207PE	**PROFESSION AL ELECTIVE-III**	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites								

Course Objective:

To provide students with understanding of biometrics, biometric equipment and standards applied to security.

Course Outcomes:

- Demonstrate knowledge of the basic physical and biological science and engineering principles underlying biometric systems.

- Understand and analyze biometric systems at the component level and be able to analyze and design basic biometric system applications.

- Be able to work effectively in teams and express their work and ideas orally and in writing.

- Identify the sociological and acceptance issues associated with the design and implementation of biometric systems.

- Understand various Biometric security issues.

UNIT-I

Biometrics-Introduction-benefits of biometrics over traditional authentication systems – benefits of biometrics in identification systems-selecting a biometric for a system –Applications – Key biometric terms and processes - biometric matching methods - Accuracyin biometric systems.

UNIT-II

Physiological Biometric Technologies: Fingerprints - Technical description – characteristics - Competing technologies - strengths – weaknesses – deployment - Facial scan - Technical description - characteristics - weaknesses-deployment - Iris scan - Technical description – characteristics - strengths – weaknesses – deployment Retina vascular pattern

UNIT-III

Technical description – characteristics - strengths – weaknesses – deployment - Hand scan - Technical description-characteristics - strengths – weaknesses deployment – DNA biometrics.

Behavioral Biometric Technologies: Handprint Biometrics - DNA Biometrics.

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UNIT-IV

Signature and hand writing technology- Technical description – classification – keyboard / keystroke dynamics- Voice – data acquisition - feature extraction - characteristics - strengths – weaknesses-deployment.

UNIT-V

Multi biometrics and multi factor biometrics - two-factor authentication with passwords - tickets and tokens – executive decision - implementation plan.

TEXT BOOKS:

1. Samir Nanavathi, Michel Thieme, and RajNanavathi :"Biometrics -Identity verification in a network", 1st Edition, Wiley Eastern, 2002.

2. JohnChirilloandScott Blaul: "ImplementingBiometricSecurity",1st Edition, Wiley Eastern Publication, 2005.

REFERENCES:

1. JohnBerger:"BiometricsforNetworkSecurity",1stEdition,Prentice Hall, 2004.

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CY3208PE: WEB SECURITY
(PROFESSIONAL ELECTIVE-III)

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3208PE	PROFESSION AL ELECTIVE-III	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:

1. Give an Overview of information security

2. Give an overview of Access control of relational databases

Course Outcomes:

Students should be able to

1. Understand the Web architecture and applications.

2. Understand client side and server-side programming.

3. Understand how common mistakes can be bypassed and exploit the application.

4. Identify common application vulnerabilities.

UNIT - I

The Web Security, The Web Security Problem, Risk Analysis and Best Practices

Cryptography and the Web: Cryptography and Web Security, Working Cryptographic Systems and

Protocols, Legal Restrictions on Cryptography, Digital Identification

UNIT - II

The Web's War on Your Privacy, Privacy-Protecting Techniques, Backups and Antitheft, Web Server

Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications

UNIT - III

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database

Issues in Trust Management and Trust Negotiation, Security in Data Warehouses and OLAP Systems

UNIT - IV

Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for

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Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data

Processing Systems, Hippocratic Databases: Current Capabilities

UNIT - V

Future Trends Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Locationbased Access Control, Efficiently Enforcing the Security and Privacy Policies in a Mobile Environment

TEXT BOOKS:

1. Web Security, Privacy and Commerce Simson GArfinkel, Gene Spafford, O'Reilly.

2. Handbook on Database security applications and trends Michael Gertz, Sushil Jajodia.

REFERENCE BOOKS:

1. Andrew Hoffman, Web Application Security: Exploitation and Countermeasures for Modern

Web Applications, O'reilly.

2. Jonathan LeBlanc Tim Messerschmidt, Identity and Data Security for Web Development - Best

Practices, O'reilly.

3. McDonald Malcolm, Web Security For Developers, No Starch Press, US.

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CY3209PE: DATABASE SECURITY
(PROFESSIONAL ELECTIVE-III)

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3209PE	PROFESSION AL ELECTIVE-III	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course objectives:

- To learn the security of databases
- To learn the design techniques of database security
- To learn the secure software design

Course Outcomes:

- Ability to carry out a risk analysis for large database.
- Ability to set up, and maintain the accounts with privileges and roles.

UNIT- I

Introduction: Introduction to Databases Security Problems in Databases Security Controls Conclusions

Security Models -1: Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

UNIT- II

Security Models -2: Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion

Security Mechanisms: Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

UNIT- III

Security Software Design: Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design

Statistical Database Protection & **Intrusion Detection Systems:** Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery

UNIT- IV

Models for the Protection Of New Generation Database Systems -1: Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases

UNIT- V

Models for the Protection of New Generation Database Systems -2: A

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Model for the Protection of New Generation Database Systems: the Orion Model Jajodia and Kogan's Model a Model for the Protection of Active Databases Conclusions

TEXT BOOKS:

1. Database Security by Castano *Pearson Edition (*1/e)
2. Database Security and Auditing: Protecting Data Integrity and Accessibility, 1st Edition, Hassan Afyouni, THOMSON Edition.

REFERENCE BOOK:

1. Database security by Alfred basta, melissa zgola, CENGAGE learning.

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CY3210PE: WIRELESS & MOBILE SECURITY
(PROFESSIONAL ELECTIVE-III)

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3210PE	PROFESSIONAL ELECTIVE-III	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
This skill oriented course equips the system Administrators with the skills required to protect & recover the computer systems & networks from various security threats.

Course Outcomes:
By the end of the course Students will
1. Familiarize with the issues and technologies involved in designing a wireless and mobile system that is robust against various attacks.
2. Gain knowledge and understanding of the various ways in which wireless networks can be attacked and tradeoffs in protecting networks.
3. Have a broad knowledge of the state-of-the-art and open problems in wireless and mobile security, thus enhancing their potential to do research or pursue a career in this rapidly developing area.
4. Learn various security issues involved in cloud computing.
5. Learn various security issues related to GPRS and 3G.

UNIT-I
Security Issues in Mobile Communication: Mobile Communication History, Security – Wired Vs Wireless, Security Issues in Wireless and Mobile Communications, Security Requirements in Wireless and Mobile Communications, Security for Mobile Applications, Advantages and Disadvantages of Application – level Security.

UNIT-II
Security of Device, Network, and Server Levels: Mobile Devices Security Requirements, Mobile Wireless network level Security, Server Level Security. Application Level Security in Wireless Networks: Application of WLANs, Wireless Threats, Some Vulnerabilities and Attach Methods over WLANs, Security for 1G Wi-Fi Applications, Security for 2G Wi-Fi Applications, Recent Security Schemes for Wi-Fi Applications

UNIT-III
Application Level Security in Cellular Networks: Generations of Cellular Networks, Security Issues and attacks in cellular networks, GSM Security for applications, GPRS Security for applications, UMTS security for applications, 3G security for applications, Some of Security and authentication Solutions.

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UNIT-IV

Application Level Security in MANETs: MANETs, Some applications of MANETs, MANET Features, Security Challenges in MANETs, Security Attacks on MANETs, External Threats for MANET applications, Internal threats for MANET Applications, Some of the Security Solutions.

Ubiquitous Computing, Need for Novel Security Schemes for UC, Security Challenges for UC, and Security Attacks on UC networks, some of the security solutions for UC.

UNIT V

Data Center Operations - Security challenge, implement "Five Principal Characteristics of Cloud Computing, Data center Security Recommendations Encryption for Confidentiality and Integrity, Encrypting data at rest, Key Management Lifecycle, Cloud Encryption Standards.

TEXT BOOKS:

1. Pallapa Venkataram, Satish Babu: "Wireless and Mobile Network Security", 1st Edition, Tata McGraw Hill2010.
2. Frank Adelstein, K.S.Gupta: "Fundamentals of Mobile and Pervasive Computing", 1st Edition, Tata McGraw Hill 2005.

REFERENCES:

1. Randall k. Nichols, Panos C.Lekkas: "Wireless Security Models, Threats and Solutions", 1st Edition, Tata McGraw Hill, 2006.
2. Bruce Potter and Bob Fleck: "802.11 Security" , 1st Edition, SPD O'REILLY 2005.
3. James Kempf: "Guide to Wireless Network Security, Springer.Wireless Internet Security – Architecture and Protocols", 1st Edition, Cambridge University Press, 2008.

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CY3211PE: SECURE PROTOCOL DESIGN

(PROFESSIONAL ELECTIVE-III)

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY3211PE	PROFESSIONAL ELECTIVE-III	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course objectives:
The main objective of this course is that to explore various protocols and design of various protocols with deeper security.

Course Outcomes:
By the end of the course Student will
1. Get the exposure to various protocols.
2. Gain knowledge on various secure mechanisms through set of protocols.
3. Efficiently design new set of protocols.
4. Learn Security issues and overcome means with protocols.

UNIT – I
OSI: ISO Layer Protocols:-Application Layer Protocols-TCP/IP, HTTP, SHTTP, LDAP, MIME,-POP& POP3-RMON-SNTP-SNMP.
Presentation Layer Protocols-Light Weight Presentation Protocol Session layer protocols.

UNIT – II
RPC protocols-transport layer protocols-ITOT, RDP, RUDP, TALI, TCP/UDP, compressed TCP. Network layer Protocols – routing protocols-border gateway protocol-exterior gateway protocol-internet protocol IPv4- IPv6- Internet Message Control Protocol- IRDP- Transport Layer Security-TSL-SSL-DTLS

UNIT – III
Data Link layer Protocol – ARP – In ARP – IPCP – IPv6CP – RARP – SLIP .Wide Area and Network Protocols- ATM protocols – Broadband Protocols – Point to Point Protocols – Other WAN Protocols- security issues.

UNIT – IV
Local Area Network and LAN Protocols – ETHERNET Protocols – VLAN protocols – Wireless LAN Protocols – Metropolitan Area Network Protocol – Storage Area Network and SAN

UNIT – V
Protocols -FDMA, WIFI and WIMAX Protocols- security issues. Mobile IP – Mobile Support Protoco for IPv4 and IPv6 – Resource Reservation Protocol. Multi- casting Protocol – VGMP IGMP – MSDP .Network Security and Technologies and Protocols – AAA Protocols – Tunneling Protocols – Secured Routing Protocols – GRE- Generic Routing Encapsulation – IPSEC – Security.

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TEXT BOOKS:

1. Jawin: "NetworksProtocols Handbook",3rdEdition,Jawin
Technologies Inc., 2005.
2. Bruce Potter and Bob Fleck: "802.11 Security", 1st Edition, O'Reilly Publications, 2002.

REFERENCES:

1. Ralph Oppliger :"SSL and TSL: Theory and Practice", 1st Edition, Arttech House, 2009.
2. Lawrence Harte: "Introduction to CDMA- Network services Technologies and
Operations", 1st Edition, Althos Publishing, 2004.
3. Lawrence Harte: "Introduction to WIMAX", 1st Edition, Althos Publishing, 2005.

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CS3211OE: INTRODUCTION TO DATA SCIENCE
(Open Elective- I)

III-II: CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CS3211OE	Open Elective- I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:

- Learn data science project concepts
- Learn to collect data and process
- Learn to visualize data

Course Outcomes:

- Able to collect data from various resources and process data
- Able to plot data using various methods
- Able to develop and evaluate models

Unit – I: Introduction

Introduction to Data Science – Evolution of Data Science – Data Science Roles – Stages in a Data Science Project – Applications of Data Science in various fields – Data Security Issues.

Unit – II: Data Collection and Data Pre-Processing

Data Collection Strategies– Data Pre-Processing Overview – Data Cleaning – DataIntegration and Transformation – Data Reduction – Data Discretization.

Unit – III: Exploratory Data Analytics

DescriptiveStatistics – Mean, StandardDeviation, Skewness and Kurtosis – Box Plots – Pivot Table – Heat Map – Correlation Statistics – ANOVA.

Unit – IV: Model Development

Simple and Multiple Regression – Model Evaluation using Visualization – Residual Plot Distribution Plot – Polynomial Regression and Pipelines – Measures for In-sampleEvaluation – Prediction and Decision Making.

Unit – V: Model Evaluation

Generalization Error – Out-of-Sample Evaluation Metrics – Cross Validation – Over fitting Under Fitting and Model Selection – Prediction by using Ridge Regression – Testing multiple Parameters by using Grid Search.

REFERENCES:

1. Jojo Moolayil, "Smarter Decisions: The Intersection of IoT and Data Science", PACKT 2016.

2. Cathy O'Neil and Rachel Schutt, "Doing Data Science", O'Reilly, 2015.

3. David Dietrich, Barry Heller, Beibei Yang, "Data Science and Big data Analytics", EMC 2013

4. Raj, Pethuru, "Handbook of Research on Cloud Infrastructures for Big DataAnalytics", IGI Global.

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CS3212OE: DATA MINING
(Open Elective- I)

III-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CS3212OE	**Open Elective- I**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**			**Total Classes:60**			
Prerequisites								

Course Objectives:
- Learn data mining concepts understand association rules mining.
- Discuss classification algorithms learn how data is grouped using clustering techniques.
- To develop the abilities of critical analysis to data mining systems and applications.
- To implement practical and theoretical understanding of the technologies for data mining
- To understand the strengths and limitations of various data mining models

Course Outcomes:
- Ability to perform the preprocessing of data and apply mining techniques on it.
- Ability to identify the association rules, classification and cluster large datasets.
- Ability to solve real world problems in business and scientific information using data mining
- Ability to classify web pages, extracting knowledge from the web

UNIT-I
IntroductiontoDataMining:Introduction,WhatisDataMining,Definition,KDD,Challenges,DataMiningTasks,DataPreprocessing,DataCleaning,Missingdata,Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, DataTransformation;Measures of Similarity and Dissimilarity-Basics.

UNIT-II
AssociationRules:ProblemDefinition,FrequentItemSetGeneration,TheAPRIORIPrinciple,SupportandConfidenceMeasures,AssociationRuleGeneration;APRIOIRIAlgorithm,the Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set-Maximal Frequent Item Set, Closed Frequent Item Set.

UNIT-III
Classification: Problem Definition, General Approaches to solving a classification problem ,EvaluationofClassifiers,Classificationtechniques,DecisionTrees-DecisiontreeConstruction , Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction;Naive-BayesClassifier,BayesianBeliefNetworks;K-Nearestneighborclassification-AlgorithmandCharacteristics.

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UNIT-IV
Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, PartitioningClustering-K-MeansAlgorithm,K-MeansAdditionalissues,PAMAlgorithm; HierarchicalClustering-AgglomerativeMethodsanddivisivemethods,Basic AgglomerativeHierarchicalClusteringAlgorithm,Specifictechniques, KeyIssuesinHierarchicalClustering,StrengthsandWeakness;OutlierDetection.

UNIT-V
WebandTextMining: Introduction,webmining, web contentmining,webstructuremining,we usage mining, Text mining –unstructured text, episode rule discovery for texts,hierarchy of categories, text clustering.

TEXTBOOKS:
1. DataMining-ConceptsandTechniques-JiaweiHan,Micheline Kamber,MorganKaufmannPublishers, Elsevier,2Edition,2006.
2. IntroductiontoDataMining,Pang-NingTan,VipinKumar,MichaelSteinbanch, PearsonEducation.
3. DataminingTechniquesandApplications,HongboDuCengageIndiaPublishing

REFERENCEBOOKS:
1. Data Mining Techniques, Arun K Pujari, 3rdEdition, UniversitiesPress.
2. DataMiningPrinciples&Applications–T.VSvereshKumar,B.EswareReddy,Jagadish SKalimani,Elsevier.
3. DataMining, VikaramPudi,PRadhaKrishna,OxfordUniversityPress

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CS3213OE: COMPUTER FORENSICS
(Open Elective- I)

III-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CS3213OE	**Open Elective- I**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites								

B.Tech. III Year II SEM

Course Objectives:
- **T**o understand the cyberspace.
- To understand the **forensics** fundamentals.
- To understand the evidence capturing process.
- To understand the preservation of **digital** evidence.

Course Outcomes:

- Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics.

UNIT-I

Computer Forensics Fundamentals:
What is Computer Forensics?

ForensicsinLawEnforcement,ComputerForensicsAssistancetoHumanResources/ Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement — Computer Forensic Technology — Types of Business Computer Forensic Technology Computer Forensics Evidence and Capture: Data Recovery Defined — Data Back-up and Recovery — The Role of Back-up in Data Recovery — The Data-Recovery Solution.

UNIT-II

Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options —Obstacles — Types of Evidence — The Rules of Evidence — Volatile Evidence — General Procedure — Collection and Archiving — Methods of Collection — Artifacts — Collection Steps — Controlling Contamination: The Chain of Custody Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene —Computer Evidence Processing Steps — Legal Aspects of Collecting and Preserving Computer Forensic Evidence ComputerImageVerificationandAuthentication:SpecialNeedsofEvidentialAuthent ication—PracticalConsideration—PracticalImplementation.

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UNIT-III
Computer Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions**NetworkForensics:**Network for ensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools,examining the honey netproject.

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence inprivate-sector incident scenes, processing law enforcement crime scenes, preparing for asearch, securing a computer incident or crime scene, seizingdigitalevidenceatthescene,storingdigitalevidence, obtainingadigitalhash,reviewingacase

UNIT-IV
CurrentComputerForensictools: evaluatingcomputerforensictoolneeds, computer for ensicss oftwaretools, computer forensics hardware tools, validating and testing forensicssoftware E-Mail Investigations: Exploring the role of e-mail in investigation, exploring therolesoftheclientandserverine-mail, investigatinge-mailcrimesandviolations,understandinge-mailservers, usingspecializede-mailforensic tools.

Cellphoneandmobiledeviceforensics: Understandingmobiledeviceforensics, understanding acquisition procedures for cellphones and mobile devices.

UNIT-V
WorkingwithWindowsandDOSSystems: understanding filesystems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption,Windowsregistry,Microsoftstartuptasks,MS-DOSstartuptasks, virtualmachines.

TEXTBOOKS
1. ComputerForensics, Computer CrimeInvestigation byJohnR.Vacca,Firewall Media,New Delhi.
2. ComputerForensicsandInvestigationsbyNelson,PhillipsEnfinger,Steuart, CENGAGELearning

REFERENCEBOOKS
1. RealDigitalForensicsbyKeithJ.Jones,RichardBejtiich,CurtisW.Rose,Addison-WesleyPearsonEducation
2. ForensicCompiling,A Tractitioneris Guide byTonySammesandBrianJenkinson,SpringerInternationaledition.
3. ComputerEvidenceCollection&PresentationbyChristopherL.T.Brown,Fire wall Media.
4. HomelandSecurity, Techniques&TechnologiesbyJesusMena, FirewallMedia.
5. SoftwareForensicsCollectingEvidencefromtheSceneofaDigitalCrimebyRobert M.Slade,TMH 2005
6. WindowsForensicsbyChadSteel, Wiley India Edition.

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EE3211OE: ELECTRICAL INSTALLATION AND COSTING
(Open Elective- I)

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
EE3211OE	Open Elective- I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: BasicElectricalEngineering								

Course Objectives:

- To emphasize the estimation and costing aspects of all electricalequipment, installation and designs on the costviability.
- To design and estimation of wiring
- To design over head and underground distributionlines, substations and illumination

Course Outcomes: AfterCompletionofthiscourse,student will be able to

- Understand the design considerations of electrical installations.
- Design electrical installation for buildings and smallindustries.
- Identify and design the various types of light sources for different applications.

UNIT-I
Design Considerations of Electrical Installations: Electric Supply System, Three phasefourwire distribution system, Protection of Electric Installation against over load,shortcircuitandEarthfault,Earthing,
Generalrequirementsofelectricalinstallations, testingofinstallations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems ofwiring, Service connections ,ServiceMains,Sub-Circuits,LocationofOutlets,Location
ofControlSwitches,LocationofMainBoardandDistributionboard,GuidelinesforInstallati onof Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating andcostingofElectricinstallations.

UNIT-II
Electrical Installation for Different Types of Buildings and Small Industries:
Electricalinstallationsforresidentialbuildings–
estimatingandcostingofmaterial,Electrical installations for commercialbuildings, Electricalinstallationsforsmallindustries.

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UNIT-III

OverheadandUndergroundTransmissionandDistributionLines: Introduction, Supports for transmission lines, Distribution lines – Materials used, Underground cables, Mechanical Designofoverheadlines, Design of underground cables.

UNIT-IV

Substations: Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoor substations–Floormountedtype.

UNIT-V

DesignofIlluminationSchemes: Introduction,Terminology in illumination, lawsofillumination,
varioustypesoflightsources,PracticallightingschemesLED,CFLandOCFLdifferences.

TextBooks:
1. "K.B.Raina, S.K.Bhattacharya","ElectricalDesignEstimatingandCosting",NewAgeInternationalPublisher,2010.
2. "Er.V.K.Jain, Er.AmitabhBajaj","DesignofElectricalInstallations",UniversitySciencePress.

ReferenceBooks:
1. CodeofpracticeforElectricalwiringinstallations,(Systemvoltagenotexceeding650 volts),IndianStandardInstitution,IS:732-1983.
2. GuideforElectricallayout inresidentialbuildings, IndianStandardInstitution,IS: 4648-1968.
3. Electrical Installation buildings Indian Standard Institution, IS: 2032.
4. CodeofPracticeforselection, InstallationofMaintenanceoffuse (voltagenotexceeding650V), IndianStandardInstitution,IS: 3106-1966.
5. CodeofPracticeforearthling, IndianStandardInstitution, IS: 3043-1966.
6. CodeofPractice forInstallationandMaintenanceofinductionmotors, IndianStandardInstitution, IS: 900-1965.
7. CodeofPracticeforelectricalwiring, Installations (systemvoltagenotexceeding650Volts), IndianStandardInstitution, IS: 2274-1963.
8. "GuptaJ.B. Katson, Ludhiana","Electrical Installation,estimatingandcosting",S.K.Katariaandsons,2013.

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EE3212OE: ELECTRICAL ENGINEERING MATERIALS
(Open Elective- I)

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
EE3212OE	Open Elective- I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: EngineeringchemistryandEngineeringPhysics-II								

Course Objective:

- To understand the importance of various materials use d in electrical engineering and obtain a qualitative analysis of the irbehavior and applications.

Course Outcomes: After completion of this course,the student will be able to

- Understand various types of dielectricmaterials, their properties in various conditions.
- Evaluate magnetic materials and their behavior.
- Evaluate semiconductormaterials and technologies.
- AcquireKnowledge on Materials use dinelectricalengineering and applications.

UNIT-I

Dielectric Materials: Dielectric as Electric Field Medium, leakage currents, dielectric

loss,dielectricstrength,breakdownvoltage,breakdowninsoliddielectrics,flashover,liquid dielectrics,electricconductivityinsolid,liquidandgaseousdielectrics,Ferromagneticmate rials, properties of ferromagnetic materials in static fields, spontaneous, polarization,curiepoint,   anti-ferromagneticmaterials,   piezoelectricmaterials, pyroelectricmaterials.

UNIT– II

Magnetic Materials: Classification of magnetic materials, spontaneous magnetization inferromagnetic materials, magnetic Anisotropy, Magnetostriction, diamagnetism,magneticallysoftandhardmaterials,

specialpurposematerials,feeblymagneticmaterials,Ferrites,castandcermetpermanent magnets, ageingofmagnets.Factors effectingpermeability andhysteresis

UNIT–III

SemiconductorMaterials: Propertiesofsemiconductors,Siliconwafers,integration techniques,Large andverylargescaleintegrationtechniques(VLSI)

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UNIT– IV

Materials for Electrical Applications: Materials used for Resistors, rheostats, heaters,transmission line structures, stranded conductors, bimetals fuses, soft and hard solders,electriccontact materials, electric carbon materials, thermocouple materials.Solid,Liquidand Gaseousinsulatingmaterials, Effectofmoistureoninsulation.

UNIT– V

SpecialPurposeMaterials: RefractoryMaterials,StructuralMaterials,Radioactive Materials,Galvanization and Impregnation of materials, Processing of electronic materials, Insulatingvarnishes and coolants, Properties and applications of mineral oils, Testing of Transformeroilas perISI.

TextBooks:

1. "RKRajput","AcourseinElectricalEngineeringMaterials",LaxmiPublications,2009
2. "TKBasak","AcourseinElectricalEngineeringMaterials",NewAgeSciencePublicatio ns2009

ReferenceBooks:

1. TTTIMadras,"ElectricalEngineeringMaterials",McGrawHillEducation, 2004.
2. "AdrianusJ.Dekker", ElectricalEngineeringMaterials, PHIPublication, 2006.
3. S.P.Seth, P.V.Gupta"AcourseinElectricalEngineeringMaterials", DhanpatRai&Sons, 2011.

EC3211OE: FUNDAMENTALS OF INTERNET OF THINGS
(Open Elective- I)

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
EC3211OE	Open Elective- I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: EngineeringchemistryandEngineeringPhysics-II								

Course Objectives:

1. Understand the concepts of Internet of Thing sand able to buildIoTapplications
2. Learn the programming and use ofArduino and RaspberryPiboards.
3. Known aboutdata handling and analyticsinSDN.

Course Outcomes: Upon completingthiscourse,the studentwillbe able to

1. Known basicprotocols in sensornetworks.
2. Program and configureArduino boardsforvariousdesigns.
3. Python programming and interfacingforRaspberryPi.
4. Design IoTapplicationsin differentdomains.

UNIT–I

Introductionto InternetofThings, Characteristics ofIoT, Physicaldesign ofIoT, Functional blocksof

IoT, Sensing, Actuation, Basics of Networking, Communication Protocols, Sensor Networks.

UNIT- II

Machine-to-Machine Communications, Difference between IoTand M2M, Interoperabilityin

IoT, Introduction to Arduino Programming, Integration ofSensorsand Actuatorswith Arduino,

UNIT–III

Introduction toPython programming, IntroductiontoRaspberryPi, Interfacing RaspberryPi with basic peripherals, Implementation of IoTwithRaspberryPi

UNIT-IV

Implementation ofIoTwith RaspberryPi, Introduction to Software defined Network (SDN), SDN for IoT, Data Handling and Analytics,

UNIT-V

Cloud Computing, Sensor-Cloud, SmartCitiesand SmartHomes, Connected Vehicles, SmartGrid, Industrial IoT, Case Study: Agriculture, Health care,Activity Monitoring

TEXTBOOKS:

1. "The Internet'ofThings: EnablingTechnologies, Platforms, and Use Cases", byPethuruRaj and AnupamaC. Raman (CRC Press)
2. "Make sensors": Terokarvinen, kemokarvinen and villeyvaltokari, 1stedition, makermedia2014.
3. "InternetofThings:AHands-on Approach",byArshdeepBahgaand VijayMadisetti

REFERENCEBOOKS:

1. VijayMadisetti,ArshdeepBahga,"InternetofThings:AHands-On Approach"
2. WaltenegusDargie,ChristianPoellabauer,"FundamentalsofWirelessSensorNetworks: TheoryandPractice"
3. Beginning Sensornetworkswith Arduino and RaspberryPi–CharlesBell,Apress,2013

ME3211OE: OPERATIONS RESEARCH
(Open Elective- I)

III-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
ME3211OE	**Open Elective- I**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:	**None**							

Course Objectives: Understanding the maticalimportance of development of model in a particular optimization model for the issue and solving it.

Course Outcome: Understanding the problem, identifying variables& constants, Formulation of optimization model and pplyingappropriate optimizationtechnique

UNIT.I

Development-definition-characteristics and phases-Types of models-Operations Researchmodels-applications.
Allocation: Linear Programming Problem Formulation-Graphicalsolution- Simplex method-Artificialvariabletechniques: Two-phasemethod,Big-Mmethod.

UNIT.II

Transportationproblem – Formulation-Optimalsolution, unbalanced transportationproblem-Degeneracy.
Assignment problem- Formulation-Optimalsolution,-Variants of Assignment problem-Travellingsalesmanproblem.

UNIT.III

Sequencing.Introduction-Flow-Shop sequencing-njobsthroughtwo machines–njobsthroughthreemachines-Jobshopsequencing-twojobsthrough'm'machines–graphicalmodelReplacement:Introduction-Replacementofitemsthatdeterioratewithtime-whenmoneyvalueisnotcountedandcounted-Replacementofitemsthatfailcompletely-GroupReplacement.

UNIT.IV

Theory of Games: Introduction- Terminology- Solution of games with saddle points and withoutsaddlepoints.2x2games-dominanceprinciple-mx2&2xngames-Graphicalmethod.

Inventory: Introduction- Single item, Deterministic models- purchase inventory models with oneprice break and multiple pricebreaks-Stochasticmodels -Demand maybediscretevariable orcontinuousvariable-singleperiodmodelandnosetupcost.

UNIT.V

Waiting lines: Introduction- Terminology- Singlechannel- Poisson arrivals and Exponentialservicetimeswithinfinitepopulationandfinitepopulationmodels.

Dynamic Programming: Introduction- Terminology, Bellman'sprinciple of optimality ApplicationsofDynamicprogramming-shortestpathproblem-linearprogrammingproblem.

TEXTBOOK:
1. OperationsResearch/J.K.Sharma/MacMilan
2. IntroductiontoOR/Hillier&Libemann/TMH

REFERENCE BOOKS:
1. IntroductiontoOR/Taha/PHI
2. OperationsResearch/NVSRaju/SMSEducation/3rdRevised Edition
3. OperationsResearch/A.M.Natarajan,P.Balasubramaniam,A.Tamilarasi/PearsonEducation.

ME3212OE: FUNDAMENTALS OF MECHANICAL ENGINEERING
(Open Elective- I)

III-II:CSE(CS)							
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**	
ME3212OE	**Open Elective- I**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**	
Prerequisites:	**None**						

Objectives:

To understand the fundamentals of mechanical systems.
To understand and appreciate significance of mechanicalengineering in different Fields of engineering.

UNIT-I

Introduction: Prime movers and its types, Concept of Force, Pressure, Energy, Work, Power,System, Heat, Temperature, Specific heat capacity, Change of state, Path, Process, Cycle, Internalenergy, Enthalpy, Statements of ZerothLawandFirstlaw.
Energy: Introduction and applications of Energy sources like Fossil fuels, nuclear fuels, Hydel, Solar, wind and bio-fuels, Environmental issues like Globalwarming and Ozonedepletion.

UNIT-II

Propertiesofgases:Gaslaws,Boyle'slaw,Charle'slaw,Combinedgaslaw,Gasconstant,Relation between Cp and Cv, Various non-flow processes like constant volume process, constantpressureprocess,Isothermalprocess,Adiabaticprocess,Poly-tropicprocess
Propertiesof Steam: Steamformation, Types of Steam, Enthalpy, Specificvolume,Internal energy and dryness fraction of steam, use of Steamtables, steamcalorimeters.
SteamBoilers: Introduction, Classification, Cochran, Lancashireand Babcockand Wilcoxboiler,functioning of differentmountingsandaccessories.

UNIT-III

Heat Engines: Heat Engine cycle and Heat Engine, working substances, Classification of heatengines, Description andthermalefficiencyofCarnot; Rankine; Ottocycle and Dieselcycles.
Internal Combustion Engines: Introduction, Classification, Engine

details, four- stroke/two-strokecyclePetrol/Dieselengines,
Indicated power, BrakePower, Efficiencies.

UNIT-IV
Pumps: Types and operationofReciprocating, Rotary and
Centrifugalpumps, Priming
AirCompressors: Types and operationof Reciprocating and Rotary air
compressors, significance of Multistage.
Refrigeration & Air Conditioning: Refrigerant, Vapor compression
refrigeration system, vaporabsorptionrefrigerationsystem,
DomesticRefrigerator,Window and splitairconditioners.

UNIT-V
Couplings, Clutches and Brakes: Construction and applications of
Couplings (Box; Flange; Pintype flexible; Universal and Oldham),
Clutches (Disc and Centrifugal), and Brakes (Block; Shoe;Band
and Disc).
Transmission of Motion and Power: Shaft and axle, Belt drive, Chain
drive, Friction drive, Geardrive.
EngineeringMaterials:TypesandapplicationsofFerrous&Nonferrousmet
als,Timber,Abrasivematerial,silica,ceramics,glass,graphite,diamond,pl
asticandpolymer.

TEXTBOOKS:
1. BasicMechanicalEngineering/PravinKumar/Pearson
2. IntroductiontoEngineeringMaterials/B.K.Agrawal/McGraw
   Hill

REFERENCEBOOKS:
1. FundamentalofMechanicalEngineering/G.S.Sawhney/PHI
2. ThermalScienceandEngineering/Dr.D.S.Kumar/Kataria

ME3213OE: METALLURGY OF NONMETALLURGISTS
(Open Elective- I)

III-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
ME3213OE	Open Elective- I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: None								

Course Objectives:
- To describethe basicprinciples of metallurgy and theimportance of metallurgy invarious discipline of engineering.
- Gain athorough knowledge about heat treatment of steels.
- Gain knowledge about properties and uses of cast irons and non-ferrous metals.
- Gaina workingknowledge of basic testing methods for metals.

Course Outcomes:
At the end of the course Student would be able
- To use and apply metallurgy in his own branch of engineering.
- The student will be able to justify the various testing methods adopted for metals.

UNIT-I
Introduction: Crystalstructure and defects, Crystalstructure of metals, Classification of steels, Carbon steels.
EngineeringMaterials:TypesandapplicationsofFerrous&Nonferrousmetals,Timber,Abrasivematerial,silica,ceramics,glass,graphite,diamond,plasticandpolymer.

UNIT-II
Heat Treatment of Steels: The Iron carbon systems, Common phases in steels, Annealing, Normalizing, Hardening and tempering.

UNIT-III
Castirons: Properties and applications of Ductile irons, Malleableirons, Compacted graphiteiron.

UNIT-IV

NonFerrousMetals: Properties and applications of LightMetals (Al,Be,Mg,Ti), Superalloys.

UNIT-V

TestingofMetals: Hardnesstesting, TensileTesting, ImpactTesting, FatigueTesting.

TEXTBOOKS:

1. MaterialsScienceandEngineering,An introduction.WDCallister,Jr.,AdaptedbyR.Balasubraman iam,JohnWiley&Sons,NY,Indianedition,2007
2. IntroductiontoPhysicalMetallurgy–SHAvner,TATAMcGRAWHILL,1997
3. MechanicalMetallurgy–G.E.Dieter

REFERENCEBOOKS:

1. EngineeringPhysicalMetallurgyandHeattreatment–YLakhtin
2. C.Suryanarayana,ExperimentalTechniquesinMechanicsan dMaterials,JohnWiley,JohnWiley,NJ,USA,2006
3. FoundationsofMaterialsScienceandEngineering–WFSmith

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CE3211OE: BASICS OF CIVIL ENGINEERING
(OpenElective–I)

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III-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CE3211OE	**Open Elective- I**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites: None								

Course objectives: The objectives of the courseare:

- To explain the concepts of CivilEngineering.
- ToUnderstand the Building Materials for construction
- To understand the concept of Transportation
- To explain theSoilCharacteristics for best foundation
- To know the Drinkingwater Standards&Water TreatmentUnits.

Course Outcomes: On successfulcompletion of this course students should be able to:

- Identify dif ferent types of building materials for construction.
- Discuss types of Traffic FlowCharacteristics.
- To know the soil classification and its properties.
- Distinguish and understand Drinkingwater and Wastewaterproperties.

UNIT-I

BuildingMaterials forConstruction

Bricks&Cement: qualities of goodbricks, types of brick, ingredients of cement, types of cement, Grade of cement.

Concrete&Steel: Properties of cementconcrete, types of concrete based on usage&propertiesanduses of various types of steel, Admixtures.

Buildingcomponents: lintels, walls, staircases types of floors, types of roofs, doors,windows-material-types,Finishers-Plastering, Painting, Tiles.

UNIT-II
TransportationEngineering
Highway: History and Importance of Highways, Classification of roads, highway crosssection, types of Pavement.

Traffic: Roadsafety-
Trafficsignals&itstypes.Roadintersections&itstypes.Railway
: Permanent way, Componentsparts itsfunctions.

Airway: Typical Airportlayout, Factors forairportsiteselection.

UNIT–IIIGeotechnicalEngineering

Soilformationanditsthree phase diagram, I.S.Classification of soils.Permeability&itsFactorsaffecting, capillaryrise.Compaction–factors affectingcompaction.

Geology- Different t ypes& its properties ofRocks &Minerals.

UNIT-IV
WaterResources&IrrigationEngineering

Hydrologiccycle, Forms of precipitation, measurement of precipitation by Symons rain gauge.

Abstractionsfromprecipitation: Infiltration, Evaporation&Runoff&their Factors affecting.

Irrigation: Water requirementofcrops, canal &itslosses, Types of lining-Advantagesanddisadvantages.

Types of dams,Factors affecting selection of adamsite.Tunneling-Purposesoftunneling.

UNIT–V
EnvironmentalEngineering

DrinkingWater: types ofwaterdemand–factorsaffectingwaterqualityandtesting–drinkingwaterstandards.Layoutandgeneral outlineof watertreatment units.

Wastewater: Waste water

treatmentplantFlowdiagram.Wastewatercollection,manholes&housedrainage.

Air&Sound pollution – Effects&Controllingmethods.

TEXTBOOKS

1. BuildingConstructionbyB.C.Punmia, AshokKumarJainandArunKumarJain–Laxmi Publications (P) ltd., NewDelhi.

2. Transportation EngineeringbyKhanna&Justo

3. GeotechnicalEngineeringbyArora

4. WaterResources&Irrigation EngineeringbySK Garg

5. EnvironmentalEngineeringbyDr.B.C.Punmia

CE3212OE: BUILDING MATERIALS AND CONSTRUCTION

(OpenElective–I)

III-II: CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CE3212OE	**Open Elective- I**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites: None								

Course Objectives: The objectives of the courseis to

- List the construction material.

- Explain different construction techniques

- Understand the building bye-laws

- Highlight the smart buildingmaterials

Course Outcomes: After the completion of the course student should be able to

- Define theBasic terminology that is used in theindustry

- Categorize different building materials,properties and theiruses

Unit-I

Cement: Introduction, ingredients of cement, types of cement, cementmortaruses.

Concrete: Properties ofcementconcrete, materials, standard concrete mixproportions, curing of concrete, methods-effects of improper curing.

Unit-II

Bricks&Bricksmasonry: qualities of goodbricks, types of bricks,brick masonry and types of brick masonry

Timber: Structure of a tree, defects in timber, seasoning of timber, qualities of good timber, important Indian timber trees.

Unit-III

ConstructionMaterials: Stone-typeofbuildingstones, glass-typesbasedonusage, plastics-advantagesand disadvantages, uses, ceramics-types usedin

buildingindustry.

Structuralsteel: properties and uses of various types of steel, types.Girders-types&uses

Unit-IV

Buildingcomponents: lintels, walls, staircases, types of floors, types of roofs, doors, windows-material-types.

Fireprotection: hazards, classificationoffireresistantmaterialsandconstructions.

Unit-V

Buildingplanning: principles of buildingplanning, classification of buildingsandbuildingbylaws. Building Services: Plumbing-water distribution, sanitary-lines and fittings, ventilations: functional requirements, system of ventilations.

TEXTBOOKS:

1. BuildingMaterialsand Construction–Arora&Bindra, DhanpatRoy Publications.

2. BuildingMaterialsand ConstructionbyGCSahu, JoygopalJenaMcGraw hillPvtLtd2015.

3. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - LaxmiPublications (P) ltd., New Delhi.

REFERENCEBOOKS:

1. BuildingMaterialsbyDuggal, NewAge International.

2. BuildingMaterialsbyP.C.Varghese,PHI.

3. BuildingConstructionbyPCVarghesePHI.

4. ConstructionTechnology– Vol–I& IIbyR.Chubby, Longman UK.

5. Alternate BuildingMaterials and Technology, Jagadish, VenkataramaReddyandothers; NewAgePublications.

CY3204PC: ETHICAL HACKING LAB

II-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY3204PC	**Core**	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes:NIL	**Tutorial classes:NIL**	**Practical classes: 36**				**Total Classes:36**		
Prerequisites:								

1. Use Google and Who is for Reconnaissance..
2. Use cryptool to encrypt and decrypt passwords using RC4 algorithm..
3. Using Trace Route, ping, if config, net stat Command.
4. Using Nmap scanner to perform port scanning of various forms – ACK, SYN, FIN, NULL, XMAS.
5. Use Wire Shark sniffer to capture network traffic and analyze.
6. Simulate persistent Cross Site Scripting attack.
7. Perform session impersonation
8. Perform SQL injection attack
9. Create a simple key logger using python.

CY3205PC: COMPILER DESIGN LAB

III-II:CSE(CS)							
Course Code	Category	Hours/Weak			Credits	Max Marks	
CY3205PC	Core	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes:NIL	Tutorial classes:NIL	Practical classes: 36				Total Classes:36	
Prerequisites:							

List of Experiments

Compiler Design Experiments

1. Write a LEX Program to scan reserved word & Identifiers of C Language
2. Implement Predictive Parsing algorithm
3. Write a C program to generate three address code.
4. Implement SLR(1) Parsing algorithm
5. Design LALR bottom up parser for the given language

```
 <program> ::= <block>
<block> ::= { <variabledefinition> <slist> }
      | { <slist> }
<variabledefinition> ::= int <vardeflist> ;
<vardeflist> ::= <vardec> | <vardec> , <vardeflist>
<vardec> ::= <identifier> | <identifier> [ <constant> ]
<slist> ::= <statement> | <statement> ; <slist>
<statement> ::= <assignment> | <ifstatement> | <whilestatement>
        | <block> | <printstatement> | <empty>
<assignment> ::= <identifier> = <expression>
      | <identifier> [ <expression> ] = <expression>
<ifstatement> ::= if <bexpression> then <slist> else <slist> endif
        | if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist> enddo
<printstatement> ::= print ( <expression> )
<expression> ::= <expression> <addingop> <term> | <term> | <addingop> <term>
<bexpression> ::= <expression> <relop> <expression>

<relop> ::= < | <= | == | >= | > | !=
<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [ <expression>]
    | ( <expression> )
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit> ::= 0|1|2|3|4|5|6|7|8|9
<empty>
```

<div align="center">**CY3206PC: SOFTWARE ENGINEERING LAB**</div>

III-II:CSE(CS)							
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**	
CY3205PC	**Core**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		0	**0**	**3**	**1.5**	**30**	**70**	**100**
Contact Classes:NIL	**Tutorial classes:NIL**	**Practical classes: 36**				**Total Classes:36**	
Prerequisites:							

Course Objectives:
- To have hands on experience in developing a software project by using various softwareengineering principles and methods in each of the phases of software development.

Course Outcomes:
- Ability to translate end-user requirements into system and software requirements
- Ability to generate a high-level design of the system from the software requirements
- Will have experience and/or awareness of testing problems and will be able to develop a simpletesting report

List of Experiments
Do the following 8 exercises for any two projects given in the list of sample projects or any otherprojects:

1. Development of problem statement.
2. Preparation of Software Requirement Specification Document, Design Documents and TestingPhase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

Sample Projects:
1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TEXT BOOKS:
1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw HillInternational Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson,Pearson Education.

MC3002: ARTIFICIAL INTELLIGENCE

III-II:CSE(CS)							
Course Code	Category	Hours/Weak			Credits	Max Marks	
MC3002	Mandatory Course	L	T	P	C	CIE	SEE	Total
		3	0	0	0	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60	
Prerequisites: None							

Course Objectives: To train the students to understand different types of AI agents, various AI search algorithms, fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation, reasoning. Study of Markov Models enable the student ready to step into applied AI.

UNIT - I
Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents
Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II
Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning
Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III
Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Non-monotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, acting under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV
Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V
Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOK:
1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice-Hall, 2010.

REFERENCE BOOKS:
1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

CY4101PC: MACHINE LEARNING

IV-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
MC3002	Mandatory Course	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: Data Structures,Knowledge on statistical methods								

Course Objectives
- This course explains machine learning techniques such as decision tree learning, Bayesianlearning etc.
- To understand computational learning theory.
- To study the pattern comparison techniques.

Course Outcomes
- Understand the concepts of computational intelligence like machine learning
- Ability to get the skill to apply machine learning techniques to address the real time problemsin different areas
- Understand the Neural Networks and its usage in machine learning application.

UNIT - I
Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning
Concept learning and the general to specific ordering – introduction, a concept learning task, concept learning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias**.**
Decision Tree Learning – Introduction, decision tree representation, appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning.

UNIT - II
Artificial Neural Networks-1– Introduction, neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm.
Artificial Neural Networks-2- Remarks on the Back-Propagation algorithm, An illustrative example: face recognition, advanced topics in artificial neural networks.
Evaluation Hypotheses – Motivation, estimation hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, difference in error of two hypotheses, comparing learning algorithms.

UNIT - III
Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, an example: learning to classify text, Bayesian belief networks, the EM algorithm.
Computational learning theory – Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis space, sample complexity for infinite

hypothesis spaces, the mistake bound model of learning.

Instance-Based Learning- Introduction, *k*-nearest neighbour algorithm, locally weighted regression, radial basis functions, case-based reasoning, remarks on lazy and eager learning.

UNIT- IV

Genetic Algorithms – Motivation, Genetic algorithms, an illustrative example, hypothesis space search, genetic programming, models of evolution and learning, parallelizing genetic algorithms.

Learning Sets of Rules – Introduction, sequential covering algorithms, learning rule sets: summary, learning First-Order rules, learning sets of First-Order rules: FOIL, Induction as inverted deduction, inverting resolution.

Reinforcement Learning – Introduction, the learning task, *Q*–learning, non-deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programming.

UNIT - V

Analytical Learning-1- Introduction, learning with perfect domain theories: PROLOG-EBG, remarkson explanation-based learning, explanation-based learning of search control knowledge.

Analytical Learning-2- Using prior knowledge to alter the search objective, using prior knowledge toaugment search operators.

Combining Inductive and Analytical Learning-Motivation, inductive-analytical approaches to learning using prior knowledge to initialize the hypothesis.

TEXT BOOK:
  1. Machine Learning – Tom M. Mitchell, - MGH

REFERENCE BOOK:
  1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

CY4102PC: CYBER LAWS AND SECURITY POLICIES

IV-I: CSE(CS)							
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY4102PC	Mandatory Course	L	T	P	C	CIE	SEE	Total
		2	0	0	2	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill			Total Classes:60			
Prerequisites:								

Course Educational Objectives:
The Objectives Of This Course Is To Enable Learner To Understand, Explore, And Acquire A Critical Understanding Cyber Law. Develop Competencies For Dealing With Frauds And Deceptions (Confidence Tricks, Scams) And Other Cyber Crimes For Example, Child Pornography Etc. That Are Taking Place Via The Internet.

Course Outcomes:
- Make Learner Conversant With The Social And Intellectual
- Property Issues Emerging From 'Cyberspace.
- Explore The Legal And Policy Developments In VariousCountries To Regulate Cyberspace;
- Develop The Understanding Of Relationship Between CommerceAnd Cyberspace; And
- Give Learners In Depth Knowledge Of Information Technology Act And Legal Frame Work Of Right To Privacy, Data SecurityAnd Data Protection.
- Make Study On Various Case Studies On Real Time Crimes.

UNIT – I

Introduction to Cyber Law Evolution of Computer Technology: Emergence of Cyber space. Cyber Jurisprudence, Jurisprudence and law, Doctrinal approach, Consensual approach, Real Approach, Cyber Ethics,Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions, Cyberspace-Web space, Web hosting and web Development agreement, Legal and Technological Significance of domain Names, Internet as a tool for global access.

UNIT – II

Information technology Act : Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

UNIT – III

Cyber law and related Legislation : Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution , Online Dispute Resolution (ODR).

UNIT – IV

Electronic Business and legal issues: Evolution and development in E- commerce, paper vs paper less contracts E-Commerce models- B2B, B2C,E security.

Application area: Business, taxation, electronic payments, supply chain, EDI, E-markets, Emerging Trends.

UNIT – V

Case Study On Cyber Crimes: Harassment Via E-Mails, Email Spoofing (Online A Method Of Sending E-Mail Using A False Name Or E-Mail Address To Make It Appear That The E-Mail Comes From Somebody Other Than The True Sender, Cyber Pornography (Exm.MMS),Cyber-Stalking.

TEXT BOOKS:
1. K.Kumar," Cyber Laws: Intellectual property & E Commerce, Security",1st Edition, Dominant Publisher,2011.
2. Rodney D. Ryder, " Guide To Cyber Laws", Second Edition,
3. Wadhwa And Company, New Delhi, 2007.
4. Information Security policy &implementation Issues, NIIT, PHI.

REFERENCES:
1. Vakul Sharma, "Handbook Of Cyber Laws" Macmillan India Ltd,2nd Edition, PHI, 2003.
2. Justice Yatindra Singh, "Cyber Laws", Universal Law Publishing,1st Edition, New Delhi, 2003.
3. Sharma, S.R., "Dimensions Of Cyber Crime", Annual Publications
4. Pvt. Ltd., 1st Edition, 2004.
5. Augastine, Paul T.," Cyber Crimes And Legal Issues", Crecent
6. Publishing Corporation, 2007.

CY4107PE: GRAPH THEORY
(PROFESSIONAL ELECTIVE-IV)

Course Objectives:
- •To learn important classes of graph theoretic problems;
- •To learn central theorems about trees, matching, connectivity.

Course Outcomes:
- •Know some important classes of graph theoretic problems;
- •Be able to formulate and prove central theorems about trees, matching, connectivity, Colouring and planar graphs;
- •Be able to describe and apply some basic algorithms for graphs;
- •Be able to use graph theory as a modelling tool.

UNIT - I

Introduction-Discovery of graphs, Definitions, Subgraphs, Isomorphic graphs, Matrix representations of graphs, Degree of a vertex, Directed walks, paths and cycles, Connectivity in digraphs, Eulerian and Hamilton digraphs, Eulerian digraphs, Hamilton digraphs, Special graphs, Complements, Larger graphs from smaller graphs, Union, Sum, Cartesian Product, Composition, Graphic sequences, Graph theoretic model of the LAN problem, Havel-Hakimi criterion, Realization of a graphic sequence.

UNIT - II

Connected graphs and shortest paths - Walks, trails, paths, cycles, Connected graphs, Distance, Cut-vertices and
cut-edges, Blocks, Connectivity, Weighted graphs and shortest paths, Weighted graphs, Dijkstra"s shortest path algorithm, Floyd-Warshall shortest path algorithm.

UNIT - III

Trees- Definitions and characterizations, Number of trees, Cayley"s formula, Kircho⌐-matrix-tree theorem, Minimum spanning trees, Kruskal"s algorithm, Prim"s algorithm, Special classes of graphs, Bipartite Graphs,
Line Graphs, Chordal Graphs,Eulerian Graphs, Fleury"s algorithm, Chinese Postman problem, Hamilton Graphs, Introduction, Necessary conditions and sufficient conditions.

UNIT - IV

Independent sets coverings and matchings– Introduction, Independent sets and coverings: basic equations, Matchings in bipartite graphs, Hall"s Theorem, K¨onig"s Theorem, Perfect matchings in graphs, Greedy and approximation algorithms.

UNIT - V

Vertex Colorings- Basic definitions, Cliques and chromatic number, Mycielski"s theorem, Greedy coloring algorithm, Coloring of chordal graphs, Brooks theorem, Edge Colorings, Introduction and Basics, Gupta-Vizing theorem, Class-1 and Class-2 graphs, Edge-coloring of bipartite graphs, Class-2 graphs, Hajos union and Class-2 graphs, A scheduling problem and equitable edge-coloring.

TEXT BOOKS:

1. J. A. Bondy and U. S. R. Murty. Graph Theory, volume 244 of Graduate Texts in Mathematics.

   Springer,1st edition, 2008.

2. J. A. Bondy and U. S. R. Murty. Graph Theory with Applications.

REFERENCE BOOKS:

1. Lecture Videos: http://nptel.ac.in/courses/111106050/13
2. Introduction to Graph Theory, Douglas B. West, Pearson.
3. Schaum's Outlines Graph Theory, Balakrishnan, TMH
4. Introduction to Graph Theory, Wilson Robin j, PHI
5. Graph Theory with Applications to Engineering And Computer Science, Narsing Deo, PHI
6. Graphs - An Introductory Approach, Wilson and Watkins

CY4108PE: INTRODUCTION TO EMBEDDED SYSTEMS
(PROFESSIONAL ELECTIVE-IV)

IV-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY4108PE	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

Course Objectives:
- To provide an overview of principles of Embedded System
- To provide a clear understanding of role of firmware, operating systems in correlation with hardware systems.

Course Outcomes:
- Expected to understand the selection procedure of processors in the embedded domain.
- Design procedure of embedded firm ware.
- Expected to visualize the role of realtime operating systems in embedded systems.
- Expected to evaluate the correlation between task synchronization and latency issues

UNIT - I

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification of Embedded Systems, Major application areas, Purpose of E bedded Systems, Characteristics and Quality attributes of Embedded Systems.

UNIT - II

The Typical Embedded System: Core of the Embedded System, Memory, Sensors and Actuators, Communication Interface, Embedded Firmware, Other System components.

UNIT - III

Embedded Firmware Design and Development: Embedded Firmware Design, Embedded Firmware Development Languages, Programming in Embedded C.

UNIT - IV

RTOS Based Embedded System Design: Operating System basics, Types of Operating Systems, Tasks, Process, Threads, Multiprocessing and Multi-tasking, Task Scheduling, Threads-Processes-Scheduling putting them together, Task Communication, Task Synchronization, Device Drivers, How to choose an RTOS

UNIT - V

Integration and Testing of Embedded Hardware and Firmware: Integration of Hardware and Firmware, Boards Bring up

The Embedded System Development Environment: The Integrated Development Environment (IDE), Types of files generated on Cross-Compilation, Disassembler/Decompiler, Simulators, Emulators and Debugging, Target Hardware Debugging, Boundary Scan.

TEXT BOOK:
1. Shibu K V, "Introduction to Embedded Systems", Second Edition, Mc Graw Hill

REFERENCE BOOKS:
1. Rajkamal, Embedded Systems Architecture, Programming and Design, Tata McGraw-Hill
2. Frank Vahid and Tony Givargis, "Embedded Systems Design" - A Unified

Hardware/Software Introduction, John Wiley

3. Lyla, "Embedded Systems" –Pearson

4. David E. Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

CY4109PE: E-COMMERCE
(PROFESSIONAL ELECTIVE-IV)

IV-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY4109PE	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

Course Objectives:
- Identify the major categories and trends of e-commerce applications.
- Identify the essential processes of an e-commerce system.
- Identify several factors and web store requirements needed to succeed in e-commerce.
- Discuss the benefits and trade-offs of various e-commerce clicks and bricksalternatives.
- Understand the main technologies behind e-commerce systems and how these technologies interact.
- Discuss the various marketing strategies for an online business.
- Define various electronic payment types and associated security risks and the ways to protect against them.

Course Outcomes:
- Ability to identify the business relationships between the organizations and their customers
- Ability to perform various transactions like payment, data transfer and etc.

UNIT - I
Electronic Commerce-Framework, anatomy ofE-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT - II
Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems. Inter Organizational Commerce - EDI, EDI Implementation, Value added networks. Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT - III
Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering. Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing

UNIT – IV
Web Marketing Strategies, Communicating with Different Market Segments, Beyond Market Segmentation: Customer Behavior and Relationship Intensity, Advertising on the Web, E- Mail Marketing, Search Engine Positioning and Domain Names, Selling to Businesses Online, Electronic Data Interchange, Supply Chain Management Using Internet Technologies, Electronic Marketplaces and Portals

UNIT - V
E-Business Revenue Models, Revenue Models for Online Business, Changing Strategies: Revenue Models in Transition, Revenue Strategy Issues for Online Businesses, Creating an Effective Business

Presence Online, Web Site Usability, Virtual Communities, Mobile Commerce, Online Auctions

TEXT BOOK:
1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson. (UNITS 1, 2, 3)
2. E-Business by Gary P. Schneider, - Cengage India Learning (UNITS 4, 5)

REFERENCES:
1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
2. E-Commerce, S. Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H. Michael Chang.
4. Electronic Commerce – Gary P. Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C. Taudon, Carol GuyericoTraver.

CY4110PE: CLOUD COMPUTING
(PROFESSIONAL ELECTIVE-IV)

IV-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY4110PE	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

Course Objectives:
- This course provides an insight into cloud computing
- Topics covered include- distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.

Course Outcomes:
- Ability to understand various service delivery models of a cloud computing architecture.
- Ability to understand the ways in which the cloud can be programmed and deployed.
- Understanding cloud service providers.

UNIT - I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT - II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT - III

CloudComputing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT - IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjra soft, Aneka Platform

TEXT BOOK:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej

M. Goscinski, Wiley, 2011.

2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.

CY4111PE: AD-HOC & SENSOR NETWORKS
(PROFESSIONAL ELECTIVE-IV)

IV-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY4111PE	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

Course Objectives:

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for ad hoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

Course Outcomes:

- Ability to understand the state-of-the-art research in the emerging subject of Ad Hoc and Wireless Sensor Networks
- Ability to solve the issues in real-time application development based on ASN.
- Ability to conduct further research in the domain of ASN

UNIT - I

Introduction to AdHocNetworks- Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms, Topology-based routing algorithms-Proactive: DSDV; Reactive: DSR, AODV; Hybrid: ZRP; Position-based routing algorithms-Location Services-DREAM, Quorum-based; Forwarding Strategies: Greedy Packet, Restricted Directional Flooding-DREAM, LAR.

UNIT - II

Data Transmission - Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbor Knowledge-based: SBA, Multipoint Relaying, AHBP. Multicasting: Tree-based: AMRIS, MAODV; Mesh-based: ODMRP, CAMP; Hybrid: AMRoute, MCEDAR.

UNIT - III

Geocasting: Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA, MGR. TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT - IV

Basics of Wireless, Sensors and Lower Layer Issues: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT - V

Upper Layer Issues of WSN: Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications, March 2006, ISBN – 981–256–681–3.
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman).

CY4112PE: CYBER CRIME AND INVESTIGATION
(PROFESSIONAL ELECTIVE - V)

IV-I: CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY4112PE	**Professional Elective-V**	L	T	P	C	CIE	SEE	Total
		3	0	0	3	25	75	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:								

Course Objectives:
To analyze how to conduct a digital forensics investigation and validate forensics data.

Course Outcomes:
1. Understand the fundamentals of cybercrime and issues.
2. Understand different investigation tools for cybercrime.
3. Understand basics of Forensic Technology and Practices.
4. Analyze different laws, ethics and evidence handling procedures.

UNIT - I
Introduction: Introduction and Overview of Cyber Crime, Nature and Scope of Cyber Crime, Types of Cyber Crime: Social Engineering, Categories of Cyber Crime, Property Cyber Crime.

UNIT - II
Cyber Crime Issues: Unauthorized Access to Computers, Computer Intrusions, White collar Crimes, Viruses and Malicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, Software Piracy, Intellectual Property, Mail Bombs, Exploitation, Stalking and Obscenity in Internet.

UNIT - III
Investigation: Introduction to Cyber Crime Investigation, Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Hands on Case Studies. Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.

UNIT - IV
Digital Forensics: Introduction to Digital Forensics, Forensic Software and Hardware, Analysis and Advanced Tools, Forensic Technology and Practices

UNIT - V
Laws and Acts: Laws and Ethics, Digital Evidence Controls, Evidence Handling Procedures, Basics of Indian Evidence ACT IPC and CrPC, Electronic Communication Privacy ACT, Legal Policies.

TEXT BOOKS:
1. Nelson Phillips and Enfinger Steuart, "Computer Forensics and Investigations", Cengage Learning, New Delhi, 2009.
2. Kevin Mandia, Chris Prosise, Matt Pepe, "Incident Response and Computer Forensics ", Tata McGraw -Hill, New Delhi, 2006.

REFERENCE BOOKS:
1. Robert M Slade," Software Forensics", Tata McGraw - Hill, New Delhi, 2005.
2. Bernadette H Schell, Clemens Martin, "Cybercrime", ABC – CLIO Inc, California, 2004.
3. "Understanding Forensics in IT ", NIIT Ltd, 2005

IV-I: CSE(CS)							
Course Code	Category	Hours/Weak			Credits	Max Marks	
CY4113PE	Professional Elective-V	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60	
Prerequisites:							

Course Objectives:
- Introduces the penetration testing basics
- Introduces the Google hacking and searching

Course Outcomes:
- Ability to analyze the web security
- Ability to secure from Google hackers

UNIT-I

Penetration Testing: Introduction, Significance of Penetration Testing, Testing Process, Penetration Testing Scope, Tools for Penetration Testing Various Applications, Pre-engagement, Rules of Engagement, Goal, Scope of Engagement, Timetable, Liabilities and Responsibilities, Non-disclosure Agreements, Emergency Plan, Allowed Techniques, Deliverables, Methodologies-PTES and OWASP Testing, Phases of PTES, Pre-engagement Interactions Phase, Intelligence Gathering Phase, Threat Modeling Phase, Vulnerability Analysis Phase, Validation, Exploitation Phase, Post Exploitation Phase, Reporting- Clients Needs/Wants, Writing Report, Reporting Phase, Report Structure-Executive Summary, Risk Exposure over time, Successful attacks by type, Vulnerabilities by cause, Vulnerability Report, Remediation Report, Information Gathering, Active and Passive Sniffing

UNIT - II
Web App Security: Introduction to Burp Suite and OWASP ZAP, Kali Linux, Cross-Site Scripting (CSS), Web Authentication and Session Management, Mobile Device Security Issue, OSINT Framework

UNIT - III

Google Searching Basics: Exploring Google's Web-based Interface, Google's Web Search Page, Google Web Results Page,Google Groups, Google Image Search, Google Preferences, Language Tools Building Google Queries, Rules of Google Searching, Basic Searching Using Boolean Operators and Special Characters, Search Reduction, Working With Google URLs, URL Syntax, Advanced Operators Syntax, Google's Advanced search Operators, keyword: Intitle, Allintitle, Allintext, Inurl and Allinurl, Site, Filetype, Link, Inanchor, Cache, Numrange, Daterange, Info, Related, Author, Group, Titles, Insubject, Msgid, Stocks

UNIT-IV
Google Hacking: Anonymity with Caches, Directory Listings, Locating Directory Listings, Finding Specific Directories, Finding Specific Files, Server Versioning, Directory Traversal, Incremental Substitution, Extension Walking.

UNIT- V

Sensitive Information Search: Searching for Usernames, Searching for Passwords, Searching for Credit Card Numbers, Social Security Numbers, and Personal Financial Data, Geek Stuff, Utilities, Open Network Devices, Open Applications, Cameras, Sensitive Info, Social Security Numbers, Credit Card Information

Protection from Google Hackers: Web Server Safeguards, Directory Listings and Missing Index Files, Robots.txt: Preventing Caching, NOARCHIVE, NOSNIPPET, Gooscan

REFERENCE BOOKS:

1.   Michael T. Simpson, Kent Backman, James Corley-Ethical Hacking and Network Defence.

2.   Stuart McClure Joel Scambray, Solutions,

3.   Johnny Long , Google Hacking Publishing, Inc. (Elsevier, Inc) George Kurtz -Hacking Exposed—Network Security Secrets & For penetration Testers, Volume 2 by PUBLISHED BY Syngress

4.   Baloch, R., Ethical Hacking and Penetration Testing Guide, CRC Press, 2015.

5.   Beaver, K., Hacking for Dummies, 3rded. John Wiley & sons., 2013.

6.   Council, Ec., Computer Forensics: Investigating Network Intrusions and Cybercrime, Cengage Learning, Second Edition, 2010

7.   McClure S., Scambray J., and Kurtz G, Hacking Exposed. Tata McGraw-Hill Education, 6the Edition, 2009

8.   Davidoff, S. and Ham, J., Network Forensics Tracking Hackers through Cyberspace, Prentice Hall, 2012.

9.   Michael G. Solomon, K Rudolph, Ed Tittel, Broom N., and Barrett, D.,Computer, Forensics Jump Start, Willey Publishing, Inc, 2011.

10.   Kimberly Graves, "CEH: Official Certified Ethical Hacker Review Guide", Wiley Publishing Inc., 2007. ISBN: 978-0-7821-4437-6.

11.   Shakeel Ali &TediHeriyanto, "Backtrack -4: Assuring security by penetration testing", PACKT Publishing., 2011. ISBN: 978-1-849513-94-4.

AM4114PE: PRIVACY PRESERVING AND DATA PUBLISHING
(PROFESSIONAL ELECTIVE - V)

IV-I: CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
AM4114PE	Professional Elective-V	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

Course Objectives:

- To provide broad understanding of privacy.
- To make the student understand Anonymization operations, methods

Course Outcomes: By the end of the course students will
- Apply anonymization methods for sensitive data protection.
- Apply state-of art techniques for data privacy protection.
- Design privacy preserving algorithms for real-world applications.
- Identify security and privacy issues in OLAP systems.
- Apply informationmetricsfor maximizing the preservation of information in the anonymization process.

UNIT I
Privacy issues privacy models

UNIT II
Anonymization operations: and Information metrics

UNIT III
Anonymization methods for the transaction data, trajectory data, social networks data, and textual data.

UNIT IV
Collaborative Anonymization, Access control of outsourced data, Use of Fragmentation and Encryption to Protect Data Privacy; Security and Privacy in OLAP systems.

UNIT V
Extended Data publishing Scenarios, Anonymizationfor Data Mining

TEXT BOOKS:
1. Benjamin C.M. Fung, Ke Wang, Ada Wai-Chee Fu and Philip S. Yu, Introduction to Privacy-Preserving Data Publishing: Concepts and Techniques, 1st Edition, Chapman & Hall/CRC, 2010.
2. Charu C. Aggarwal, Privacy-Preserving Data Mining: Models and Algorithms, 1st Edition, Springer, 2008.

CY4115PE: PUBLIC KEY INFRASTRUCTURE AND TRUST MANAGEMENT
(PROFESSIONAL ELECTIVE - V)

IV-I: CSE(CS)							
Course Code	Category	Hours/Weak			Credits	Max Marks	
CY4115PE	Professional Elective-V	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60	
Prerequisites:							

Course objectives:

The course is designed to train the graduates in:

- In depth understanding of Public Key Cryptography.

- In depth understanding of Public key Infrastructure.

- In depth understanding of security credentials.

- To design new or modify existing cryptographic techniques.

Course Outcomes:

Graduates after completing the course shall gain:

- In depth understanding of Public key cryptography and Infrastructure.

- Ability to design and analyze Public Key cryptographic techniques.

- Ability to solve network security issues in real time applications.

- Ability to take up doctoral level research work in security.

UNIT -I

Public key infrastructure: components and architecture. PKI interoperability, deployment and assessment PKI data structures – certificates, validation, revocation, authentication, and cross-certification. Repository, Certification Authority (CA) and Registration Authority (RA), trusted third party, digital certificates.

UNIT-II

PKI services: authentication, non-repudiation, privilege management, privacy, secures communication.

UNIT-III

Key management: certificate revocation list, root CA, attacks on CA, key backup. PKI standards – SSL,LDAP, IPSec, X.500, X.509, S/MIME

UNIT-IV

Trust models: strict v/s loose hierarchy, four corners, distributed. Certificate path processing – pathconstruction and path validation.

UNIT -V

Issues: Revocation- Anonymity-Privacy issues

Trust Management: Policy based Trust Management System- Social network based Trust Management System- Reputation based Trust Management System (DMRep, EigenRep, P2Prep)-Framework for Trust Establishment

Risks Impact on E-Commerce and E- Business: Information Risk – Technology Risk – Business Risk

.

REFERENC BOOKS:

1. Ashutosh Saxena, Public Key Infrastructure, Tata McGraw Hill.

2. CarlisleAdams,SteveLloyd.UnderstandingPKI:Concepts,Standards,andDeployment Considerations, Addison Wesley.

3. John R. Vacca. Public Key Infrastructure: Building Trusted Applications and Web Services,AUERBACH.

Messaoud Benantar, Introduction to the Public Key Infrastructure for the Internet, Pearson Education

4. Desmedt, Yvo G. (Ed.), *Secure Public Key Infrastructure Standards, PGP and Beyond*, Springer, 2012.

5. Jan Camenisch and Costas Lambrinoudakis, *Public Key Infrastructures, Services and Applications*, 7th EuropeaWorkshop, EuroPKI 2010, Athens, Greece, Revised Selected Articles, 2011

IV-I: CSE(CS)							
Course Code	Category	Hours/Weak			Credits	Max Marks	
CY4116PE	Professional Elective-V	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60	
Prerequisites:							

Course Objectives:

To introduce the terminology, technology and its applications

To introduce implementation

Course Outcomes:

To understand about the intruders.

To know the intrusion detection and prevention policies

UNIT- I: INTRODUCTION:

Understanding Intrusion Detection – Intrusion detection and prevention basics – IDS and IPS analysis schemes, Attacks, Detection approaches –Misuse detection – anamoly detection – specification based detection – hybrid detection THEORETICAL FOUNDATIONS OF DETECTION: Taxonomy of anomaly detection system – fuzzy logic – Bayes theory – Artificial Neural networks – Support vector machine – Evolutionary computation – Association rules – Clustering

UNIT- II: ARCHITECTURE AND IMPLEMENTATION

Centralized – Distributed – Cooperative Intrusion Detection – Tiered architecture

UNIT- III: JUSTIFYING INTRUSION DETECTION

Intrusion detection in security – Threat Briefing –Quantifying risk – Return on Investment (ROI)

UNIT- IV: APPLICATIONS AND TOOLS

Tool Selection and Acquisition Process – Bro Intrusion Detection – Prelude Intrusion Detection – Cisco Security IDS – Snorts Intrusion Detection – NFR security

UNIT- V: LEGAL ISSUES AND ORGANIZATIONS STANDARDS

Law Enforcement/Criminal Prosecutions – Standard of Due Care – Evidentiary Issues, Organizations and Standardizations.

REFERENCES:

Ali A. Ghorbani, Wei Lu, "Network Intrusion Detection and Prevention: Concepts and Techniques", Springer, 2010.

Carl Enrolf, Eugene Schultz, Jim Mellander, "Intrusion detection and Prevention", McGraw Hill, 2004

Paul E. Proctor, "The Practical Intrusion Detection Handbook ", Prentice Hall, 2001.

Ankit Fadia and Mnu Zacharia, "Intrusiion Alert", Vikas Publishing house Pvt., Ltd, 2007.

Earl Carter, Jonathan Hogue, "Intrusion Prevention Fundamentals", Pearson Education, 2006.

CS4121OE: PYTHON PROGRAMMING
(Open Elective- II)

IV-I: CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CS4121OE	Open Elective-II	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

CourseObjectives:

- To be able to introduce core programming basics and program design with functionsusing Pythonprogramminglanguage.
- To understand arrange of Object-OrientedProgramming, aswellasin-depth data and information processing techniques.
- To understand the high-performance programs designed to streng the n the practical expertise.

COURSE OUTCOMES:

- Able to write programs using classes and objects
- Able to develop GUI

UNIT-I

Introduction to Python, Installing Python. How a Program Works, UsingPython, ProgramDevelopmentCycle, InputProcessingand Output, DisplayingOutputwiththePrintFunction, Comments, Variables, Reading Input from the Keyboard, Performing CalculationsOperators. Typeconversions, Expressions.More about Data Output.Decision Structures andBoolean Logic: if, if-else, if-elif-else Statements, Nested DecisionStructures, ComparingStrings and Logical Operators, Boolean Variables.RepetitionStructures: Introduction, whileloop,

Forloop, Calculating a Running Total, Input Validation Loops, Nested Loops.

Datatypes and Expressions: Strings, Assignment and Comments, Numeric Data Types andCharacterSets, Expressions, Functions and Modules.

UNIT-II

Control Statements: Definite Iteration, Formatting Text for Output, Selection, ConditionalIteration.

File and Exceptions: Introduction to File Input and Output, Using Loops to Process Files, Processing Records, Exceptions.

Functions: Introduction, Defining and Calling a Void Function, Designing a Program to UseFunctions, Local Variables, Passing

Arguments to Functions, Global Variables and GlobalConstants, Value-Returning Functions-Generating Random Numbers, The math Module, Storing Functions I nModules.

UNIT-III

StringsandTextFiles: Accessing Characters and Substrings in aString,Strings and Number System, String Methods, Basic String Operations, String Slicing, Testing, Searching,and Manipulating Strings.TextFiles,Data Encryption,Lists,IntroductiontoLists,Listslicing, FindingItemsinListswiththeinOperator,ListMethodsandUsefulBuilt-inFunctions,CopyingLists,ProcessingLists,Two-Dimensional Lists,TuplesSequences,Tuples.DictionariesandSets:Dictionaries,Sets,S erializingObjects.Recursion:Introduction,ProblemSolving withRecursion,ExamplesofRecursiveAlgorithms.

UNIT-IV

Design with Classes: Classes and Objects, Classes and Functions, ClassesandMethods, WorkingwithInstances, Inheritanceand Polymorphism.Object-OrientedProgramming: Procedural and Object-OrientedProgramming, Classes, techniquesforDesigningClasses.

UNIT-V

Graphical User Interfaces: Behavior of terminal-based programs and GUI-basedprograms, CodingsimpleGUI-basedprograms, other useful GUI resources. GUIProgramming: GraphicalUserInterfaces, Using the tkinterModule, DisplaytextwithLabelWidgets, OrganizingWidgets with Frames, ButtonWidgetsandInfoDialogBoxes, GettingInput withEntryWidget, UsingLabelsasOutputFields, RadioButtons, CheckButtons.
Simple Graphics and Image Processing: Overview of Turtle Graphics, Two dimensionalShapes, Colors andRBGSystem, Image Processing.

TEXTBOOKS:

1. KennethA.Lambert, The FundamentalsofPython: FirstPrograms,2011Cengage Learning.
2. **ThinkPythonFirst Edition**, byAllenB. Downey, Oriellypublishing

REFERENCEBOOKS:

1. Introduction toComputation andProgrammingUsingPython.John V. Guttag, TheMITPress.
2. JamesPayne, BeginningPythonusingPython2.6andPython3, Wroxpublishing
3. PaulGries, PracticalProgramming: AnIntroductiontoComputerScienceusingPython3, ThePragmaticBookshelf,2ndedition(4Oct.2013)
4. CharlesDierach, IntroductiontoComputerScienceusingPython

CS4122OE: R PROGRAMMING
(Open Elective- II)

IV-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CS4122OE	**Open Elective-II**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:								

Course Objectives:

- Understanding and being able to use basic programmingconcepts
- Automatedataanalysis
- Working collaboratively and openlyoncode
- Knowing how to generate dynamicdocuments
- Being able to use a continuoustest-drivendevelopmentapproach

Course Outcomes:
- Be able to use and program in the programminglanguageR
- Be able to use Rtosolvestatisticalproblems
- Be able to implement and describe MonteCarlothetechnology
- Be able to minimize and maximize functions usingR

UNIT–I

Introduction: Overview of R, R data types and objects, reading and writingdata,subsettingRObjects,EssentialsoftheRLanguage, InstallingR,RunningR,PackagesinR,Calculations, Complex numbers in R,Rounding,Arithmetic,Moduloandintegerquotients, Variablenamesandassignment,Operators,Integers,Factors,Logicaloperations

UNIT– II

Controlstructures,functions,scopingrules,datesandtimes, IntroductiontoFunctions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, Data Frames,and Classes

Vectors: Generating sequences, Vectors and subscripts, Extracting elements of a vector usingsubscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Addingand Deleting Vector Elements,Obtaining the Length of a Vector, MatricesandArraysasVectorsVectorArithmeticandLogicalOperations, VectorIndexing, CommonVectorOperations

UNIT–III

Lists: CreatingLists,GeneralListOperations,ListIndexingAddingandDele tingListElements,GettingtheSizeofaList,Extended Example:TextConcordanceAccessing ListComponentsandValuesApplyingFunctionstoLists,DATAFRAMES,Cr eatingDataFrames,AccessingDataFrames,OtherMatrix-Like Operations

UNIT-IV

FACTORSANDTABLES: Factors andLevels, CommonFunctionsUsedwithFactors, WorkingwithTables, Matrix/Array-LikeOperationsonTables,Extracting a Subtable,

Findingthe Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products,Minima and Maxima, Calculus, FunctionsforStatisticalDistributions

UNIT-V
OBJECT-
ORIENTEDPROGRAMMING:SClasses,SGenericFunctions,WritingSCla sses,UsingInheritance,SClasses,WritingSClasses,ImplementingaGeneri cFunctiononanSClass,visualization, Simulation, code profiling, Statistical Analysis with R, datamanipulation

TEXTBOOKS:
1. RProgrammingfor DataSciencebyRoger D.Peng
2. TheArtofRProgrammingbyPrashanthsingh, VivekMoury a Cengage LearningIndia**.**

CS4123OE: JAVA PROGRAMMING
(Open Elective- II)

IV-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CS4123OE	Open Elective-II	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

Course Objectives:

⦁ To introduce the object-orientedprogramming concepts.
⦁ To understandobject-orientedprogrammingconcepts,and applytheminsolvingproblems.
⦁ To introduce the principles of inheritance and polymorphism;and demonstrate how they relate to the design of abstractclasses
⦁ To introduce the implementation of packages and interfaces
⦁ To introduce theconcepts of exceptionhandling and multithreading.
⦁ To introduce the design of GraphicalUser Interface using applets and swingcontrols.

Course Outcomes:
⦁ Able to solve realworld problems using OOPtechniques.
⦁ Able to understand the use of abstractclasses.
⦁ Able to solve problems using javacollectionframework andI/oclasses.
⦁ Able to develop multithreaded applications with synchronization.
⦁ Able to develop applets for webapplications.
⦁ Able to design GUIbased applications

UNIT-I

Object-Oriented Thinking- Awayof viewing world – Agents and Communities, messages andmethods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding,Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview ofJava, Datatypes, variables and Arrays, operators,expressions, controlstatements, Introducingclasses,Methods and Classes,String handling.

Inheritance–
Inheritanceconcept,Inheritancebasics,Memberaccess,Constructors,CreatingMultilevelhierarchy,superuses,usingfinalwithinheritance,Polymorphism-adhocpolymorphism,purepolymorphism, method overriding, abstract classes, Objectclass,formsofinheritance- specialization, specification,construction,extension, limitation,combination,benefitsofinheritance,costsofinheritance.

UNIT-II

Packages- DefiningaPackage, CLASSPATH, Access protection, importing packages.

Interfaces-defininganinterface,implementinginterfaces,Nested interfaces,applyinginterfaces,variablesininterfacesand extendinginterfaces.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Readingconsole Input and Writing Console Output, File class, Reading and writing Files, Random access fileoperations, The Console class, Enumerations Serialization,autoboxing,generics.

UNIT-III

Exceptionhandling-
Fundamentalsofexceptionhandling,Exceptiontypes,Terminationorresu mptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nestedtrystatements,throw,throwsandfinally,built-inexceptions, creatingownexceptionsubclasses.

Multithreading-Differencesbetweenthread-basedmultitaskingandprocess-basedmultitasking, Javathreadmodel, creatingthreads, thread priorities, synchronizingthreads, interthread communication.

UNIT-IV

The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collectionclasses- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing aCollection viaanIterator,UsinganIterator,theFor-Eachalternative,MapInterfaces andClasses,Comparators,Collectionalgorithms,Arrays, TheLegacyClassesandInterfaces-
Dictionary,Hashtable,Properties,Stack,Vector
MoreUtilityclasses,StringTokenizer,BitSet,Date,Calendar,Random,Formatte r, Scanner

UNIT-V

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components,containers.Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout,GridBag Layout.

EventHandling-TheDelegationeventmodel-Events,Eventsources, EventListeners,Eventclasses,Handlingmouseandkeyboardevents, Adapterclasses,Innerclasses,AnonymousInnerclasses.

ASimpleSwingApplication,Applets–
AppletsandHTML,SecurityIssues,AppletsandApplications,passingpara meterstoapplets.CreatingaSwingApplet,PaintinginSwing,APaintexample ,ExploringSwing Controls- JLabel and Image Icon, JText Field, **The SwingButtons**-JButton,JToggle
Button,JCheckBox,JRadioButton,JTabbedPane,JScrollPane,
JList,JComboBox,SwingMenus, Dialogs.

TEXTBOOKS:

1. JavaThecompletereference, 9thedition,HerbertSchildt, McGrawHillEducation(India)Pvt.Ltd.
2. UnderstandingObject-Oriented Programmingwith Java, updatededition, T. Budd, PearsonEducation.

REFERENCEBOOKS:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch,JohnWiley&sons
2. IntroductiontoJavaprogramming, Y.DanielLiang,PearsonEducation.
3. ObjectOrientedProgrammingthroughJava, P. RadhaKrishna, UniversityPress.
4. ProgramminginJava, S.Malhotra, S.Chudhary,2ndedition,OxfordUniv.Press.
5. JavaProgrammingandObject-orientedApplicationDevelopment, R.A.Johnson,CengageLearning.

EE4121OE: RENEWABLE ENERGY SOURCES

(Open Elective- II)

IV-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
EE4121OE	**Open Elective-II**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**			**Total Classes:60**			
Prerequisites:								

Course Objectives:

- ☐ To recognize the awareness of energy conservation in students.
- ☐ To identify the use of renewable energy sources for electrical powergeneration.
- ☐ To collect different energystorag emethods.
- ☐ To detect about environmental effects of energy conversion.

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

- ☐ Understand the principles of windpower and solar photovoltaicpowergeneration, fuel cells.
- ☐ Assess the cost of generation for conventional and renewable energyplants.
- ☐ Design suitable power controller for wind and solar applications.
- ☐ Analyze the issues involved in the integration of renewable energy sources to the grid.

UNIT-I

Introduction: RenewableSourcesofEnergy-Grid-SuppliedElectricity-DistributedGeneration-RenewableEnergyEconomics-CalculationofElectricityGenerationCosts–Demand side Management Options –SupplysideManagementOptions-Modern ElectronicControlsofPowerSystems.

Wind PowerPlants: AppropriateLocation-Evaluation of Wind Intensity-Topography -Purpose of the Energy Generated - General Classification of Wind Turbines-Rotor Turbines-Multiple-Blade Turbines Drag Turbines - LiftingTurbines-GeneratorsandSpeedControlusedin WindPowerEnergyAnalysis ofSmall Generating Systems.

UNIT-II

Photovoltaic Power Plants: Solar Energy-Generation of Electricity by Photovoltaic Effect -Dependence of a PV Cell Characteristic on Temperature-Solar cell Output Characteristics-EquivalentModelsandParametersforPhotovoltaicPanels-PhotovoltaicSystems-ApplicationsofPhotovoltaic Solar Energy-EconomicalAnalysis of SolarEnergy.

FuelCells: TheFuelCell-LowandHighTemperatureFuelCells-CommercialandManufacturing Issues Constructional Features of Proton Exchange-Membrane Fuel Cells –Reformers-Electro-lyzer Systems and

Related Precautions-Advantages and Disadvantagesof Fuel Cells-Fuel Cell Equivalent Circuit- Practical Determination of the Equivalent ModelParameters-AspectsofHydrogen asFuel.

UNIT-III
InductionGenerators

PrinciplesofOperation-RepresentationofSteady-StateOperation- PowerandLossesGenerated-Self-ExcitedInductionGenerator- MagnetizingCurvesandSelf-ExcitationMathematical Description oftheSelf- Excitation Process-Interconnected and Stand-aloneoperation -Speed andVoltageControl -EconomicalAspects.

UNIT-IV
StorageSystems: EnergyStorageParameters-Lead–AcidBatteries- UltraCapacitors-Flywheels–SuperconductingMagneticStorageSystem- PumpedHydroelectricEnergyStorage - Compressed Air Energy Storage - Storage Heat -Energy Storage as an EconomicResource.

UNIT-V
Integration of Alternative Sources of Energy: Principles of Power Injection-InstantaneousActive and Reactive Power Control Approach Integration of Multiple Renewable EnergySources- IslandingandInterconnection Control-DGControlandPowerInjection.
InterconnectionofAlternativeEnergySourceswiththeGrid:
Interconnection Technologies - Standards and Codes for Interconnection - Interconnection Considerations –Interconnection Examples for AlternativeEnergySources.

TEXTBOOKS:
1. FelixA.Farret, M.GodoySimoes,"IntegrationofAlternativeSourcesofEnergy",JohnWiley&Sons,2006.
2. Solanki: Renewable EnergyTechnologies: PracticalGuideforBeginners, PHI LearningPvt.Ltd., 2008

REFERENCES:
1. D. Mukherjee: Fundamentals of Renewable EnergySystems, NewAgeInternationalpublishers, 2007.
2. Remus Teodorescu, MarcoLiserre, Pedro Rodríguez: Grid Converters for Photovoltaic and WindPowerSystems, JohnWiley&Sons, 2011.
3. GilbertM.Masters: RenewableandEfficientElectricPowerSystems, JohnWiley&Sons, 2004.

EE4122OE: RELIABILITY ENGINEERING

(Open Elective- II)

IV-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
EE4122OE	**Open Elective-II**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites: Mathematics-III (LaplaceTransforms,Numerical Methods and Complexvariables).								

Course Objectives:

- ☐ To introduce the basic concepts of reliability,variousmodels of reliability
- ☐ To analyze reliability of various systems
- ☐ To introduce techniques of frequency and duration for reliability evaluation of repairable systems

Course Outcomes: After completion of this course, the student will be able to

- ☐ Model various systems applying reliability networks
- ☐ Evaluate the reliability of simple and complex systems
- ☐ Estimate the limiting state probabilities of repairable systems
- ☐ Apply various mathematical models for evaluating reliabilityof irreparablesystems

UNIT-I

BasicProbabilityTheory: Elementsofprobability,probability distributions, Randomvariables,DensityandDistributionfunctions-Mathematicalexpected–variance and standarddeviation

BinomialDistribution: Concepts, properties, engineering applications.

UNIT-II

Network Modeling and Evaluation of Simple Systems: Basic concepts-EvaluationofnetworkReliability/Unreliability-Seriessystems, Parallelsystems-Series-Parallelsystems-Partiallyredundantsystems-Examples.

NetworkModelingand EvaluationofComplexSystems

Conditional probability method- tie set, Cut-set approach- Event tree and reduced event treemethods-Relationshipsbetween tie and cut-sets-Examples.

UNIT-III

Probability Distributions In Reliability Evaluation: Distribution concepts, Terminology ofdistributions, General reliability functions, Evaluation of the reliability functions,shapeofreliabilityfunctions–

Poissondistribution–
normaldistribution,exponentialdistribution,Weibulldistribution.

Network Reliability Evaluation Using Probability Distributions:
Reliability Evaluation ofSeries systems, Parallel systems – Partially
redundant systems- determination of reliabilitymeasure-
MTTFforseriesandparallelsystems–Examples.

UNIT-IV

Discrete Markov Chains: Basic concepts- Stochastic transitional
probability matrix- timedependent probability evaluation- Limiting State
Probability evaluation- Absorbing states –Application.

Continuous Markov Processes: Modeling concepts- State space diagrams-
Unreliabilityevaluationofsingleandtwo componentrepairablesystems

UNIT-V

Frequency and Duration Techniques: Frequency and duration concepts,
application tomultistateproblems, Frequency balance approach.

Approximate System Reliability Evaluation: Series systems – Parallel
systems- Networkreduction techniques- Cut set approach- Common mode
failures modeling and evaluationtechniques-Examples.

TEXTBOOKS:
1. RoyBillintonandRonaldNAllan, Reliability Evaluation of
   EngineeringSystems, Plenum Press.
2. E.Balagurusamy,Reliability Engineeringby Tata McGraw-
   HillPublishingCompanyLimited

REFERENCES:
1. ReliabilityEngineering: Theory and
   PracticebyAlessandroBirolini,Springer Publications.
2. AnIntroductiontoReliabilityandMaintainabilityEngineeringbyCharlesE
   beling, TMHPublications.
3. ReliabilityEngineeringbyElsayedA. Elsayed, PrenticeHall Publications.

EC4121OE: PRINCIPLES OF COMPUTER COMMUNICATIONS AND NETWORKS (Open Elective- II)

IV-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
EC4121OE	**Open Elective-II**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:								

Course Objectives:
- To understand theconcept of computer communication.
- To learn about the networking concept layeredprotocols.
- To understand various communications concepts.
- To get theknowledge of various networking equipment.

Course Outcomes:
- The student cange the knowledge of networking of computers, datatransmission between computers.
- Will have the exposure about the various communication concepts.
- Will get awareness about the structure and equipment ofcomputer network structures.

UNIT-I
OverviewofComputerCommunicationsandNetworking:IntroductiontoComputer CommunicationsandNetworking,IntroductiontoComputerNetwork,TypesofCompu ter Networks,NetworkAddressing,Routing,Reliability,InteroperabilityandSecurity,Net work Standards,TheTelephoneSystemandDataCommunications.

UNIT-II
Essential Terms and Concepts: Computer Applications and application protocols, ComputerCommunicationsandNetworkingmodels, Communication ServiceMethodsand datatransmissionmodes,analog and DigitalCommunications ,Speedandcapacityofa Communication Channel,Multiplexing and switching, NetworkarchitectureandtheOSI referencemodel.

UNIT-III
AnalogandDigitalCommunication Concepts: Representing data as an alogsignals, representing data as digital signals, data rate and bandwidth reduction, DigitalCarrier Systems.

UNIT-IV

PhysicalanddatalinklayerConcepts:
ThePhysicalandElectricalCharacteristicsofwire, Coppermedia, fiberopticmedia,
wirelessCommunications.Introduction todatalinkLayer,the
logicallinkcontrolandmediumaccesscontrolsub-layers.

UNIT-V

NetworkHardwareComponents: Introduction to Connectors, Transreceivers and
mediaconvertors, repeaters, network interferencecards and PCcards, bridges,
switches, switches VsRouters.

TEXTBOOKS:
1. Computer Communicationsand Networking Technologies, MichelA. Gallo
   andWilliamH.Hancock, Thoms on Brooks/Cole.
2. DataCommunicationsandNetworking–BehrouzA.Forouzan,
   FourthEditionMC GRAWHILLEDUCATION2006.

REFERENCEBOOKS:
1. PrinciplesofComputerNetworksandCommunications, M.BarryDumas,
   MorrisSchwartz,Pearson.
2. Computer Networking: A Top-DownApproach Featuring the Internet,
   James F.Kurose,K.W.Ross, 3^{rd}Edition,PearsonEducation

ME4121OE: FABRICATION PROCESSES

(Open Elective- II)

IV-I:CSE(CS)							
Course Code	Category	Hours/Weak			Credits	Max Marks	
ME4121OE	Open Elective-II	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill			Total Classes:60		
Prerequisites: None							

Course Objectives: To understand the philosophies of various Manufacturing process.

CourseOutcomes: At the end ofthe course for given product, one should be able identifythemanufacturingprocess.

UNIT-I

Casting: Stepsinvolvedinmakingacasting–Advantageofcastinganditsapplications;Patterns- Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of mouldingsands.

MethodsofMelting-Cruciblemeltingandcupolaoperation–Defectsincastings;

Casting processes – Types – Sand moulding, Centrifugal casting, die- casting, Investment casting,shell moulding; Principles of Gating – Requirements – Types of gates, Design ofgatingsystems –Riser–Function,typesofRiserandRiserdesign.

UNIT-II

Welding: Classification – Types of welds and welded joints; Gaswelding-Types,oxy-fuelgascutting.Arcwelding,for gewelding,submergedarcwelding,Resistancewelding,Thermi tewelding.

Inert Gas Welding - TIG Welding, MIG welding, explosive welding, LaserWelding; Soldering andBrazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive andnon-destructivetestingof welds.

UNIT-III

Hotworkingcoldworking,strain hardening, recovery, recrystallisation, and graingrowth.Stamping, forming, and other coldworkingprocesses.Blankingand piercing– Bending andforming – Drawing and its types – wire drawing and

Tubedrawing–coining–Hotandcoldspinning.Types of presses and press tools. Forces and power requirement in the above operations.

UNIT-IV

Extrusion of Metals: Basic extrusion process and its characteristics.Hotextrusionandcoldextrusion-Forwardextrusionandbackwardextrusion–Impactextrusion–Extrudingequipment

–Tubeextrusionandpipemaking, Hydro static extrusion.Forces inextrusion.

UNIT-V

Forging Processes: Forging operations and principles – Tools – Forging methods – Smith forging, Drop Forging – Roll forging – Forging hammers: Rotaryforging–forgingdefects–coldforging, swaging, Forces in for going operations

TEXTBOOKS:

1. Manufacturing Technology/P.N.Rao/McGrawHill
2. Manufacturing EngineeringandTechnology/KalpakjinS/Pearson.

REFERENCEBOOKS:

1. Metal Casting/T.VRamanaRao/NewAge
2. Métal FabricationTechnology/Mukherjee/PHI

ME4122OE: TOTAL QUALITY MANAGEMENT

(Open Elective- II)

IV-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
ME4122OE	**Open Elective-II**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:	**None**							

UNIT-I

Introduction: The concept of TQM, Quality and Business performance, attitude and involvement of top management, communication, culture and management systems. Management of ProcessQuality: Definition of quality, Quality Control, a brief history, Product Inspection vs. ProcessControlStatisticalQualityControl, ControlChartsandAcceptanceSampling.

UNIT-II

Customer Focus and Satisfaction: Process vs. Customer, internalcustomerconflict,quality focus,Customer Satisfaction,roleofMarketingandSales,Buyer–Supplierrelationships.

Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of benchmarketing, the benchmarking procedure, pitfallsofbenchmarketing.

UNIT-III

Organizing for TQM: The systems approach, organizing forqualityimplementation, making the transition from a traditionaltoTQMorganization, QualityCircles,seven Tools of TQM:Stratification, check sheet, Scatter diagram, lshikawa diagram, paneto diagram, Kepner &TregoeMethodology.

UNIT-IV

The Cost of Quality: Definition of the Cost of Quality, QualityCosts, Measuring Quality Costs,use

ofQualityCostinformation,
AccountingSystemsandQualityManagement.

UNIT-V

ISO9000: Universal Standards of Quality: ISO around the
world,TheISO9000ANSI/ASQCQ90.SeriesStandards,
benefitsofISO9000certification,thethirdpartyaudit,
DocumentationISO9000andservices,thecostofcertificationi
mplementingthesystem.

TEXTBOOK:

1. Total Quality Management/Joel E.
   Ross/TaylorandFranscisLimited
2. Total Quality Management/P.N.Mukherjee/PHI

REFERENCE BOOKS:

1. Beyond TQM/RobertL.Flood
2. StatisticalQualityControl/E.L.Grant.
3. TotalQualityManagement:APracticalApproach/H.Lal
4.QualityManagement/KanishkaBedi/OxfordUniversityPress/2011

5. TotalEngineeringQualityManagement/SunilSharma/Macmillan

ME4123OE: ENERGY MANAGEMENT AND CONSERVATION

(Open Elective- II)

IV-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
ME4123OE	Open Elective-II	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: None								

CourseObjectives: To acquaint the student with the conventional energy sources and the irutilization.To understand the importance of heat recovery and energy conservation methods andenergyaudit.

Course Outcomes: Students would have a good knowledge about conventionalenergysourcesand their audit.Ability to applythefundamentalsofenergyconservation andmanagement.

UNIT-I

Introduction: Global&Indian Energy Scenario-ClassificationofEnergysources-Energyneedsofgrowingeconomy-Energysectorreform,EnergyandEnvironment:Global EnvironmentalConcerns,BasicsofEnergyandits variousforms.

UNIT-II

EnergyAudit:Typesofenergyaudit,Energymanagement(audit) approach understandingenergycosts,Benchmarking,Energyperforma nce,Matchingenergyusetorequirement,Maximizing systemefficiencies,Optimizingthe inputenergyrequirements,Fuelandenergysubstitution, Energyauditinstruments.

Material and energy balance: Facility as an energy system,Methodsforpreparingprocessflow, Materialandenergybalancediagrams.

UNIT-III

EnergyActionPlanning,Financial Management: Financial analysistechniques-Riskandsensitivityanalysis-Financingoptions,Energyperformancecontractsandroleof ESCOs-Energy Monitoring and Targeting: Elements of monitoring&targeting,Dataandinformation-analysis,Techniques-energyconsumption, Production,Cumulativesum of differences (CUSUM).

UNIT-IV

Building Envelope – principles of analysis – Envelope performance -Envelope analysis ofExisting and new buildings – Building standards for new and Existing constructions.HVAC Systems types – Energy conservationopportunities–coolingequipment–Domestic hotwaterEstimatingHVACEnergyconsumption.

UNIT-V

Principles of Electric EnergyManagement, Energy Management control systems – Energysystems maintenance. Energy management in water and wastewater treatment – solidwaste treatment- air pollution control systems .EnergyManagementinBoilersandFiredsystems– Steamandcondensatesystems–cogeneration– WasteHeatrecovery.EnergyManagementinProcessIndustries, EnergySecurity,Codes,Standards,ElectricityAct, EnergyConservationAct.

TEXT BOOKS:

1. Energy Management by Murfy
2. General Aspects of EnergyManagement and Audit,National ProductivityCouncilofIndia,Chennai(CourseMaterial-NationalCertificationExaminationfor EnergyManagement)

REFERENCE BOOKS:

1. EnergyManagementHandbook, W.C.Turner5thEdition, MarcelDekkerIincNewYork, 2005.
2. GuidetoEnergyManagement, B.L.Capehart, W.CTurner, W.J.Kennedy, CRCPress, NewYork, 2005.
3. EnergyManagementbyO.P.Collagan

CE4121OE: ENVIRONMENTAL IMPACT ASSESSMENT
(OpenElective-II)

IV-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CE4121OE	Open Elective-II	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: None								

Course Objectives: The objectives of the course are to

- Define and Classify Environmental Impacts and the terminology
- Understands the environmental Impact assessment procedure
- Explain the EIA methodology
- List and describe environmental audits

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

- Identify the environmental attributes to be considered for the EIA study
- Formulate objectives of the EIAstudies
- Identify the methodology to prepare rapid EIA
- Prepare EIAreportsandenvironmentalmanagement plans

UNIT-I

Introduction:TheNeedforEIA,IndianPoliciesRequiringEIA,TheEIACycleandProcedures,Screening,Scoping,BaselineData,ImpactPrediction,Assessmentof Alternatives,DelineationofMitigationMeasureandEIAReport,PublicHearing,DecisionMaking,MonitoringtheClearanceConditions,ComponentsofEIA,RolesintheEIAProcess.Governmentof IndiaMinistryofEnvironmentandForestNotification(2000),Listof projectsrequiringEnvironmentalclearance,Applicationform,CompositionofExpertCommittee,Ecologicalsensitive places,Internationalagreements.

UNIT-II

EIA Methodologies: Environmental attributes-Criteria for the selection of EIA methodology, impactidentification, impactmeasurement, Impactinterpretation&Evaluation,impactcommunication,Methods-Adhocmethods,Checklistsmethods,Matricesmethods,Networksmethods, Overlaysmethods.EIAreview-BaselineConditions -Construction Stage Impacts, postprojectimpacts.

UNIT-III
Environmental Management Plan: EMP preparation, Monitoring Environmental ManagementPlan, Identification of Significant or Unacceptable ImpactsRequiringMitigation,MitigationPlansandRelief&Rehabilitation, Stipulating the Conditions,MonitoringMethods,Pre-Appraisaland Appraisal.

UNIT-IV

Environmental Legislation and Life cycle Assessment: Environmental laws and protectionacts,Constitutionalprovisions-powersandfunctionsofCentralandStategovernment,TheEnvironment (Protection) Act 1986, The Water Act 1974, The Air act 1981, Wild Life act 1972,Guidelines for control of noise, loss of biodiversity, solid and Hazardous waste managementrules. Life cycle assessment: Life cycle analysis, Methodology, Management, Flow of materials-costcriteriacasestudies.

UNIT-V

CaseStudies:PreparationofEIAfordevelopmentalprojects-Factors to be considered in making assessment decisions, Water Resources Project, Pharmaceuticalindustry,thermalplant,Nuclear fuelcomplex,Highwayproject,Sewagetreatmentplant,MunicipalSolidwasteprocessingplant, Airports.

TEXTBOOKS:

1. Anjaneyulu.YandManickam.V.,EnvironmentalImpactAssessmentMethodologies,B.S.Publications,Hyderabad,2007
    2. Barthwal,R.R.,Environmental ImpactAssessment,NewAgeInternationalPublishers,2002

REFERENCEBOOKS:

1. Jain,R .K.,Urban,L.V.,Stracy, G.S.,Environmental ImpactAnalysis,VanNostrandReinholdCo.,New York, 1991.
2. Rau,J. G .and Wooten,D.C.,EnvironmentalImpactAssessment, McGrawHillPub.Co.,NewYork,1996.

CE4122OE: INDUSTRIAL WASTE WATER TREATMENT
(OpenElective-II)

IV-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CE4122OE	**Open Elective-II**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:	**EnvironmentalEngineering**							

Course Objectives:

- To present the information of waste water generation from various industries
- To inform about the conventional treatment processes for specificindustrial
- Waste waters
- To explain about the new developments in industrial waste watertreatment
- technologies

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

- Identify the characteristics of industrial wastewaters
- Describe pollution effects of disposal of industrialeffluent
- Identify and design treatment options for industrial wastewater
- Formulate environmental managementplan

UNIT-I

Introduction: WastewaterCharacteristics,Standards of Disposal, Treatment Objective and Strategies,LayoutsofPrimary,Secondaryand AdvancedTreatment Units.

UNIT-II

Design of Preliminary and Primary Treatment Operations: Screens, Grit Chambers, SkimmingTank, Primaryand SecondarySedimentation Tanks.

UNIT-III

Biological Treatment Processes: Types, Kinetics of Plug Flow and Completely Mixed Systems.Attached Growth Processes: Trickling Filters (Standard Rate, HighRate),Biofilters,Practices,FeaturesandDesign,
OperationalDifficultiesandRemedialMeasures,
RotatingBiologicalContactors.Suspended Growth Processes:

UNIT-IV

Activatedsludge Process, Modifications and Design Equations, Process Design Criteria,Oxygen and Nutrient Requirements-ClassificationandDesignof OxidationPonds, Lagoons.

UNIT-V

Sludge Treatment and Disposal: Sludge Thickening, Aerobic and Anaerobic Sludge DigestionProcesses,Design of DigesterTank,SludgeDewatering, Ultimate Disposal,Sludge DryingBeds,Other Methods ofSludgeTreatment.

TEXTBOOKS:

1. WastewaterTreatment–ConceptsandDesignApproach,byGLKariaandRAChristian,PrenticeHall ofIndia, 2006

2. EnvironmentalEngineeringbyGerardKiely,McGrawHillEducation(India)PvtLtd,2013

3. EnvironmentalEngineering–ADesignApproachbyA.P.SinceroandGASincero,PrenticeHallofIndia, 2014

REFERENCES:

1. WastewaterEngineering-Collection, Treatment, DisposalandReusebyMetcalfandEddy, McGraw Hill Education (India) PvtLtd, 2013

2 IndustrialWasteTreatmentbyNelson LeonardNemerow, Butterworth-Heinemann2007.

3. Biological Process Designs for Wastewater Treatment by BenefieldL.D.andRandallC.D.PrenticeHall Pub. Co., 1980.

CY4103PC: MACHINE LEARNING LAB

IV-I:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CY4103PC	**Open Elective-II**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		0	**0**	**2**	**1**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites: EnvironmentalEngineering								

Course Objective: The objective of this lab is to get an overview of the various machine learning techniques and can able to demonstrate those using python.

Course Outcomes: After the completion of the course the student can able to:

- Understand complexity of Machine Learning algorithms and their limitations;
- Understand modern notions in data analysis-oriented computing;
- Be capable of confidently applying commonMachineLearningalgorithms in practice and implementing their own;
- Be capable of performing experiments in MachineLearning using real-worlddata.

List of Experiments

1. The probability that it is Friday and that a student is absent is 3 %. Since there are 5 schooldays in a week, the probability that it is Friday is 20 %. Whatistheprobabilitythatastudent is absent given that today is Friday? ApplyBaye'srulein python to get the result.(Ans:15%)

2. Extract the data from database using python

3. Implement k-nearest neighbours classification using python

4. Giventhefollowingdata,whichspecifyclassificationsforninecombinationsofVAR1andVAR2predict a classification for a case where VAR1=0.906 and VAR2=0.606, using the result of k-meansclustering with 3means(i.e.,3 centroids)

VAR1	VAR2	CLASS
1.713	1.586	0
0.180	1.786	1
0.353	1.240	1
0.940	1.566	0
1.486	0.759	1
1.266	1.106	0

1.540	0.419	1
0.459	1.799	1
0.773	0.186	1

5. The following training examples map description so find individuals on to high, medium and lowcredit-worthiness.
Medium skiingdesignsingle twenties
no-> highRiskhighgolftrading
  marriedfortiesyes->lowRisk
Low
  speedwaytransportmarriedthirti
esyes-
>medRiskmediumfootballbanking
  singlethirties yes ->
lowRiskhigh
  flyingmediamarriedfiftiesyes-
>highRisk
Low footballsecuritysingletwenties
no-> medRiskmediumgolfmedia
    singlethirties yes ->
medRiskmediumgolf
  transportmarriedfortiesyes ->
lowRiskhigh skiingbanking
  singlethirties yes ->
highRisklow golf
  unemployedmarriedfortiesyes-
>highRisk

Input attributes are (from left to right) income, recreation, job, status, age-group, home-owner. Find theunconditional probability of `golf' and the conditional probability of `single' given `medRisk' in thedataset?

6. Implement linear regression using python.
7. Implement Naïve Bayes theorem to classify the English text
8. Implement an algorithm to demonstrate the significance of geneticalgorithm
9. Implement the finitewords classification system using Back-propagationalgorithm

*MC4001: INTELLECTUAL PROPERTY RIGHTS

IV-I:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CY4103PC	Mandatory Course	L	T	P	C	CIE	SEE	Total
		3	0	0	0	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

UNIT – I
Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II
Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes.

UNIT – III
Law of copy rights: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.
Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV
Trade Secrets: Trade secretes law, determination of trade secretes status, liability for misappropriations of trade secrets, protection for submission, trade secretes litigation.
Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – V
New development of intellectual property: new developments in trade mark law; copy right law, patent law, intellectual property audits.
International overview on intellectual property, international – trade mark law, copy right law, international patent law, and international development in trade secrets law.

TEXT & REFERENCE BOOKS:
1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, TataMcGraw Hill Publishing company ltd

SM4201MS: ORGANIZATIONAL BEHAVIOUR

IV-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
SM4201MS	Mandatory Course	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

Course Objectives: The objective ofthe course is to provide the students withtheconceptualframeworkandthetheoriesunderlying OrganizationalBehaviour.

UNIT-I:

IntroductiontoOB-Definition,Nature and Scope–Environmentaland organizationalcontext–ImpactofIT, globalization, Diversity, Ethics, culture, rewardsystemsandorganizational designonOrganizationalBehaviour.CognitiveProcesses-I:PerceptionandAttribution:Nature and importance of Perception – Perceptualselectivityandorganization–Socialperception–AttributionTheories– Locusof control–Attribution Errors–Impression Management.

UNIT-II:

CognitiveProcesses-II: Personality and Attitudes–Personalityasacontinuum– Meaningofpersonality-JohariWindowandTransactionalAnalysis-NatureandDimensionofAttitudes–Jobsatisfactionandorganizational commitment-Motivational needs and processes- Work-Motivation Approaches Theoriesof Motivation- Motivation across cultures - Positive organizational behaviour: Optimism – Emotionalintelligence– Self-Efficacy.

UNIT-III:

Dynamics of OB-I: Communication – types – interactive communication in organizations – barriers tocommunication and strategies to improve the follow of communication - Decision Making: Participativedecision-making techniques – creativity and group decision making. Dynamics of OB –II Stress andConflict: Meaning and types of stress –Meaning and types of conflict - Effectofstress and intra-individualconflict-strategiestocope with stressand conflict.

UNIT-IV:

Dynamics of OB –III Power and Politics: Meaning and types of power – empowerment - Groups Vs.Teams – Natureofgroups – dynamics of informal groups – dysfunctions of groups and teams – teamsinmodern workplace.

UNIT-V:

Leading High performance: Job design and Goal setting for High performance- Quality of WorkLife-SociotechnicalDesignandHigh-performanceworkpractices-
Behaviouralperformancemanagement:reinforcementandpunishmentasprinciplesofLearning–ProcessofBehaviouralmodification-Leadershiptheories-Styles,ActivitiesandskillsofGreatleaders.

REFERENCEBOOKS:

1. Luthans,Fred:OrganizationalBehaviour10/e,McGraw-Hill,2009
2. McShane: OrganizationalBehaviour,3e,TMH,2008
3. Nelson: Organizational Behaviour, 3/e,Thomson,2008.
4. NewstromW.John&DavisKeith, Organisational Behaviour--HumanBehaviouratWork, 12/e, TMH, NewDelhi, 2009.
5. PierceandGardner: Management and Organisational Behaviour: An Integratedperspective, Thomson, 2009.
6. Robbins,P.Stephen,TimothyA.Judge:OrganisationalBehaviour,12/e, PHI/Pearson,NewDelhi,2009.
7. PareekUdai: Behavioural ProcessatWork: Oxford&IBHNewDelhi, 2009.
8. Schermerhorn: OrganizationalBehaviour9/e, Wiley2008.
9. Hitt:OrganizationalBehaviour,Wiley,2008
10. Aswathappa: OrganisationalBehaviour,7/e,Himalaya,2009
11. Mullins: ManagementandOrganisationalBehaviour, Pearson2008.
12. McShane, Glinow: OrganisationalBehaviour--Essentials, TMH 2009.
13. Ivancevich: OrganisationalBehaviour andManagement, 7/eTMH2008.

CS4203PE: COMPUTATIONAL COMPLEXITY

(Professional Elective-VI)

IV-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CS4203PE	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: Acourseon"ComputerProgrammingandDataStructures" A courseon "DiscreteStructuresandGraphTheory"								

Course Objectives:
- Introduces to theory of computational complexity classes
- Discuss about algorithmic techniques and application of these techniques to problems.
- Introduce to randomized algorithms and discuss how effective they are in reducing time andspacecomplexity.
- Discuss about Graph based algorithms and approximation algorithms
- Discuss about search trees

Course Outcomes:
- Ability to classifydecision problemsintoappropriatecomplexityclasses
- Ability to specify what time means to re duce one problem to another, and construct reductions for simple examples.
- Ability to classify optimization problems into appropriate approximation complexityclasses
- Ability to choose appropriate datastructure for the given problem
- Ability to choose and apply appropriate design method for the given problem

UNIT-I

ComputationalComplexity:Polynomial time and its justification, Nontrivial examples of polynomial-timealgorithms, the concept of reduction (reducibility), Class P Class NP and NP- Completeness, The PversusNPproblemand whyit'shard

UNIT-II

Algorithmicparadigms: Dynamic Programming–Longest common subsequence, matrixchain multiplication, knapsack problem, Greedy – 0-1 knapsack, fractional knapsack, scheduling problem, Huffman coding, MST, Branch-and-bound – travelling sales person problem, 0/1 knapsack

problem, Divide and Conquer– Mergesort,binary search,quicksort.

UNIT-III
RandomizedAlgorithms: Finger Printing, Pattern Matching, Graph Problems,Algebraic Methods, Probabilistic Primality Testing,De-Randomization AdvancedAlgorithms.

UNIT-IV
GraphAlgorithms: Shortest paths, Flow networks, SpanningTrees; Approximationalgorithms,
Randomizedalgorithms.Approximationalgorithms:
PolynomialTimeApproximationSchemes.

UNIT-V
AdvancedDataStructuresandapplications:Decision Trees and CircuitsB-Trees, AVLTrees,RedandBlack trees, Dictionaries and tries, Maps, Binomial Heaps, Fibonacci Heaps, Disjoint sets, Union byRank and Path Compression

TEXTBOOKS:
1. T.Cormen, C.Leiserson, R.Rivest and C.Stein, Introduction to Algorithms, ThirdEdition, McGraw-Hill, 2009.
2. R.MotwaniandP.Raghavan, RandomizedAlgorithms, Cambridge UniversityPress, 1995.
3. J.J.McConnell, Analysis of Algorithms: AnActiveLearningApproach, Jones&BartlettPublishers2001.
4. D.E.Knuth,Art of ComputerProgramming,Volume3,SortingandSearching,SecondEdition,Addison-WesleyProfessional,1998.
5. S.Dasgupta, C. H. Papadimitriou and U.V.Vazirani Algorithms, McGraw-Hill, 2008.

CS4204PE: DISTRIBUTED SYSTEMS

(ProfessionalElective- VI)

IV-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CS4204PE	**Professional Elective- VI**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites: A course on"OperatingSystems" **A course on"ComputerOrganization&Architecture"**								

Course Objectives

- This course provides an in sight intoDistributedsystems.
- Topics include-PeertoPeerSystems,Transactions and Concurrencycontrol,Security and Distributed sharedmemory

Course Outcomes

- Ability to understand Transactions and Concurrency control.
- Ability to understand Security issues.
- Understanding Distributed sharedmemory.
- Ability todesign distributed systemsfor basic level applications.

UNIT-I

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resourcesharing and web, challenges, System models -Introduction,ArchitecturalandFundamental

models,NetworkingandInternetworking,InterprocessCommunication,Distrib utedobjectsandRemoteInvocation-Introduction,Communicationbetween distributed objects, RPC, Events and notifications,Casestudy-Java RMI.

UNIT-II

OperatingSystemSupport-Introduction,OSlayerProtection, ProcessesandThreads, Communication and Invocation, Operating system architecture,DistributedFile Systems-Introduction, File Servicearchitecture.

UNIT-III

Peer to Peer Systems–Introduction, Napster and itslegacy, Peer toPeer middleware, Routingoverlays, Overlaycasestudies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore.

TimeandGlobalStates-Introduction, Clocksevents and Processstates, Synchronizing physicalclocks, logical time andlogical clocks, global states, distributed debugging.
CoordinationandAgreement-Introduction, Distributed mutual exclusion, Elections, Multicastcommunication, consensusand related problems.

UNIT-IV

TransactionsandConcurrencyControl-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestampordering.DistributedTransactions-Introduction,Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions,Distributed deadlocks,Transaction recovery.

UNIT-V

Replication-Introduction,System model and groupcommunication, Faulttolerantservices, Transactionswith replicated data.
Distributedsharedmemory, Design and Implementationissues, Consistencymodels.

TEXTBOOKS:

1. DistributedSystemsConceptsandDesign, GCoulouris, JDollimore andTKindberg, FourthEdition,Pearson Education.
2. DistributedSystems, S.Ghosh, Chapman &Hall/CRC, Taylor&FrancisGroup, 2010.

REFERENCEBOOKS:

1. DistributedSystems–PrinciplesandParadigms, A.S.TanenbaumandM.V.Steen, Pearson Education.
2. DistributedComputing, Principles, AlgorithmsandSystems, AjayD.Kshemakalyani andMukeshSinghal, Cambridge,rp 2010.

CS4205PE: NEURAL NETWORKS & DEEP LEARNING

(ProfessionalElective- VI)

IV-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CS4205PE	Professional Elective- VI	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

Course Objectives:

- To introduce the foundations of Artificial NeuralNetworks
- To a cquire the knowledge on Deep LearningConcepts
- To learn various types of Artificial NeuralNetworks
- To gain knowledge to apply optimization strategies

Course Outcomes:
- Ability to understand the concepts of NeuralNetworks
- Ability to select the Learning Networks in modelingreal worldsystems
- Ability to use an efficientalgorithm for DeepModels
- Ability to applyoptimization strategies for large scale applications

UNIT-I

Artificial Neural Networks Introduction, Basic models of ANN, important terminologies,SupervisedLearningNetworks,Perceptron Networks,AdaptiveLinearNeuron,Back-propagationNetwork.AssociativeMemoryNetworks.TrainingAlgorithmsforpatternassociation,BAMandHopfieldNetworks.

UNIT-II

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, HammingNetwork, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter PropagationNetworks, AdaptiveResonanceTheoryNetworks.SpecialNetworks-Introductionto various networks.

UNIT-III

Introduction to Deep Learning, Historical Trends in Deep learning, Deep Feed-forward networks,Gradient-Based learning,HiddenUnits, Architecture

Design,Back-PropagationandOtherDifferentiationAlgorithms

UNIT-IV
Regularizationfor Deep Learning: Parameter norm Penalties, Norm Penalties as ConstrainedOptimization,RegularizationandUnder-Constrained Problems,DatasetAugmentation,NoiseRobustness,Semi-Supervised learning, Multi-task learning, Early Stopping, Parameter Typing andParameterSharing,SparseRepresentations,BaggingandotherEnsembleMe thods,Dropout,AdversarialTraining,TangentDistance,tangentPropandManifo ld,TangentClassifier

UNIT-V
Optimization for Train Deep Models: Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization StrategiesandMeta-Algorithms
Applications: Large-Scale Deep Learning, Computer Vision, Speech Recognition, Natural LanguageProcessing

TEXTBOOKS:
1. DeepLearning:AnMITPressBookByIanGoodfellowandYoshuaBengioandAa ronCourville
2. NeuralNetworksandLearningMachines, SimonHaykin, 3rd Edition, PearsonPrenticeHall.

CS4206PE: HUMAN COMPUTER INTERACTION

(ProfessionalElective- VI)

IV-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CS4206PE	**Professional Elective- VI**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:								

CourseObjectives: To gain an overview of Human-ComputerInteraction(HCI), with an understanding of use interface desig ingeneral,andalternativestotraditional"keyboardandmouse"computing; becomefamiliarwiththevocabularyassociatedwithsensoryand cognitivesystemsasrelevanttotaskperformancebyhumans;beabletoapplymod elsfromcognitivepsychologytopredictinguserperformanceinvarioushuman-computerinteractiontasksandrecognizethelimitsofhumanperformanceasthey applytocomputeroperation;appreciatetheimportanceofadesignandevaluation methodology that begins with and maintains a focus on the user; be familiarwithavarietyofbothconventionalandnon-traditionaluserinterfaceparadigms,thelatterincludingvirtualandaugmentedre ality, mobileandwearablecomputing,andubiquitouscomputing;andunderstandthes ocialimplications of technology and their ethical responsibilities as engineers in the design of technologicalsystems. Finally, working in small groups on a product design from start to finish will provide you withinvaluableteam-workexperience.

Course Outcomes:
- Ability to apply HCIandprinciplestointeractiondesign.
- Ability to design certain tools for blind orPHpeople.

UNIT-I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of gooddesign.A brief history of Screendesign.
The graphical user interface – popularity of graphics, the concept of direct manipulation,graphical system, Characteristics, Webuser–Interfacepopularity,Characteristics-Principlesofuserinterface.

UNIT-II

Design process – Human interaction with computers, importance of human characteristics humanconsideration, Human interactionspeeds, understanding businessjunctions.

ScreenDesigning:Designgoals–Screen planning and purpose,organizing screen elements,ordering of screen data and content – screen navigation and flow – Visually pleasing composition–amount of information–focus and emphasis–presentation information simply and meaningfully-informationretrievalonweb–statisticalgraphics–Technologicalconsiderationininterface design.

UNIT-III
Windows–NewandNavigationschemesselectionofwindow,selectionof devicesbasedandscreen-based controls. Components – text and messages, Icons and increases – Multimedia, colors, usesproblems, choosing colors.

UNIT-IV
HCIinthesoftwareprocess,The software lifecycle Usability engineering Iterativedesign and prototyping Design Focus:Prototyping in practice DesignrationaleDesignrulesPrinciplesto supportusabilityStandardsGoldenrulesandheuristicsHCIpatternsEvaluation techniques,Goalsofevaluation,Evaluationthroughexpertanalysis, Evaluationthroughuser participation, Choosinganevaluationmethod.Universaldesign,UniversaldesignprinciplesMulti-modalinteraction

UNIT-V
CognitivemodelsGoalandtaskhierarchiesDesignFocus: GOMSsavesmoneyLinguisticmodelsThe challenge of display-based systems PhysicalanddevicemodelsCognitivearchitectures UbiquitouscomputingandaugmentedrealitiesUbiquitouscomputingapplicationsresearchDesignFocus: AmbientWood – augmenting the physical Virtual and augmented reality Design Focus: Shared experienceDesign Focus: Applications of augmented reality Information and data visualization Design Focus:Getting the size right.

TEXTBOOKS:
1. Theessentialguidetouser interface design,WilbertOGalitz,WileyDreamTech.Units1,2,3
2. Human–ComputerInteraction.AlanDix,JanetFincay,GreGoryd,Abowd,Russell Bealg,Pearson Education Units4,5

REFERENCEBOOKS:
1. Designingtheuser interface.3rdEditionBenShneidermann, Pearson EducationAsia.
2. InteractionDesignPrece, Rogers, Sharps.WileyDreamtech.
3. UserInterfaceDesign, SorenLauesen,Pearson Education.
4. Human–ComputerInteraction, D.R.Olsen, CengageLearning.
5. Human–ComputerInteraction, Smith- Atakan, CengageLearning.

CS4207PE: CYBER FORENSICS

(ProfessionalElective-VI)

IV-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
CS4207PE	ProfessionalElective- VI	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: NetworkSecurity								

Course Objectives:

- A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
- Inorder to understand the objectives of compute r forensics, firs t of all, and people have to recognize the different roles computer plays in a certain crime.
- According to a snippet from the UnitedStatesSecurityService, the functions computer has in different kinds of crimes.

Course Outcomes:

- Students will understand the usage of computers in forensic, and how to use various forensictoolsfora widevarietyofinvestigations.
- Itgivesan opportunitytostudentstocontinue theirzeal inresearch incomputerforensics

UNIT-I

IntroductionofCybercrime:Types,TheInternetspawnscrime,Wormsversu sviruses,Computers'rolesin crimes,Introduction to digital forensics, Introduction to Incident - Incident Response Methodology –Steps-ActivitiesinInitial Response,Phase afterdetectionofan incident

UNIT-II

Initial Response and forensic duplication, Initial Response & Volatile Data Collection from Windowssystem -Initial Response & Volatile Data CollectionfromUnixsystem–ForensicDuplication:Forensic duplication:ForensicDuplicatesasAdmissibleEvidence,ForensicDuplicationTool Requirements,CreatingaForensic.Duplicate/QualifiedForensicDuplicat eofaHard Drive

UNIT-III

Forensics analysis and validation: Determining what data to collect

andanalyze,validating forensicdata, addressing data-hidingtechniques,performingremote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions,developing standard proceduresfor network forensics,using network tools,examining the honey netproject.

UNIT-IV

Current Forensic tools: evaluating computer forensic tool needs, computer forensics software tools,computer forensics hardware tools, validating and testing forensics software E-Mail Investigations:Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail,investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mailforensictools.

Cell phone and mobile device forensics: Understanding mobile device forensics, understandingacquisitionproceduresforcellphonesand mobiledevices.

UNIT-V

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft FileStructures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoftstartuptasks, MS-DOSstartuptasks, virtual machines.

TEXTBOOKS:

1. KevinMandia, ChrisProsise,"IncidentResponseandcomputerforensics",Tata McGrawHill,2006.

CS4231OE: MACHINE LEARNING
(Open Elective- III)

IV-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CS4231OE	**Open Elective- III**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:								

Course Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand arrange of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

Course Outcomes:

- Student should be able to understand the basic concepts such as decision trees and neural networks.
- Ability to formulate machine learning techniques to respective problems.
- Apply machine learning algorithms to solve problems of moderate complexity

UNIT–I

Introduction: An illustrative learning task, and a few approaches to it. Whatisknown fromalgorithms? Theory,Experiment,Biology. Psychology. OverviewofMachinelearning, related areas and applications.Linear Regression,Multiple Regression,Logistic Regression,logisticfunctions.**ConceptLearning**:Versionspaces.Inductiv eBias.Activequeries.Mistake bound/ PAC model. Basic results. Overview of issues regarding data sources, successcriteria.

UNIT– II

Decision Tree Learning: - Minimum Description Length Principle.Occam's razor. Learningwith active queries Introduction to information theory, Decision Trees, Cross Validation and over fitting. **Neural Network Learning**: Perceptions and gradient descent back propagation, multi layer networks and backpropagation.

UNIT–III

Sample Complexity and Over fitting: Errors in estimating means. Cross Validation andjackknifingVCdimension.Irrelevantfeatures: Multiplicative rulesfor weight tuning.

Support Vector Machines: functional and geometric margins, optimum margin classifier,constrained optimization, Lagrange multipliers, primal/dual problems, KKT conditions, dualofthe optimummarginclassifier,so ftmargins,andkernels.

Bayesian Approaches: The basics Expectation Maximization. Bayes theorem, Naïve BayesClassifier, Markov models, Hidden Markov Models

UNIT-IV

Instance-based Techniques: Lazy vs. eager generalization. K nearest neighbour, case-basedreasoning.**ClusteringandUnsupervised Learning:** K-means clustering, Gaussian mixturedensityestimation, model selection

UNIT-V

Genetic Algorithms: Different search methods for induction - Explanation-based Learning: using prior knowledge to reduce sample complexity.

Dimensionalityreduction: featureselection, principal componentanalysis, lineardiscriminantanalysis,factor analysis, independent component analysis, multi dimensional scaling, manifoldlearning

TEXTBOOKS:

1. TomMichel, MachineLearning, McGrawHill,1997
2. TrevorHastie,RobertTibshirani&JeromeFriedman.TheElementsofStaticallyLearning,SpringerVerlag,2001

REFERENCEBOOKS:

1. MachineLearningMethodsintheEnvironmentalSciences, NeuralNetworks, WilliamW Hsieh, Cambridge UnivPress.
2. Richardo.Duda,PeterE.HartandDavidG.Stork,pattern classification,JohnWiley&Sons Inc.,2001
3. ChrisBishop,NeuralNetworksforPatternRecognition,OxfordUniversityPress,1995

IV-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CS4232OE	**Open Elective- III**	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:								

Course Objectives:

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

Course Outcomes:

- Ability to understand the virtualization and cloudcomputing concepts.

UNIT-I
SystemsModeling,
DistributedSystemModelsandEnablingTechnologies,ComputerClusters for Scalable Parallel Computing, VirtualMachinesandVirtualization of ClustersandDatacenters.

UNIT-II
Foundations: Introduction to CloudComputing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud ComputingParadigm.

UNIT-III
Infrastructure as a Service (IAAS) & Platform and Software as a Service(PAAS/SAAS): Virtualmachinesprovisioningand
Migrationservices, On the Management of Virtualmachinesfor Cloud Infrastructures, Enhancing Cloud Computing Environments usingaclusterasaService,Secure
DistributedDataStorageinCloudComputing.

Aneka,CometCloud,T-Systems',WorkflowEngineforClouds,
Understanding ScientificApplicationsforCloudEnvironments.

UNIT-IV

Monitoring,ManagementandApplications:
AnArchitectureforFederated CloudComputing, SLA Management in CloudComputing,PerformancePredictionfor
HPConClouds,BestPracticesinArchitectingCloudApplicationsin theAWScloud,BuildingContentDeliverynetworksusingClouds,Resource CloudMashups.

UNIT-V

Governance and Case Studies: Organizational Readiness and Change management intheCloudage,Data Security in the Cloud, LegalIssuesinCloudcomputing, Achieving Production Readiness for CloudServices.

TEXTBOOKS:

1. CloudComputing: Principles and Paradigms by RajkumarBuyya, JamesBroberg and AndrzejM.Goscinski, Wiley2011.
2. Distributed and CloudComputing, KaiHwang, GeofferyC.Fox, JackJ.Dongarra, Elsevier, 2012.

REFERENCEBOOKS:

1. CloudComputing: APracticalApproach, AnthonyT.Velte, To by J.Velte, RobertElsenpeter, TataMcGrawHill, rp2011.
2. EnterpriseCloudComputing, Gautam Shroff, Cambridge UniversityPress, 2010.
3. CloudComputing: Implementation, Management and Security,JohnW. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. CloudApplicationArchitectures: Building Applications and InfrastructureintheCloud, GeorgeReese, O'Reilly,SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, TimMather, Subra Kumaraswamy, ShahedLatif, O'Reilly, SPD, rp2011.

4233OE: NATURAL LANGUAGE PROCESSING

(Open Elective- III)

IV-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
4233OE	**Open Elective- III**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:								

Course Objectives:

- Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.

Course Outcomes:

- Show sensitivity to linguistic phenomena and an ability to model the mwith formal grammars.
- Understand and carryout proper experimental methodology for training and evaluating empiricalNLPsystems
- Able to manipulate probabilities, construct statisticalmodelsoverstringsand trees and estimate parameter susing supervised and unsupervised training methods.
- Abletodesign,implement,andanalyzeNLPalgorithms
- Able todesign different language modeling Techniques.

UNIT-I

FindingtheStructureofWords: Words and Their Components, Issues and Challenges, MorphologicalModels

FindingtheStructureofDocuments: IntroductionMethods, Complexityofthe Approaches, Performances of the Approaches

UNIT-II

SyntaxAnalysisParsingNaturalLanguage, Tree banks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, ModelsforAmbiguityResolutioninParsing,MultilingualIssues

UNIT-III

SemanticParsing: Introduction, SemanticInterpretation,

SystemParadigms, for SenseSystems, Software.

UNIT-IV
Predicate-ArgumentStructure, Meaning RepresentationSystems,Software.

UNIT-V
Discourse Processing: Cohension, Reference Resolution, Discourse Cohension and Structure**LanguageModeling:** Introduction, N-GramModels, LanguageModelEvaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-SpecificModelingProblems, Multilingual and CrosslingualLanguage Modeling

TEXTBOOKS:
1. MultilingualnaturalLanguageProcessingApplications:From TheorytoPractice–Daniel M.Bikeland Imed Zitouni,Pearson Publication
2. NaturalLanguageProcessingandInformationRetrieval:TanvierSiddiqui,U.S.Tiwary

REFERENCEBOOK:

1. Speech and NaturalLanguageProcessing-DanielJurafsky&JamesHMartin,PearsonPublications

E4231OE: INSTRUMENTATION AND CONTROL

(Open Elective- III)

IV-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
EE4231OE	**Open Elective- III**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:	**BasicElectricalEngineering,AnalogElectronics,Mathematics**							

Course objectives:

- To introduce the basic principles of all measuring instruments
- To deal with the measuremen to voltage, current, Powerfactor, power, energyandmagneticmeasurements.
- To understand the basic concepts of ControlEngineering

Course Outcomes: After completion of this course,the student able to

- Understand different types of measuring instruments, their construction, operation and characteristics
- Identifytheinstrumentssuitablefortypicalmeasurements
- Applytheknowledgeabouttransducersandinstrumenttransformerstou sethemeffectively.
- Applytheknowledge of basiccontrolengineering.

UNIT–I

CharacteristicsofSignals: MeasuringSystems, Performance Characteristics-Staticcharacteristics, Dynamic Characteristics; Errors in Measurement- Gross Errors, SystematicErrors, Statistical AnalysisofRandomErrors.

UNIT–II

Oscilloscope: Cathoderayoscilloscope-Cathoderaytube-timebasegenerator-horizontalandverticalamplifiers-CROprobes-applicationsofCRO-Measurementofphaseandfrequency-lissajouspatterns-Samplingoscilloscope-analoganddigitaltype.

UNIT–III

Transducers: Definitionoftransducers,Classificationoftransducers, Advantagesof electricaltransducers,Characteristics and choice of

transducers; principle of operation of resistor, inductor,LVDT and capacitor transducers.

Measurement of Non-Electrical Quantities: Measurement ofstrain, Gauge sensitivity,Displacement, Force Velocity, Angular Velocity, Acceleration, Force, Torque, Temperature,Pressure,Vacuum,Flow

UNIT–V

Introduction to Control System: Concepts of Control Systems- Open Loop andclosedloopcontrolsystemsandtheirdifferences-Differentexamplesofcontrolsystems-Classificationofcontrolsystems,Feed-BackCharacteristics,Effectsoffeedback.Mathematicalmodels–Differential equations-Impulse Response and transfer functions - TranslationalandRotational mechanicalsystems.

TEXTBOOKS:
1. G.K.Banerjee,"ElectricalandElectronicMeasurements",PHILearni ngPvt.Ltd.,2ndEdition,2016
2. S.C.Bhargava,"ElectricalMeasuringInstrumentsandMeasurements", BSPublications,2012.
3. B.C.Kuo,"AutomaticControlSystem",PrenticeHall,1995

REFERENCES:
1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", DhanpatRai&Co.Publications, 2005.
2. R.K.Rajput,"Electrical&ElectronicMeasurement&Instrumentatio n",S.ChandandCompanyLtd.,2007.
3. BuckinghamandPrice,"ElectricalMeasurements",Prentice–Hall,1988.
4. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International(P) LimitedPublishers,1stEdition2010.
5. E.W.GoldingandF.C.Widdis,"ElectricalMeasurementsandmeasur ingInstruments",fifthEdition,WheelerPublishing,2011.

EE4232OE: ENERGY STORAGE SYSTEMS

(Open Elective- III)

IV-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
EE4232OE	Open Elective- III	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:	Electro chemistry							

Course Objective:

- To enable the student to understand the need for energy storage,devices and technologies available and their applications.

Course Outcomes: After completion of this course, the student will be able to

- Analyze the characteristics of energy from various sources and need for storage.
- Classify various types of energy storage and various devices used for the purpose.
- Identify various realtime applications.

UNIT-I

Electrical Energy Storage Technologies: Characteristics of electricity, Electricity and theroles of EES, High generation cost during peak-demand periods, Need for continuous andflexible supply, Long distance between generation and consumption, Congestion in powergrids,Transmission bycable.

UNIT-II

Needs for Electrical Energy Storage: Emerging needs for EES, More renewable

energy,lessfossilfuel,SmartGriduses,Therolesofelectricalenergystoragetechnologies,Therolesfromthe viewpoint of a utility, The roles from the viewpoint of consumers, The roles from theviewpointofgeneratorsofrenewable energy.

UNIT-III

Features of Energy Storage Systems: Classification of EES systems , Mechanical storagesystems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Flywheelenergy storage (FES),Electrochemical storage systems, Secondary batteries, Flow batteries,Chemicalenergystorage,Hydrogen(H2),Synthetic naturalgas(SNG).

UNIT-IV

Types of Electrical Energy Storage systems: Electrical storage systems, Double-layer capacitors(DLC),Superconductingmagneticenergystorage(SMES),Thermal storagesystems,Standards for EES,Technical comparison of EEStechnologies.

UNIT-V

Applications: Presentstatusofapplications,Utilityuse(conventionalpowergeneration, gridoperation&service),Consumeruse(uninterruptablepowersupplyforlargeconsumers),New trends in applications ,Renewable energy generation, Smart Grid, Smart Micro grid,Smart House, Electric vehicles, Management and control hierarchy of storage systems,Internal configuration of battery storage systems, External connection of EES systems ,Aggregating EES systems and distributed generation (Virtual Power Plant), Battery SCADA–aggregationofmanydispersedbatteries.

TextBooks:

1. "JamesM.Eyer, JosephJ.IannucciandGarthP.Corey","EnergyStorageBenefitsandMar ketAnalysis",SandiaNationalLaboratories,2004.
2. TheElectricalEnergyStoragebyIECMarketStrategyBoard.

ReferenceBook:

1."Jim Eyer, Garth Corey", Energy Storage for the Electricity Grid: Benefits and MarketPotentialAssessmentGuide,Report,SandiaNationalLaborat ories,Feb201

EC4231OE: ELECTRONIC MEASURING INSTRUMENTS
(Open Elective- III)

IV-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
EC4231OE	Open Elective- III	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites:								

Course Objectives:

1. It provides an understanding of various measuring systems functioning vandmetrics for performance analysis.
2. Providesunderstandingofprinciploperation, workingofdifferentelectronicinstrumentsviz. signalgenerators, signal analyzers,recorders and measuring equipment.
3. Providesunderstandingofuseofvariousmeasuringtechniquesformeasurementofdifferent physicalparametersusingdifferent classesoftransducers.

Course Outcomes: On completion of this course student can be able to

1. Identifythevariouselectronicinstrumentsbasedontheirspecificationsforcarryingout aparticulartaskofmeasurement.
2. Measurevariousphysicalparametersbyappropriatelyselectingthetransducers.
3. Usevarioustypes ofsignalgenerators, signal analyzers for generating and analyzing various real-time signals.

UNIT-I

BlockSchematicsofMeasuringSystemsandPerformanceMetrics: PerformanceCharacteristics,StaticCharacteristics,
Accuracy,Precision,Resolution,TypesofErrors,GaussianError,RootSum Squaresformula,DynamicCharacteristics,Repeatability,
Reproducibility,Fidelity,Lag.

UNIT-II

SignalGenerators: AF,RF Signal Generators, Sweep Frequency Generators, PulseandSquarewaveGenerators,FunctionGenerators,ArbitraryWaveformGenerator, and Specifications.

UNIT-III

MeasuringInstruments:DCVoltmeters,D'ArsonvalMovement,DCCurrentMeters,AC VoltmetersandCurrentMeters,Ohmmeters,Multimeters,MeterProtection,Extensionof Range,TrueRMSRespondingVoltmeters,SpecificationsofInstruments.CRT,Block SchematicofCRO,TimeBaseCircuits,LissajousFigures,CROProbes.

UNIT-IV

Recorders: X-YPlotter,Curve tracer,GalvanometricRecorders,Servotransducers,pen driving mechanisms,MagneticRecording,Magneticrecordingtechniques.

UNIT-V

Transducers: Classification,StrainGauges,Bounded,unbounded;orceandDisplacement Transducers,ResistanceThermometers,HotwireAnemometers,LVDT,Thermocouples, Synchros,SpecialResistanceThermometers,DigitalTemperaturesensingsystem, PiezoelectricTransducers,VariableCapacitanceTransducers,MagnetoStrictiveTransducers.

TEXTBOOKS:

1. ElectronicMeasurementsandInstrumentation: B.M.Oliver, J.M.CageTMHReprint2009.
2. ElectronicInstrumentation: H.S.Kalsi–TMH, 2ndEdition2004.

REFERENCES:

1. ElectronicInstrumentationandMeasurements–DavidA.Bell, OxfordUniv.Press, 1997.
2. ModernElectronicInstrumentationandMeasurementTechniques: A.D.Helbincs, W.D. Cooper: PHI5[th]Edition2003.
3. ElectronicMeasurementsandInstrumentation–K.LalKishore, PearsonEducation 2010.
4. IndustrialInstrumentation: T.R.PadmanabhamSpringer2009.

ME4231OE: RELIABILITY ENGINEERING
(Open Elective- III)

IV-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
ME4231OE	Open Elective- III	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: Mathematics III								

Course Objectives:

- To introduce the basic concepts of reliability, various models of reliability
- To analyze reliability of various systems
- To introduce techniques of frequency and duration for reliability valuation of repairable systems.

Course Outcomes: After completion of this course, the student will be able to

- model varioussystems applying reliability networks
- evaluate the reliability of simple and complex systems
- estimate the limiting state probabilities of repairable systems
- apply various mathematical models for evaluating reliability of irreparable systems

UNIT-I

Basic Probability Theory: Elements of probability, probability distributions, Random variables,Density and Distributionfunctions-Binomialdistribution-Expectedvalueandstandarddeviation

- Binomial distribution, Poisson distribution, normal distribution, exponential distribution, Weibulldistribution.

Definition of Reliability: Definition of terms used in reliability, Component reliability, Hazardrate, derivation of the reliability function in terms of the hazard rate. Hazard models - Bath tubcurve, Effect of preventive maintenance.

Measures of reliability: Mean Time to Failure and MeanTimebetweenFailures.

UNIT–II

Network Modeling and Evaluation of Simple Systems: Basic concepts- Evaluation of networkReliability / Unreliability - Series systems,Parallelsystems-Series-Parallelsystems partiallyredundantsystems-Examples.

NetworkModelingandEvaluationofComplexsystems: Conditionalprobability methodtieset, Cutset approach-Event tree and reduced event tree methods- Relationships between tie andcutsets-Examples.

UNIT–III

TimeDependentProbability: Basicconcepts-Reliabilityfunctionf(t).F(t),R(t)andh(t)-Relationshipbetweenthesefunctions.

Network Reliability Evaluation Using Probability Distributions: Reliability Evaluation of Seriessystems, Parallelsystems–Partiallyredundantsystems-determinationofreliabilitymeasure-MTTFforseriesandparallelsystems–Examples.

UNIT–IV

DiscreteMarkovChains: Basicconcepts-Stochastictransitionalprobabilitymatrix-timedependentprobabilityevaluation-LimitingStateProbabilityevaluation-Absorbingstates–Examples.

Continuous Markov Processes: Modeling concepts- State spacediagrams-Unreliability evaluationofsingleandtwocomponentrepairablesystems

UNIT–V

Frequency and Duration Techniques: Frequency and durationconcepts,applicationtomultistateproblems, Frequencybalanceapproach.

ApproximateSystemReliabilityEvaluation: Series systems–Parallelsystems-Networkreductiontechniques-Cutsetapproach-Commonmodefailuresmodelingand evaluationtechniques-Example.

TEXTBOOKS:

1. RoyBillintonandRonaldNAllan, Reliability Evaluation of EngineeringSystems, PlenumPress, 1983.
2. E.Balagurusamy,Reliability Engineering byTataMcGraw-HillPublishingCompanyLimited, 2002.

REFERENCE BOOK:

1. K.K.Agarwal, Reliability Engineering-KluwerAcademicPublishers, 1993.

ME4232OE: INDUSTRIAL MANAGEMENT
(Open Elective- III)

IV-II:CSE(CS)								
Course Code	Category	Hours/Weak			Credits	Max Marks		
ME4232OE	Open Elective- III	L	T	P	C	CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites: None								

Course objectives:

- Understand the philosophies of managementgurus
- Understandthevarioustypesoforganization structuresandtheirfeaturesand theiradvantagesanddisadvantages.
- LearningvariousIndustrialEngineeringPracticeslikeOp erationsManagementtechniques,workstudy, statisticalqualitycontrol techniques,JobevaluationTechniquesandnetworkanal ysis techniques.

Course outcomes:

- Able to apply principles of management
- Able to design the organization structure
- Able to apply techniques for plant location, design plant layout and value analysis
- Able to carryout workstudy to find the bes tmethod for doing the work and establish standardtime for a given method
- Able to apply various qualitycontrol techniques and sampling plans
- Able to do job evaluation and network analysis.

UNIT.I

IntroductiontoManagement:Entrepreneurshipand organization-Nature andImportanceofManagement, Functions ofManagement,Taylor'sScientificManagementTheory, Fayol'sPrinciplesofManagement,Maslow's TheoryofHumanNeeds,DouglasMcGregor'sTheoryX

andTheoryY,Herzberg'sTwo-FactorTheoryofMotivation,SystemsApproachtoManagement,LeadershipStyles,SocialresponsibilitiesofManagement

UNIT.II

DesigningOrganizationalStructures:DepartmentalizationandDecentralization,TypesofOrganizationstructures-Lineorganization,Lineandstafforganization,functional organization,Committeeorganization,matrixorganization,VirtualOrganization,CellularOrganization,teamstructure,boundarylessorganization,invertedpyramidstructure,leanandflatorganizationstructureandtheirmerits,demeritsandsuitability.

UNIT.III

OperationsManagement: Objectives-productdesignprocess-Processselection-Typesofproductionsystem

(Job, batch and MassProduction), Plantlocation-factors-Urban-Ruralsites comparison- Types of Plant Layouts-Design of product layout- Line balancing (RPW method)Valueanalysis-Definition-typesofvalues-Objectives-Phasesofvalueanalysis-Fastdiagram

UNIT.IV:

WorkStudy: Introduction-definition-objectives-stepsinworkstudy-Methodstudy-definition, objectives-stepsofmethodstudy.WorkMeasurement-purpose-typesofstudy-

Stop watch methods steps – keyrating – allowances - standardtimecalculations-worksampling.

Statistical Quality Control: variables-attributes, Shewart control charts for variables- chart, Rchart, - Attributes-Defective-Defect- Charts for attributes-p-chart -c chart (simple Problems),AcceptanceSampling-Singlesampling-Doublesamplingplans-OCcurves.

UNIT.V

Job Evaluation: Methods of job evaluation - simple routing objective systems - classificationmethod factor comparison method,pointmethod,benefits of job evaluation and limitations.ProjectManagement(PERT/CPM):

NetworkAnalysis,ProgrammeEvaluationandReviewTechniqu e(PERT), Critical Path Method (CPM), Identifying critical path, ProbabilityofCompletingtheprojectwithin giventime,ProjectCostAnalysis,ProjectCrashing.(Simpleprob lems)

TEXTBOOKS:

1. IndustrialEngineeringandManagement/O.P.Khanna/Khanna Publishers.
2. Industrial Engineering and Management Science/T.R. Banga and S.C.Sarma/KhannaPublishers.

REFERENCEBOOKS:

1. Motion and TimeStudy by RalphMBarnes! JohnWilley&SonsWorkStudybylLO.
2. Humanfactors in Engineering&Design/ErnestJMcCormick/TMH.
3. Production&OperationManagement/PaneerSelvam/PHI.
4. IndustrialEngineeringManagement/NVSRaju/CengageLearni ng.
5. IndustrialEngineeringHandBook/Maynard.
6. IndustrialEngineeringManagementI Ravi Shankar/Galgotia.

ME4233OE: RENEWABLE ENERGY SOURCES
(Open Elective- III)

IV-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
ME4233OE	**Open Elective- III**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites:	**None**							

Course Objectives:

- To explain the concepts of Non-renewable and renewable energysystems
- To outline utilization of renewable energy sources for both domestic andindustrialapplications
- To analyse the environmenta l and cost economic sofrenewableenergy sources in comparison with fossilfuels.

Course Outcomes:

- Understanding of renewable energysources
- Knowledge of working principle of various energysystems
- Capability to carry out basic design of renewable energysystems

UNIT.I

Global and National Energy Scenario: Over view of conventional & renewable energy sources,need & development of renewable energy sources, types of renewable energy systems, Future ofEnergyUse, Global and IndianEnergy scenario,Renewable and Non-renewableEnergy sources,Energy for sustainable development, Potential of renewable energy sources, renewable electricityand key elements, Global climate change, CO2 reduction potential of renewable energy- conceptofHybridsystems.

UNIT.II

Solar Energy: Solar energy system, Solar Radiation, Availability, Measurement and Estimation,Solar Thermal ConversionDevicesandStorage, ApplicationsSolarPhotovoltaicConversion

solarphotovoltaic,solarthermal,applicationsofsolarenergysystems.

UNIT.III

WindEnergy: WindEnergyConversion,Potential,Windenergypotentialmeasurement,Siteselection,Typesofwindturbines,Windfarms,wind GenerationandControl.Nature of the wind, power inthewind,factorsinfluencingwind,windatand energyestimation, windspeedmonitoring,classificationofwind,characteristics,applicationsofwindturbines,offshorewindenergy-Hybridsystems,windresourceassessment,Betzlimit,siteselection,windenergyconversiondevices. Safety and environmental aspects, wind energy potential and installation in India.

UNIT.IV

Biogas: Properties of biogas (Calorific valueand composition), biogasplanttechnologyandstatus,Bioenergysystem,designand constructionalfeatures.Biomassresourcesandtheirclassification,Biomass conversionprocesses,Thermochemicalconversion,direct combustion,biomassgasification,pyrolysis and liquefaction, biochemical conversion,anaerobicdigestion,typesofbiogasPlants,applications,alcoholproductionfrombiomass,biodieselproduction, Urbanwastetoenergyconversion, BiomassenergyprogrammeinIndia.

UNIT.V

Ocean Energy: Ocean wave energy conversion, principle of Ocean Thermal Energy Conversion (OTEC), ocean thermal power plants, tidal energyconversion, Tidalandwave energy its scope and development, Scheme of development to ftidalenergy.

Small hydro Power Plant: Importance of small hydro power plants and theirElements, types of turbines for small hydro, estimation of primary and secondarypower.

GeothermalEnergy: Geothermalpowerplants,typesof Geothermal resources, hot springs andsteamejection.

TEXTBOOKS:

1. RenewableEnergySources/Twidell,J.W.andWeir,A./EFNSp onLtd.,1986.
2. Non-ConventionalEnergySources/G.DRai/KhannaPublishers

REFERENCEBOOKS:

1. Kishore VVN,RenewableEnergyEngineeringandTechnology,TeriPress, NewDelhi,2012
2. GodfreyBoyle, RenewableEnergy, Power for a SustainableFuture, Oxford UniversityPress, U.K, 1996.
3. Non-ConventionalEnergyResourcesbyEHKhan

CE4231OE: REMOTE SENSING AND GIS
(OpenElective-III)

IV-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
ME4233OE	**Open Elective- III**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites: Surveying								

Course Objectives: This course will make the student to understand about the principles of GIS, Remote Sensing, SpatialSystems and its applicationsto EngineeringProblems.

CourseOutcomes: At theend of the course, thestudent willbe ableto:

- Retrieve the information content of remotely sensed data
- Analyze the energy interactions in the a tmosphere and earth surface features
- Interpret the images for preparation of the maticmaps
- Apply problems pecific remote sensing data for engineering applications
- Analyze spatial and attribute data for solving spatial problems
- Create GIS and car to graphic outputs for presentation

UNIT– I

Introduction to Photogrammetry: Principles& types of aerial photograph, geometry of verticalaerial photograph, Scale & Height measurement on single verticalaerialphotograph,Heigh measurement based on relief displacement, Fundamentalsofstereoscopy,fiducialpoints,parallaxmeasurement usingfiducial line.

UNIT– II

Remote Sensing: Basic concept of remote sensing, Data and Information, Remote sensing dataCollection,Remotesensingadvantages&Limitations,RemoteSensingprocess.Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surfacefeatures (soil,water, vegetation), Indian Satellites and Sensors characteristics,Resolution,MapandImage andFalsecolorcomposite,introductiontodigitaldata,elementsofvisualinterpretationtechniques.

UNIT– III

GeographicInformationSystems: Introduction to GIS; Components of a GIS; GeospatialData: Spatial Data-Attribute data – Joining Spatial and Attribute data; GIS Operations: SpatialDataInput-AttributedataManagement–Datadisplay-DataExploration-DataAnalysis.COORDINATESYSTEMS: GeographicCoordinateSystem:ApproximationoftheEarth,Datum;Map Projections: Types of Map Projections-Map projection parameters- Commonly usedMapProjections -Projected coordinate Systems

UNIT– IV

Vector Data Model: Representation of simple features- Topology and its importance; coverageand its data structure, Shape file; Data models for composite features Object BasedVector DataModel; Classes and their Relationship; The geobase data model; Geometric representation ofSpatialFeatureand datastructure, Topologyrules

UNIT– V

Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster DataStructure, Data Conversion, Integration of Rasterand Vectordata.

Data Input: Metadata, Conversion of Existing data, creating new data; Remote Sensing data,Field data, Text data, Digitizing, Scanning, on screen digitizing, importance of source map, DataEditing

TEXTBOOKS:

1. RemoteSensingandGISLillesandandKiefer, JohnWilley2008.

2. RemoteSensingandGISB.BhattabyOxfordPublishers2015.

3. IntroductiontoGeographicInformationSystem–Kang-TsungChang,McGraw-Hill2015

REFERENCES:

1. Concepts&Techniques of GIS by C.P.LoAlbert,K.W.Yonng, PrenticeHall(India) Publications.

2. PrincipalsofGeophysicalInformationSystems–PeterABurraghandRachaelA.McDonnell, Oxford Publishers 2004.

3. BasicsofRemotesensing&GISbyS.Kumar,Laxmi Publications.

CE4232OE: DISASTER MANAGEMENT
(OpenElective-III)

IV-II:CSE(CS)								
Course Code	**Category**	**Hours/Weak**			**Credits**	**Max Marks**		
CE4232OE	**Open Elective- III**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact Classes:45	**Tutorial classes:15**	**Practical classes: Nill**				**Total Classes:60**		
Prerequisites: Surveying								

Course Objectives: The subject provides different disasters, tools and methods for disastermanagement.

Course Outcomes: At the end ofthe course, the student willbe able to:

- Understanding Disasters,man-madeHazards and Vulnerabilities
- Understanding disastermanagement mechanism
- Understanding capacity building concepts and planning of disaster managements

UNIT-I

Understanding Disaster: Concept of Disaster - Different approaches- Concept of Risk - LevelsofDisasters -DisasterPhenomenaand Events (Global,national and regional)

Hazards and Vulnerabilities: Natural and man-made hazards; response time, frequency andforewarning levels of different hazards - Characteristics and damage potential or natural hazards;hazard assessment - Dimensions of vulnerability factors; vulnerability assessment - Vulnerabilityanddisasterrisk - Vulnerabilities to flood and earthquakehazards

UNIT-II

Disaster Management Mechanism: Concepts of risk management and crisis managements-DisasterManagementCycle-ResponseandRecovery-Development, Prevention, MitigationandPreparedness-PlanningforRelief

UNIT-III

CapacityBuilding: Capacity Building:

Concept-StructuralandNonstructuralMeasuresCapacity Assessment; Strengthening Capacity for Reducing Risk – Counter -Disaster ResourcesandtheirutilityinDisasterManagement-LegislativeSupportatthe stateandnational levels

UNIT-IV

CopingwithDisaster: CopingStrategies; alternative adjustment processes– Changing Concepts of disaster management - Industrial Safety Plan; Safety norms and survival kits - Massmediaand disastermanagement

UNIT-V

Planning for disaster management: Strategies for disaster management planning - Steps forformulating a disaster risk reduction plan - Disaster management Act and Policy in India -Organizational structure for disaster management in India- Preparation of state and districtdisastermanagement plans

TEXTBOOKS:

1. ManualonDisasterManagement, NationalDisasterManagement,Agency Govt of India.

2. DisasterManagementbyMrinaliniPandeyWiley2014.

3. DisasterScienceandManagementbyT.Bhattacharya,McGrawHillEducation(India)PvtLtd Wiley2015

REFERENCES:

1. EarthandAtmosphericDisastersManagement, N.Pandharinath, CKRajanBSPublications2009.

2. NationalDisasterManagementPlan,MinistryofHomeaffairs,GovernmentofIndia(http://www.ndma.gov.in/images/policyplan/dmplan/draftndmp.pdf)