

NATIONAL ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to Anna University, Chennai)

K.R.NAGAR, KOVILPATTI – 628 503

www.nec.edu.in

REGULATIONS – 2013



**DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING**

**CURRICULUM AND SYLLABI OF
B.E. – COMPUTER SCIENCE AND ENGINEERING**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION

- To produce globally competent, innovative and socially responsible computer professionals

MISSION

- To provide world-class teaching - learning and research facilities.
- To stimulate students' logical thinking, creativity, and communication skills effectively.
- To cultivate awareness about emerging trends through self-initiative.
- To instil a sense of societal and ethical responsibilities.
- To collaborate with industries and government organizations.

Program Educational Objectives (PEO)

- Accomplish their professional career and/or pursue higher education by applying knowledge of computer science and engineering.
- Exhibit their technical skills to analyze and design appropriate solutions with social consciousness and ethical values.
- Adapt themselves to organizational needs by learning advanced technologies.

Program Outcomes (PO)

By the time of graduation graduates will attain the following programme outcomes:

1. Apply knowledge of mathematics, natural science, engineering fundamentals and system fundamentals, software development, networking & communication, and information assurance & security to the solution of complex engineering problems in computer science and engineering.
2. Identify, formulate, research literature and analyse complex computer science and engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, engineering sciences, system fundamentals, software development, networking & communication, and information assurance & security.
3. Design solutions for complex computer science and engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems in networking & communication, and information assurance & security using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
5. Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex computer science and engineering problems, with an understanding of the limitations.
6. Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice in system development and solutions to complex engineering problems related to system fundamentals, software development, networking & communication, and information assurance & security.
7. Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems related to system fundamentals, software development, networking & communication, and information assurance & security in societal and environmental contexts.
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of computer science and engineering practice.
9. Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.
12. Demonstrate knowledge and understanding of engineering management principles and economic decision making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

REGULATIONS 2013 – CURRICULUM AND SYLLABI**B.E. – COMPUTER SCIENCE AND ENGINEERING****SEMESTER I** (Common to all B.E. / B.Tech., Degree Programmes)

Sl. No.	Course Code	Course Title	L	T	P	C
<i>THEORY</i>						
1.	SH100	Technical English – I	3	1	0	4
2.	SH101	Matrices and Differential Calculus	3	1	0	4
3.	SH102	Applied Physics	3	0	0	3
4.	SH103	Engineering Chemistry	3	0	0	3
5.	SH104	Fundamentals of Computing and Programming in C	3	0	0	3
6.	SH105	Engineering Graphics	2	3	0	4
<i>PRACTICAL</i>						
7.	SH106	C Programming Laboratory	0	0	3	2
8.	SH107	Physics and Chemistry Laboratory – I Part A – Physics Laboratory – I Part B – Chemistry Laboratory – I	0	0	3	2
9.	SH108	Engineering Practices Laboratory Part A – Mechanical and Civil Engineering Practices Part B – Electrical and Electronics Engineering Practices	0	0	3	2
Total Number of Credits :					27	

SEMESTER II

S. NO.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	13C20	Technical English – II (<i>Common to all</i>)	3	0	0	3
2.	13C21	Integral Calculus and Transforms (<i>Common to all</i>)	3	1	0	4
3.	13C22	Solid State Physics (<i>Common to ECE, CSE, EEE, EIE, and IT</i>)	3	0	0	3
4.	13C23	Chemistry of Electrical and Electronic Materials (<i>Common to ECE, CSE, EEE, EIE and IT</i>)	3	0	0	3
5.	13C24	Electric Circuits and Electron Devices (<i>Common to CSE and IT</i>)	3	1	0	4
6.	13C25	Basic Civil and Mechanical Engineering (<i>Common to ECE, CSE, EEE, EIE and IT</i>)	4	0	0	4
PRACTICAL						
7.	13C26	Computer Programming Laboratory (<i>Common to all</i>)	0	1	2	2
8.	13C27	Physics and Chemistry Laboratory – II (<i>Common to all</i>) Part A – Physics Laboratory – II Part B – Chemistry Laboratory – II	0	0	3	2
9.	13C28	Electronic Devices and Circuits Laboratory (<i>Common to CSE and IT</i>)	0	0	3	2
10.	13C29	English Language Skill Laboratory (<i>Common to all</i>)	0	0	3	2
Total Number of Credits :				29		

SEMESTER III

S. NO	COURSE CODE	COURSE TITLE	L	T	P	C
Theory						
1	13CS31	Complex Analysis and Numerical Methods	3	1	0	4
2	13CS32	Environmental Science and Engineering	3	0	0	3
3	13CS33	Data Structures and Applications	3	1	0	4
4	13CS34	Computer Networks	3	1	0	4
5	13CS35	Object Oriented Programming	3	0	0	3
6	13CS36	Digital Principles and System Design	3	0	2	4
Practical						
7	13CS37	Data Structures Laboratory	0	0	3	2
8	13CS38	Object Oriented Programming Laboratory	0	0	3	2
9	13CS39	Communication Skills and Technical Seminar	0	0	3	2
			18	3	11	28
Total Number of Credits : 28						

SEMESTER IV

S. NO	COURSE CODE	COURSE TITLE	L	T	P	C
Theory						
1	13CS41	Probability and Queueing Theory	3	1	0	4
2	13CS42	Design and Analysis of Algorithms	3	1	0	4
3	13CS43	Operating Systems	3	0	0	3
4	13CS44	Java Programming	3	1	0	4
5	13CS45	Database Management Systems	3	0	0	3
6	13CS46	Computer Organization and Architecture	3	1	0	4
Practical						
7	13CS47	Operating Systems Laboratory	0	0	3	2
8	13CS48	Java Database Access Laboratory	0	0	3	2
			18	4	6	26
Total Number of Credits : 26						

SEMESTER V

S. No	Course Code	Course Title	L	T	P	C
Theory						
1.	13CS51	Discrete Mathematics	3	1	0	4
2.	13CS52	Theory of Computation	3	1	0	4
3.	13CS53	Microcontroller and Embedded Systems	3	1	0	4
4.	13CS54	C# and .Net Technologies	3	0	0	3
5.	13CS55	Professional Ethics and Human Values (Common to all Branches)	3	0	0	3
6.		Elective - I	3	0	0	3
Practical						
7.	13CS57	Microcontroller and Embedded Systems Laboratory	0	0	3	2
8.	13CS58	C# and .Net Technologies Laboratory	0	0	3	2
			18	3	6	25
Total Number of Credits : 25						

SEMESTER VI

S. No	Course Code	Course Title	L	T	P	C
Theory						
1.	13CS61	Principles of Management (Common to all Branches)	3	0	0	3
2.	13CS62	Internet and Web Technology (Common to CSE, ECE and IT)	3	0	0	3
3.	13CS63	Software Engineering Methodologies	3	0	0	3
4.	13CS64	Principles of Compiler Design	3	1	0	4
5.	13CS65	Network Security	3	1	0	4
6.		Elective - II	3	0	0	3
Practical						
7.	13CS67	Network Security Laboratory	0	0	3	2
8.	13CS68	Internet and Web Technology Laboratory (Common to CSE and IT)	0	0	3	2
9.	13CS69	Comprehension	0	0	3	1
			18	2	9	25
Total Number of Credits : 25						

SEMESTER VII

S. No	Course Code	Course Title	L	T	P	C
Theory						
1	13CS71	Computer Graphics and Visualization	3	1	0	4
2	13CS72	Mobile Application Development	3	0	0	3
3	13CS73	Artificial Intelligence and Robotics (Common to CSE, ECE and Mechanical)	3	0	0	3
4	13CS74	Object Oriented Analysis and Design	3	0	0	3
5	E3	Elective - III	3	0	0	3
6	E4	Elective - IV	3	0	0	3
Practical						
7	13CS77	Computer Graphics and Visualization Laboratory	0	0	3	2
8	13CS78	Mobile Application Development Laboratory	0	0	3	2
			18	1	6	23
Total Number of Credits : 23						

SEMESTER VIII

S. No	Course Code	Course Title	L	T	P	C
Theory						
1	13CS81	Software Testing Techniques	3	0	0	3
2	13CS82	Mobile and Pervasive Computing	3	0	0	3
3	E5	Elective - V	3	0	0	3
4	E6	Elective - VI	3	0	0	3
5	E7	Elective - VII	3	0	0	3
Practical						
6	13CS87	Project Work	0	0	18	6
			15	0	18	21
Total Number of Credits : 21						

CORE ELECTIVES

S. No.	Course Code	Course Title	L	T	P	C
1.	13CSAA	Advanced Database Technology (Common to CSE and IT)	3	0	0	3
2.	13CSAB	Advanced Java Programming	3	0	0	3
3.	13CSAC	Unix Internals	3	0	0	3
4.	13CSAD	Neuro Fuzzy Systems	3	0	0	3
5.	13CSAE	Distributed Computing	3	0	0	3
6.	13CSAF	Computational Graph Theory	3	0	0	3
7.	13CSAG	Applied Game Theory	3	0	0	3
8.	13CSAH	Business Intelligence and its Applications (Common to CSE, ECE and IT)	3	0	0	3
9.	13CSAJ	Windows Internals	3	0	0	3
10.	13CSAK	Advanced Computer Architecture	3	0	0	3
11.	13CSAL	Computer Oriented Optimization Techniques	3	0	0	3
12.	13CSAM	Data Mining	3	0	0	3
13.	13CSAN	Cyber Forensics and Ethical Hacking	3	0	0	3
14.	13CSAP	Simulation Theory and Practices	3	0	0	3
15.	13CSAR	Software Quality Management	3	0	0	3
16.	13CSAS	M-Commerce (Common to CSE and IT)	3	0	0	3
17.	13CSAT	Nature and Bio Inspired Computing	3	0	0	3
18.	13CSAU	Adhoc and Sensor Networks	3	0	0	3
19.	13CSAV	Medical Imaging	3	0	0	3

INTERDISCIPLINARY ELECTIVES (Maximum of 2 Electives to be opted)

S. No.	Course Code	Course Title	L	T	P	C
1.	13CSBA	Social Computing (Common to IT, ECE and CSE)	3	0	0	3
2.	13CSBB	Analytic Computing (Common to IT, ECE and CSE)	3	0	0	3
3.	13CSBC	Cloud Computing (Common to IT, ECE, CSE and EEE)	3	0	0	3
4.	13CSBD	High Speed Networks (Common to ECE, CSE and IT)	3	0	0	3
5.	13CSBE	Service Oriented Architecture (Common to IT and CSE)	3	0	0	3

TRANS DISCIPLINARY ELECTIVES

S. No.	Course Code	Course Title	L	T	P	C
Any one of the following course is compulsory						
1.	13TD01E	Indian Business Laws	0	0	0	3
2.	13TD02E	Leadership and Personality Development	0	0	0	3
3.	13TD03E	International Business Management	0	0	0	3
4.	13TD04E	Basics of Marketing	0	0	0	3
5.	13TD05E	Retailing and Distribution management	0	0	0	3
6.	13TD06E	International Economics	0	0	0	3
7.	13TD07E	Indian Economy	0	0	0	3
8.	13TD08E	Rural Economics	0	0	0	3
9.	13TD09E	International Trade	0	0	0	3
10.	13TD10E	Global Challenges and issues	0	0	0	3
11.	13TD11E	Indian Culture and Heritage	0	0	0	3
12.	13TD12E	Indian History	0	0	0	3
13.	13TD13E	Sustainable Development and Practices	0	0	0	3
14.	13TD14E	Women in Indian Society	0	0	0	3
15.	13TD15E	Indian Constitution	0	0	0	3
16.	13TD16E	Bio Mechanics in Sports	0	0	0	3

SH100

TECHNICAL ENGLISH – I
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C
3 1 0 4

COURSE OUTCOMES

The Student will

- apply basic grammar in Writing and Speaking.
- prepare formal Letter Writings.
- come out with proper pronunciation.
- speak confidently in interactions.
- develop interest to read any article.

UNIT I**12****Language Focus:** Technical Vocabulary, Word Formation, Concord, Tense (Present).**Writing:** Leave Application Letter, Paragraph writing.**Listening:** Listening to correct pronunciation of words.**Speaking:** Self - Introduction, Greetings.**UNIT II****12****Language Focus:** Words often misspelled, Articles, Tense (Past)**Writing:** Permission letters (In-plant training/Seminar/Workshop), Chart description.**Listening:** Listening to the Sentences with correct stress and Intonation.**Speaking:** Situational Conversations.**UNIT III****12****Language Focus:** Compound nouns, Tense (Future), Preposition, Comparative Adjectives.**Writing:** Invitation Letter, Acceptance Letter, Declining Letter.**Listening:** Listening to the conversations.**Speaking:** One minute speech.**UNIT IV****12****Language Focus:** Modal verbs, Gerund, Infinitives, Voice.**Writing:** Writing Instructions, Letters to Editor.**Listening:** Listening to the different Tonal Expressions.**Speaking:** Giving Opinions.**UNIT V****12****Language Focus:** 'If' Conditionals, 'Wh' questions, Question Tags.**Writing:** Reading and Note - taking**Speaking:** Group Discussion.**Reading:** ERC, one word questions from the suggested book.**SUGGESTED ACTIVITIES**

1. Matching words and meanings – Using words in context – Making sentences.
2. Exercises on gap filling and correction of errors on Concord (Subject – Verb Agreement).
3. Gap filling exercises using the appropriate Tense forms.
4. Exercises on transferring information from Graph to Text – Bar charts, Flow charts.
5. Making sentences using Modal verbs to express probability, compulsion, etc.
6. Exercises on Writing Instructions.
7. Exercises on framing Questions.
8. Other relevant classroom activities.

L: 45 T: 15 TOTAL: 60 PERIODS

BOOK SUGGESTED FOR READING

1. R.K.Narayanan, “Malgudi Days”, Indian Thought Publications, 1943.

REFERENCES

1. Rizvi. M. Ashraf, “Effective Technical Communication”, McGraw Hill Companies, 2005.
2. P.K.Dutt, G.Rajeevan and C.L.N. Prakash, “A Course in Communication Skills”, Cambridge University Press India, 2007.
3. Andrea.J.Rutherford, “Basic Communication Skills for Technology”, Pearson Education, 2nd Edition, 2007.

SH101**MATRICES AND DIFFERENTIAL CALCULUS
(Common to all B.E. / B.Tech., Degree Programmes)****L T P C
3 1 0 4****COURSE OUTCOMES**

- Ability to find inverse and integral powers of matrices and to perform transformations of matrices.
- Ability to find the evolutes of various curves.
- Ability to solve ordinary and partial differential equations.
- Ability to obtain constrained maxima and minima.

UNIT I MATRICES**12**

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties (excluding proofs); Cayley – Hamilton theorem (excluding proof) – Inverse and integral powers of a matrix using Cayley – Hamilton theorem; Diagonalisation of a matrix by orthogonal transformation; Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT II DIFFERENTIAL CALCULUS**12**

Curvature in cartesian, parametric and polar forms; Centre, radius and circle of curvature; Evolutes.

UNIT III FUNCTIONS OF SEVERAL VARIABLES**12**

Partial derivatives; Total derivatives; Differentiation of implicit functions; Jacobians; Maxima and Minima - Method of Lagrangian multipliers.

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS**12**

Higher order linear differential equations with constant coefficients; Method of variation of parameters; Cauchy's and Legendre's linear equations; Simultaneous first order linear equations with constant coefficients.

UNIT V PARTIAL DIFFERENTIAL EQUATIONS**12**

Formation of partial differential equations; Lagrange's linear equations; Solutions of standard types of first order partial differential equations; Linear partial differential equations of second and higher order with constant coefficients.

L: 45 T: 15 TOTAL: 60 PERIODS**TEXT BOOKS**

1. Grewal. B.S, "Higher Engineering Mathematics", Khanna Publications, Delhi, 40th Edition, 2007.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India, 8th Edition, Reprint 2011.

REFERENCES

1. Bali N. P. and Manish Goyal, "Text book of Engineering Mathematics", Laxmi Publications Private Limited, 7th Edition, Reprint, 2010.
2. Ramana.B.V., "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2007.
3. Jain.R.K. and Iyengar.S.R.K., "Advanced Engineering Mathematics", Narosa Publishing House Private Limited, 3rd Edition, 2007.
4. Veerarajan.T., "Engineering Mathematics for semester I and II", Tata McGraw Hill Education Private Limited, New Delhi, 3rd Edition, 2012.
5. Veerarajan.T., "Transforms and Partial Differential Equations", Tata McGraw Hill Education Private Limited, New Delhi, 2012.

SH102

APPLIED PHYSICS
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C
3 0 0 3

COURSE OUTCOMES

The students will be able to

- gain knowledge on the properties of matter and hydrodynamics.
- study and apply the ultrasonic methods for industrial and medical field.
- understand Lasers and to identify the appropriate Laser technique for industrial and medical field.
- understand the different types, fabrication, losses of optical fibers and the applications of fiber optics in communication and instrumentation.
- understand the physical properties of photons and electrons and to study the different Electron Microscopes.

UNIT I PROPERTIES OF MATTER AND HYDRODYNAMICS 9

Properties of Matter

Stress, Strain, Hooke's law; Types of moduli of elasticity; Torsional pendulum – Determination of Rigidity modulus of a wire; Bending of beams – Expression for bending moment – Measurement of Young's modulus by uniform and Non- uniform bending – I Shaped girders.

Hydrodynamics

Stream line flow, Turbulent flow, Poiseuille's formula for flow of liquid through a capillary tube, Determination of coefficient of viscosity of a liquid.

UNIT II ULTRASONICS 9

Production – magnetostriction effect – magnetostriction generator – piezoelectric effect – piezoelectric generator; Detection of ultrasonic waves; Properties – Cavitations – Velocity measurement – acoustic grating; Industrial applications – drilling, welding, soldering and cleaning – SONAR - Non Destructive Testing – pulse echo system through transmission and reflection modes – A,B and C scan displays; Medical applications – Sonograms.

UNIT III LASERS 9

Principle of spontaneous emission and stimulated emission, Population inversion, Pumping, Einstein's A and B coefficients – derivation; Types of Lasers - CO₂ Laser, Nd-YAG Laser, Semiconductor Laser (Homojunction); Determination of wavelength of Laser using grating and Particle size; Applications of Lasers: Industrial applications – Welding, Cutting and Heat treatment; Medical applications; Holography (construction and reconstruction).

UNIT IV FIBER OPTICS AND ITS APPLICATIONS 9

Principle and propagation of light in optical fibers; Numerical aperture and Acceptance angle; Types of optical fibers – material, refractive index and mode; Double crucible technique of fiber drawing; Splicing – fusion splicing; Loss in optical fiber – attenuation, dispersion and bending; Fiber optical communication system (Block diagram); Advantages and Applications of optical fiber; Fiber optic sensors – temperature and displacement; Endoscope.

UNIT V QUANTUM PHYSICS AND MICROSCOPY 9

Black body radiation – Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh Jean's Law from Planck's theory; Photoelectric effect – Law of Photoelectric effect – Photoelectric equation; Matter Waves – De Broglie wavelength - Schrodinger's wave equation – time independent and time dependent equations – Particle in one dimensional box; Heisenberg's Uncertainty principle; Linear Harmonic oscillator; Electron microscope – scanning electron microscope – transmission electron microscope.

TOTAL: 45 PERIODS

TEXT BOOKS

1. R.K.Gaur and S.C.Gupta, "Engineering Physics", Dhanpat Rai Publications, New Delhi, 2009.
2. M.Arumugam, "Engineering Physics", Anuradha Publishers, 2010.

REFERENCES

1. David Halliday, Robert Resnick, Jearl Walker, "Fundamentals of Physics", John Wiley and Sons, Inc., USA, 9th Edition, 2013.
2. Arthur Beiser, "Concepts of Modern Physics", McGraw Hill Publications Private Limited, 5th Edition, 2008.
3. Richard P.Feynmann, Robert B.Leighton and Mathew Sands, "Feynmann's Lectures on Physics", Addison Wesley Publication, USA, 2010.
4. Yoav Peleg, Reuven Pnini, Elvahu Zaarur, Eugene Hecht, "Schaum's Outline of Quantum Mechanics", McGraw Hill Companies Limited, USA, 2nd Edition, 2010.

SH103

ENGINEERING CHEMISTRY
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C
3 0 0 3

COURSE OUTCOMES

The students will be able to

- select suitable water treatment techniques for industrial and domestic purpose.
- acquire knowledge of electrochemistry.
- apply the contextual knowledge of adsorption techniques for industrial applications.
- synthesize polymers for domestic and industrial applications.
- understand the knowledge of nano materials for their applications in Science and Engineering.

UNIT I WATER TREATMENT 9

Hardness: types of hardness, estimation of hardness of water – EDTA method – problems; disadvantages of hard water: scales and sludges – disadvantages of scales and sludges – boiler corrosion – priming and foaming – caustic embrittlement; domestic water treatment: screening, sedimentation, coagulation, filtration, disinfection – chlorine – UV method; water softening: demineralization process; desalination: definition, reverse osmosis.

UNIT II ELECTRO ANALYTICAL TECHNIQUES 9

Electrode potential: definition, measurement of electrode potential, Nernst equation – problems; EMF: definition, measurement of EMF – Poggendorff's method; reference electrode: standard hydrogen electrode, calomel electrode, glass electrode – measurement of pH using glass electrode; CO₂ sensing electrode; conductometric titrations: acid-base titration (HCl vs NaOH); potentiometric titrations: redox titration (Fe²⁺ vs K₂Cr₂O₇), precipitation titration (Ag⁺ vs NaCl).

UNIT III CATALYSIS AND SURFACE PHENOMENA 9

Types of catalysis – homogeneous catalysis – heterogeneous catalysis, mechanism of catalytic action - contact theory, catalytic promoters, catalytic poison; enzyme catalysis: Michaelis-Menton equation; adsorption: definition, types – physical adsorption – chemical adsorption – differences between physical and chemical adsorption; adsorption isotherms: definition, Freundlich and Langmuir adsorption isotherms, applications of adsorption.

UNIT IV ENGINEERING POLYMERS 9

Polymerization – types of polymerization – addition – free radical addition polymerization mechanism – copolymerization – condensation polymerization; plastics: classification – thermoplastics and thermosetting plastics, preparation, properties and uses of commercial plastics – PVC, teflon, perlon – U, bakelite; rubber: vulcanization of rubber, synthetic rubber – butyl rubber, SBR; composites: definition, types of composites – polymer matrix composites – FRP.

UNIT V NANO MATERIALS 9

Nanoparticles: definition, carbon nanotubes (CNT), types of carbon nano tubes – single walled and multi walled carbon nanotubes – fullerene; synthesis of carbon nanotubes: chemical vapour deposition – laser ablation – arc-discharge method; properties of CNT: mechanical, electrical, thermal and optical properties; applications of carbon nanotubes in chemical field, medicinal field, mechanical field and current applications.

TOTAL: 45 PERIODS**TEXT BOOKS**

1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 15th Edition, 2005.
2. S.S.Dara, "A text book of Engineering Chemistry", S. Chand and Company Limited, New Delhi, 12th Edition, 2006.

REFERENCES

1. J.Hammer Mark, “Water and Waste water Technology”, Prentice Hall, New Arrivals, 2012.
2. G.Whitmore, “Electrochemistry and its Applications”, Sarup book publishers, New Delhi, 2009.
3. G.Whitmore, “Adsorption and Catalysis”, Sarup Book Publishers, New Delhi, 2008.
4. Fred.Bilmayer, “Text book of Polymer Science”, Wiley, 1st Edition, 2007.
5. T.Pradeep, “Nano – The Essential”, Tata McGraw Hill Education Private Limited, New Delhi, 2012.
6. S.C.Bhatia, “Engineering Chemistry”, CBS Publishers and Distributors, 1st Edition, 2011.

SH104 FUNDAMENTALS OF COMPUTING AND PROGRAMMING IN C
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C
3 0 0 3

COURSE OUTCOMES

- Learn the major components of a computer system.
- Formulate the algorithms and analyze their complexity.
- Identify the correct and efficient ways of solving problems.
- Acquire knowledge about dynamic memory allocation, modular programming and data organization.
- Develop real time applications using the power of C language features.

UNIT I COMPUTER FUNDAMENTALS 10

Introduction – Characteristics of Computers – Evolution of Computers – Computer Generations – Classification of Computers – Basic Computer organization – Number Systems – Problem Analysis – Algorithms – Flow charts – Computer Software – Types of Software.

UNIT II BASIC C PROGRAMMING 9

Structure of C Program – Keywords, Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operators – Decision Making – Branching and Looping.

UNIT III FUNCTIONS, ARRAYS AND POINTERS 9

Functions: User-defined functions – Definitions – Declarations - Call by reference – Call by value. Arrays: Declaration – Definition – Multidimensional Arrays – Functions with array as arguments. Pointers: Initialization – Pointers as Arguments – Pointers to Pointers – Dynamic Memory Management Functions.

UNIT IV STRUCTURES AND UNIONS 9

Derived types – Structures: Declaration – Definition – Initialization of structures – Accessing structures – Nested structures – Arrays of structures – Structures and functions – Pointers to structures – Self-referential structures – Unions.

UNIT V FILE HANDLING 8

File structure – binary and text files – File handling functions – File I/O – File Manipulations.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Pradip Dey, Manas Ghosh, “Fundamentals of Computing and Programming in C”, Oxford University Press, 1st Edition, 2009.
2. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India), 2011.

REFERENCES

1. Ashok.N.Kamthane, “Computer Programming”, Pearson Education (India), 2008.
2. Stephen G.Kochan, “Programming in C”, Pearson Education (India), 3rd Edition, 2005.
3. Brian W.Kernighan and Dennis M.Ritchie, “The C Programming Language”, Pearson Education Inc., 2005.

SH105

ENGINEERING GRAPHICS
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C
2 3 0 4

COURSE OUTCOMES

- Students will be able to use the drawing instruments effectively.
- An ability to draw the basic engineering curves and problems related to projections of points, straight lines, planes and solids.
- Able to apply the knowledge acquired on practical applications of sectioning and development of solids.
- Able to draw simple solids and its sections in isometric view and projections and also to draw its perspective views.

Drawing Instruments – IS specifications on lines – drawing sheets – Printing letters and dimensioning – scales (not for examination) – First angle projection should be followed.

UNIT I PLANE CURVES **12**
Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloids – Epi and Hypo cycloids - construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES **12**
Projection of points and straight lines located in the first quadrant – Traces – Determination of true lengths and true inclinations.
Projection of regular polygonal surfaces and circular lamina inclined to any one reference plane.

UNIT III PROJECTION OF SOLIDS **12**
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES **12**
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – obtaining true shape of section.
Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinder and cone – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS **12**
Principles of isometric projection – isometric scale – isometric projections of simple solids – cube – prisms, pyramids, cylinder and cone in simple position only, truncated prisms, pyramids, cylinders and cones.
Perspective projection of prisms, pyramids and cylinders by visual ray method and vanishing point method.

TOTAL: 60 PERIODS

Note: In end semester examination from each unit one question with either or pattern may be asked. No short questions.

TEXT BOOK

1. N.D. Bhatt, “Engineering Drawing”, Charotar Publishing House, 46th Edition, 2003.

REFERENCES

1. K.V.Natrajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2006.

2. M.S.Kumar, "Engineering Graphics", D.D. Publications, 2007.
3. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited, 2008.
4. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005.
5. K.R.Gopalakrishnan, "Engineering Drawing" (Vol. I & II), Subhas Publications, 1998.
6. Dhananjay A.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGraw Hill Publishing Company Limited, 2008.
7. Basant Agarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

SH106

C PROGRAMMING LABORATORY
(Common to all B.E. / B.Tech., Degree Programmes)**L T P C**
0 0 3 2**COURSE OUTCOMES**

- Acquire logical thinking and problem solving skills.
- Implement the algorithms and analyze their complexity.
- Identify the correct and efficient ways of solving problems.
- Acquire hands on practice in dynamic memory allocation, modular programming and data organization.
- Implement real time applications using the power of C language features.

LIST OF EXPERIMENTS

1. Solve problems such as temperature conversion, student grading, interest calculation.
2. Finding the 2's complement of a binary number.
3. Generation of the first 'n' terms of the Fibonacci sequence and prime sequence.
4. Computing Sine series and Cosine series.
5. Given distance traveled by a vehicle as $d = ut + \frac{1}{2}at^2$, where 'u' and 'a' are the initial velocity and acceleration. Calculate the distance traveled for different time intervals.
6. Solving the roots of a quadratic equation.
7. Designing a simple arithmetic calculator. (Use switch statement)
8. Performing the following operations: (Use loop statement)
 - i. Generate Pascal's triangle.
 - ii. Construct a Pyramid of numbers.
9. Performing the following operations to a string:
 - i. To insert a sub-string into main string at a given position.
 - ii. To delete 'n' characters from a given position in a string.
 - iii. To replace a character of string either from beginning or ending or at a specified location.
10. Performing the following operations: (Use arrays)
 - i. Matrix addition.
 - ii. Transpose of a matrix.
 - iii. Matrix multiplication by checking compatibility.
11. Performing the following operations: (Use recursive functions)
 - i. To find the factorial of a given integer.
 - ii. To find the GCD (Greatest Common Divisor) of two given integers.
 - iii. To solve Towers of Hanoi problem.
12. Performing the Student Information Processing using File Handling concepts.

TOTAL: 45 PERIODS**SOFTWARE REQUIREMENTS**

- Turbo C/ ANSI C Compiler
- Gcc compiler

SH107 PHYSICS AND CHEMISTRY LABORATORY – I
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C
0 0 3 2

PART A – PHYSICS LABORATORY – I

COURSE OUTCOMES

At the end of the Laboratory classes, the students are able to

- develop collaborative learning skills and to add some of their own ideas to the experiments and their explanations.
- understand the optical properties, mechanical properties and electrical properties.

LIST OF EXPERIMENTS

1. (a) Particle size determination using Diode Laser.
(b) Determination of Laser parameters – Wavelength, and angle of divergence.
(c) Determination of Numerical aperture and acceptance angle of an optical fiber.
2. Determination of thickness of a thin wire – Air wedge method.
3. Determination of velocity of sound and compressibility of the liquid – Ultrasonic Interferometer.
4. Determination of Dispersive power of a prism using Spectrometer.
5. Determination of Young's modulus – Non-uniform bending method.
6. Determination of coefficient of viscosity of liquid – Poiseuille's method.
7. Determination of specific resistance of a given coil of wire – Carey Foster's Bridge.
• *A minimum of FIVE experiments shall be offered.*

PART B - CHEMISTRY LABORATORY – I

COURSE OUTCOMES

The student

- can estimate the amount of hardness and acidity present in the water sample.
- gain knowledge about the estimation of nickel in an alloy.
- quantify the electrolyte by measuring the conductance and pH.

LIST OF EXPERIMENTS

1. Estimation of hardness of Water sample by EDTA method.
2. Estimation of acidity of Water sample.
3. Estimation of Nickel by EDTA method.
4. Conductometric titration (HCl Vs NaOH).
5. Conductometric titration (BaCl₂ Vs Na₂SO₄).
6. pH metric titration (HCl Vs NaOH).
7. Determination of molecular weight and degree of polymerization using Viscometry.

- *A minimum of FIVE experiments shall be offered.*
- *Laboratory classes on alternate weeks for Physics and Chemistry.*

TOTAL: 45 PERIODS

SH108

ENGINEERING PRACTICES LABORATORY
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C
0 0 3 2

COURSE OUTCOMES

- Students will be able to prepare the pipe connections and identify the various components used in plumbing.
- An ability to prepare simple wooden joints using wood working tools.
- An ability to prepare simple lap, butt and tee joints using arc welding equipments.
- An ability to prepare simple components using lathe and drilling machine.

PART A – MECHANICAL AND CIVIL ENGINEERING PRACTICES

I	PLUMBING WORKS: Study of components related to plumbing. Hands-on-exercise: Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.	5
II	CARPENTRY PRACTICES: Study of the joints in roofs, doors, windows and furniture. Hands-on-exercise: Wood work, joints by sawing, planning and cutting.	6
III	WELDING: Study of the tools used in welding Gas welding practice. Preparation of butt joints, lap joints and tee joints using arc welding.	5
IV	BASIC MACHINING: (a) Simple Turning and Taper turning. (b) Drilling Practice.	7

REFERENCES

1. Ramesh Babu.V., “Engineering Practices Laboratory Manual”, VRB Publishers Private Limited, Chennai, Revised Edition, 2013 – 2014.
2. Jeyachandran.K., Natarajan.S. and Balasubramanian.S., “A Primer on Engineering Practices Laboratory”, Anuradha Publications, 2007.
3. Bawa.H.S., “Workshop Practice”, Tata McGraw Hill Publishing Company Limited, 2007.
4. Rajendra Prasad.A. and Sarma.P.M.M.S., “Workshop Practice”, Sree Sai Publication, 2002.
5. Kannaiah.P. and Narayana.K.L., “Manual on Workshop Practice”, Scitech Publications, 1999.

PART B – ELECTRICAL AND ELECTRONICS ENGINEERING PRACTICES**COURSE OUTCOMES**

- An ability to develop familiarity with rudimentary measurement equipment – signal generators, oscilloscopes, multimeters and power supplies.
- Ability to demonstrate and evaluate the parameters of basic electronic components (wires, resistors, capacitors, diodes etc.) based on their physical parameters and dimensions.
- Define, describe, and analyze fundamentals of Boolean algebra and digital logic gates.
- An ability to predict qualitatively and quantitatively compute the steady state AC responses of basic circuits using the phasor method.
- Gain experience in the documentation of measurements and procedures as well as the preparation of formal reports.

I ELECTRICAL ENGINEERING PRACTICE 10

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair-case wiring.
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of an electrical equipment.

II ELECTRONICS ENGINEERING PRACTICE 12

1. Study of Electronic components and equipments – Resistor, colour coding, measurement of AC signal parameters (peak-peak, rms period, frequency) using CRO
2. Study of logic gates AND, OR, XOR and NOT.
3. Generation of Clock Signal.
4. Soldering practice – Components, Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

TOTAL: 45 PERIODS**REFERENCES**

1. K.Jeyachandran, S.Natarajan and S.Balasubramanian, “A Primer on Engineering Practices Laboratory”, Anuradha Publications, 2007.
2. T.Jeyapoovan, M.Saravanapandian and S.Pranitha, “Engineering Practices Lab Manual”, Vikas Publishing House Private Limited, 2006.
3. H.S.Bawa, “Workshop Practice”, Tata McGraw Hill Publishing Company Limited, 2007.
4. A.Rajendra Prasad and P.M.M.S.Sarma, “Workshop Practice”, Sree Sai Publication, 2002.
5. P.Kannaiah and K.L.Narayana, “Manual on Workshop Practice”, Scitech Publications, 1999.

13C20

TECHNICAL ENGLISH – II
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C
3 0 0 3

COURSE OUTCOMES

The student will be able to

- apply correct form of language while Speaking and Writing.
- prepare his own Professional letter writings.
- interpret any passage after listening.
- interact at different situations fluently.

UNIT I**10**

Language Focus: Homonyms, Different grammatical forms of the same word, correct usage of words / phrases.

Writing: Recommendation writing.

Listening: Interpreting Poetic lines.

Speaking: Telephone English.

UNIT II**9**

Language Focus: Cause and Effect, Phrasal Verbs.

Writing: Quotation letter, Clarification Letter, Placing orders, Complaint Letter.

Listening: Conversations.

Speaking: Asking questions.

UNIT III**9**

Language Focus: Idioms and Phrases with animal names.

Writing: Checklist, Process Description.

Speaking: Presentations.

UNIT IV**9**

Language Focus: Technical Definitions, Transformation of Sentences.

Writing: Job Application Letter, Curriculum Vitae, Bio-data, Resume.

Speaking: Mock Interview.

UNIT V**8**

Language Focus: British and American Vocabulary, Numerical Expressions.

Writing: E-mail Writing, Report Writing.

Speaking: Group Discussion.

SUGGESTED ACTIVITIES

1. Making sentences using different grammatical forms of the same word.
2. Exercises on combining sentences using Cause and Effect expressions.
3. Writing Formal Letters.
4. Writing exercises on Recommendations.
5. Exercises on Idioms and Phrases.
6. Exercises on preparing letter of Job Application with annexure.
7. Exercises on British and American English words with meanings.

TOTAL: 45 PERIODS

BOOK SUGGESTED FOR READING

1. A.P.J.Abdul Kalam, Arun Tiwari, "Wings of Fire", an Autobiography, University Press Private Limited India, 1999, 30th Impression, 2007.

REFERENCES

1. T.M.Farhathullah, “Communication Skills for Technical Students”, Orient Longman Private Limited, 2002.
2. K.R.Lakshmi Narayanan, “English for Technical Communication”, SciTech Publications, 1999.
3. Jack.C.Richards, Jonathan Hull and Susan Protor, “English for International Communication”, Cambridge University Press, 3rd Edition, 2004.

13C21**INTEGRAL CALCULUS AND TRANSFORMS
(Common to all B.E. / B.Tech., Degree Programmes)****L T P C
3 1 0 4****COURSE OUTCOMES**

- Ability to find area and volume of objects using double and triple integrals.
- Ability to analyze the concepts related to vector calculus and to apply them in engineering field.
- Ability to perform the ideas of Laplace transform and Z-transform in their respective engineering subjects.

UNIT I MULTIPLE INTEGRALS**12**

Double integration – Cartesian and polar coordinates; Change of order of integration; Change of variables between cartesian and polar coordinates; Triple integration in cartesian coordinates; Area as double integral; Volume as triple integral.

UNIT II VECTOR CALCULUS**12**

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields; Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

UNIT III LAPLACE TRANSFORM**12**

Definition of Laplace transform – Conditions for existence – Transform of elementary functions – Basic properties – Derivatives and Integrals of Transform – Transform of derivatives and integrals – Transform of unit step function and impulse function – Transform of periodic function – Initial and final value theorems.

UNIT IV INVERSE LAPLACE TRANSFORM**12**

Definition of Inverse Laplace transform – Convolution theorem – Solution of linear ordinary differential equations of second order with constant coefficients using Laplace transformation techniques and solution of simultaneous differential equations of first order with constant coefficients using Laplace transformation techniques.

UNIT V Z – TRANSFORM**12**

Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Formation of difference equations – Solution of difference equations using Z-transform.

L: 45 T: 15 TOTAL: 60 PERIODS**TEXT BOOKS**

1. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publications, New Delhi, 40th Edition, 2007.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India, 8th Edition, 2011.

REFERENCES

1. Bali.N.P. and Manish Goyal, "Text book of Engineering Mathematics", Laxmi Publications Private Limited, 7th Edition, 2008.
2. Ramana.B.V., "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2007.
3. Jain.R.K. and Iyengar.S.R.K., "Advanced Engineering Mathematics", Narosa Publishing House Private Limited, 3rd Edition, 2007.
4. Veerarajan.T., "Engineering Mathematics for semester I & II", Tata McGraw Hill Education Private Limited, 3rd Edition, New Delhi, 2012.
5. Veerarajan.T., "Transforms and Partial Differential Equations", Tata McGraw Hill Education Private Limited, New Delhi, 2012.

13C22

SOLID STATE PHYSICS
(Common to ECE, CSE, EEE, EIE and IT)

L T P C
3 0 0 3

COURSE OUTCOMES

The Student will be able to

- identify the crystal lattices, their structures and how the structure influences its major properties at different levels.
- choose the major functional and structural properties required for specific applications of conducting materials
- check the parameter that satisfies superconducting behaviour.
- relate technology to the physics of semiconductor devices.
- classify the magnetic materials and their storage applications.
- design optical materials that are able to be manufactured and measured using the state of art optical fabrication technologies.

UNIT I CRYSTAL PHYSICS**9**

Lattice, Unit cell, Bravais lattice, Lattice planes; Miller indices – d-spacing in cubic lattice; Calculation of number of atoms per unit cell, Atomic radius, Coordination number and Packing factor for SC, BCC, FCC and HCP structures; Crystal defects – point, line and surface defects; Burger vector.

UNIT II CONDUCTING MATERIALS AND SUPERCONDUCTORS**9****Conductors**

Band theory of solids - Distinguish between conductors, semiconductors and insulators on the basis of band theory of solids; Classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann Franz law – Lorentz number – Draw backs of classical theory; Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

Superconductors

Superconductivity: Properties – Meissner effect – Isotopic effect; Types of superconductors – Type I and Type II superconductors; Applications of superconductors – Magnetic levitation.

UNIT III SEMICONDUCTORS**9**

Intrinsic semiconductor – carrier concentration derivation – Fermi level – variation of Fermi level with temperature – electrical conductivity – bandgap determination; Extrinsic semiconductors – carrier concentration derivation in n-type and p-type semiconductor – variation of Fermi level – with temperature and impurity concentration; Hall effect – Determination of Hall coefficient – Applications.

UNIT IV MAGNETIC MATERIALS AND STORAGE DEVICES**9**

Origin of magnetic moment, Bohr magneton, Dia and Para magnetism, Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials; Anti-ferromagnetic materials; Ferrites – structure and applications; magnetic recording and readout – storage of magnetic data – tapes, floppy, Hard disk and CD ROM.

UNIT V OPTICAL MATERIALS**9**

Optical properties of metals, insulators and semiconductors; Phosphorescence and fluorescence; Excitons traps and color centre and their importance; Different phosphors used in CRO screens, liquid crystal display, LED – working of LED; Thermography and its applications; Solar cell – PN junction solar cell – Conversion efficiency and solar concentration – Hetero junction solar cell.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Charles Kittel, "Introduction to Solid State Physics", John Wiley and Sons, Singapore, 7th Edition, 2007.
2. Dr.N.Sankar, S.O.Pillai, "A Text book of Engineering Physics", New Age International Publications, New Delhi, 2009.

REFERENCES

1. Donald A.Neamen "Semiconductor Physics and Devices", Tata McGraw Hill Publication, New Delhi, 3rd Edition, 2007.
2. M.Arumugam, "Materials Science", Anuradha publications, Kumbakonam, 2010.
3. Calister, "Material Science and Engineering: An Introduction", John Wiley and Sons, 6th Edition, 2009.

13C23 CHEMISTRY OF ELECTRICAL AND ELECTRONIC MATERIALS
(Common to ECE, CSE, EEE, EIE and IT)

L T P C
3 0 0 3

COURSE OUTCOMES

The students can

- apply the knowledge in designing new energy storing devices.
- identify the types of corrosion and to design a method to control the corrosion.
- apply the knowledge of photochemistry in designing the various electronic materials.
- choose proper analytical technique for analyzing the synthesized electronic materials.

UNIT I ENERGY SOURCES AND STORAGE DEVICES 9

Nuclear energy: definition – mass defect; types of nuclear reactions: nuclear fission – characteristics – nuclear chain reaction – fusion reactions – difference between nuclear fusion and fission reaction; nuclear reactor: components – light water nuclear reactor – breeder reactor; solar energy: solar cell – advantages; wind energy: wind mill – advantages; storage batteries: types – primary battery – alkaline battery – secondary battery – lead-acid, nickel-cadmium; lithium battery; fuel cell: H₂-O₂ fuel cell.

UNIT II CORROSION AND ITS CONTROL 9

Chemical corrosion: oxidation corrosion – Pilling-Bedworth rule; electrochemical corrosion: mechanism – hydrogen evolution mechanism – oxygen absorption mechanism – galvanic corrosion – differential aeration corrosion; factors influencing corrosion; corrosion control: cathodic protection: sacrificial anodic protection – impressed current cathodic protection – inhibitors; electroplating: methods of cleaning the article – electroplating of gold; electroless plating: advantages over electroplating – electroless plating of nickel.

UNIT III PHOTOCHEMICAL PROCESSES 9

Photochemical reactions: definition, characteristics; laws of photochemistry – Grothus-Draper's law – Stark-Einstein's law – Beer-Lambert's Law; quantum yield: definition, reason for low and high yield; photochemical equilibrium: photochemical synthesis of hydrogen chloride; photophysical processes: types – non radiative transition – internal conversion – inter system crossing – radiative transition – fluorescence – phosphorescence; chemiluminescence, thermoluminescence, photosensitization: definition, halogen photosensitizer, applications.

UNIT IV ELECTRONIC MATERIALS 9

Organic semiconducting materials: advantages; p-type and n-type semiconducting materials – pentacene – fullerenes-C-60; organic dielectric material: definition, examples – polystyrene – PMMA; organic light emitting polymer: polythiophene; conducting polymers: types – intrinsically conducting polymer – doped conducting polymer – extrinsically conducting polymer – coordination conducting polymer, applications; polymer with piezoelectric, pyroelectric and ferroelectric properties: polyvinylidene fluoride; OLED materials: definition, polymer OLED material – polyphenylene vinylene.

UNIT V ANALYTICAL INSTRUMENTATION 9

UV-Visible spectroscopy: types of transitions – chromophore, auxochrome – instrumentation (block diagram only) – applications; IR spectroscopy: molecular vibrations – linear molecule – CO₂ – nonlinear molecule – H₂O – instrumentation (block diagram only) – applications; Atomic absorption spectroscopy: principle – instrumentation (block diagram only) – estimation of nickel by AAS; flame photometry: principle – instrumentation (block diagram only) – estimation of sodium by flame photometry; thermogravimetry (TG): definition – instrumentation (block diagram only) – characteristics of thermogram – factors influencing thermogravimetry – analyzing CuSO₄.5H₂O thermogram – applications.

TOTAL: 45 PERIODS

TEXT BOOKS

1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 15th Edition, 2002.
2. S.S.Dara, "A text book of Engineering Chemistry" S.Chand and Company Limited, New Delhi, 13th Edition, 2006.
3. B.S.Chauhan, "Engineering Chemistry", University science press, New Delhi, 3rd Edition, 2009.

REFERENCES

1. S.C.Bhatia, "Engineering Chemistry", CBS Publishers and Distributors, 1st Edition, 2011.
2. Kuriacoarse J.C., and Rajaram.J., "Chemistry in Engineering and Technology", Vol.1 & 2, Tata McGraw Hill Publishing Company Limited, New Delhi, 1989.
3. Hagen Klauk, "Organic Electronics: Materials, manufacturing and applications", Wiley - VCH, 2006.
4. S.Rao, Dr.B.B.Parulekar, "Energy Technology", Khana Publishers, New Delhi, 21st Edition, 2004.
5. Skoog, Holler, Crouch, "Instrumental Analysis", Cengage Learning India Private Limited, New Delhi, 2011.
6. R.Chaudhary, "Basics of Photochemistry", Anmol Publications and Company, New Delhi, 2009.

**13C24 ELECTRIC CIRCUITS AND ELECTRON DEVICES
(Common to CSE and IT)**

**L T P C
3 1 0 4**

COURSE OUTCOMES

Upon successful completion of this course, students will be able to

- Analyze the circuits using various network theorems.
- Compute the transient response of RL, RC and RLC circuits for AC and DC inputs.
- Determine the resonance condition for series and parallel circuits.
- Describe the operation and characteristics of different types of semiconductor diodes.
- Compare the operation and characteristics of various transistors like BJT, JFET and MOSFET.

UNIT I CIRCUIT ANALYSIS TECHNIQUES 12

Ohm's law, Kirchhoff's laws – Resistors in series and parallel circuits – Mesh current and node voltage method of analysis – Voltage and current division – Source transformation – Star-delta conversion. **Network Theorems:** Thevenin's theorem, Superposition theorem, Norton's theorem, Maximum power transfer theorem (only for resistive network).

UNIT II TRANSIENT RESPONSE FOR CIRCUITS 12

Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and AC with sinusoidal input.

UNIT III RESONANT CIRCUITS 12

Voltage and current relation in pure Resistor, Inductor, Capacitor, RL, RC and RLC circuits – Series and parallel circuits – Parallel and series resonances – their frequency response – Quality factor and bandwidth.

UNIT IV SEMICONDUCTOR DIODES 12

Review of intrinsic and extrinsic semiconductors – Theory of PN junction diode – Energy band structure – current equation – space charge and diffusion capacitances – effect of temperature and breakdown mechanism – Zener diode and its characteristics – Tunnel diode – PIN diode – Varactor diode – Photodiode.

UNIT V TRANSISTORS 12

Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – Breakdown in transistors – operation and comparison of N-Channel and P-Channel JFET - drain current equation – MOSFET – Enhancement and depletion types – structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

1. A.Sudhakar, Shyammoan S.Palli, "Circuits and Networks - Analysis and Synthesis", Tata McGraw Hill, 4th Edition, 2010.
2. Joseph A. Edminister, Mahmood, Nahri, "Electric Circuits", Shaum series, Tata McGraw Hill, 2001.
3. S.Salivahanan, N.Suresh kumar and A.Vallavaraj, "Electronic Devices and Circuits", Tata McGraw Hill, 2nd Edition, 2008.

REFERENCES

1. William H.Hayt, J.V.Jack, E.Kemmebly and Steven M.Durbin, “Engineering Circuit Analysis”, Tata McGraw Hill, 2011.
2. Robert T.Paynter, “Introductory Electronic Devices and Circuits”, Pearson Education, 7th Edition, 2008.
3. J.Millman and Halkins, Satyebranta Jit, “Electronic Devices and Circuits”, Tata McGraw Hill, 2nd Edition, 2008.
4. David A. Bell, “Electronic Devices and Circuits”, Oxford University Press, 5th Edition, 2008.

13C25 BASIC CIVIL AND MECHANICAL ENGINEERING
(Common to ECE, CSE, EEE, EIE and IT)

L T P C
4 0 0 4

COURSE OUTCOMES

- An ability to identify the various systems and its components of various power plants.
- An ability to state and differentiate the working principles of IC engines.
- Students will be able to identify the various systems and components of refrigeration and air conditioning systems.

A – CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS 15

Surveying: Objects – types – classification – principles – measurements of distances – angles – leveling – determination of areas – illustrative examples.

Civil Engineering Materials: Bricks – stones – sand – cement – concrete – steel sections.

UNIT II BUILDING COMPONENTS AND STRUCTURES 15

Foundations: Types, Bearing capacity – Requirement of good foundations.

Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Landscaping.

B – MECHANICAL ENGINEERING

UNIT III POWER PLANT ENGINEERING 10

Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants – Merits and Demerits – Pumps and turbines – working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.

UNIT IV IC ENGINES 10

Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM 10

Terminology of Refrigeration and Air Conditioning – Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air Conditioner.

TOTAL: 60 PERIODS

REFERENCES

1. Shanmugam G. and Palanichamy M.S., “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishing Company Limited, New Delhi, 1996.
2. Ramamrutham S., “Basic Civil Engineering”, Dhanpat Rai Publishing Company Private Limited, 1999.
3. Seetharaman S., “Basic Civil Engineering”, Anuradha Agencies, 2005.
4. Venugopal K. and Prabhu Raja V., “Basic Mechanical Engineering”, Anuradha Publishers, Kumbakonam, 2000.
5. Shantha Kumar S.R.J., “Basic Mechanical Engineering”, Hi-tech Publications, Mayiladuthurai, 2000.

13C26 COMPUTER PROGRAMMING LABORATORY
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C
0 1 2 2

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to:

- Demonstrate how to use the UNIX Shell commands.
- Use the Shell programming constructs.
- Learn tracing mechanisms (for debugging), user variables, Shell variables, read-only variables, positional parameters, reading input to a Shell script.
- Test on numeric values, test on file type, and test on character strings using shell scripts.
- Write moderately complex Shell scripts and make them executable.

Execute programs written in C under UNIX environment.

LIST OF EXPERIMENTS

1. Study of UNIX OS, vi Editor.
2. Use of Basic UNIX Shell Commands:
ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.
3. Shell Programming:
 - i. Interactive shell scripts
 - ii. Positional parameters
 - iii. Arithmetic Operators
 - iv. if-then-fi, if-then-else-fi, nested if-else
 - v. Logical operators
 - vi. if - elif, case structure
 - vii. while, until, for loops, use of break
 - viii. Metacharacters
4. Shell scripts for the following:
 - i. Showing the count of users logged in
 - ii. Printing column wise list of files in your home directory
 - iii. To count lines, words and characters in its input (do not use wc)
5. C Programming on UNIX:
 - i. Dynamic Storage Allocation
 - ii. Pointers
 - iii. Functions
 - iv. File Handling

TOTAL: 45 PERIODS

SOFTWARE REQUIREMENTS

- UNIX/LINUX OS
- Gcc compiler

13C27

PHYSICS AND CHEMISTRY LABORATORY – II
(Common to all B.E. / B.Tech., Degree Programmes)

L	T	P	C
0	0	3	2

PART A - PHYSICS LABORATORY – II

COURSE OUTCOMES

At the end of the Laboratory classes, the students

- demonstrate and report the elastic behaviour of materials
- demonstrate the interference property of light waves
- demonstrate the diffraction property of light waves
- measure the thermal properties of conducting materials
- identify the substance that deforms continuously when subjected to shearing stress.

LIST OF EXPERIMENTS

1. Determination of Young's modulus – Uniform bending method.
2. Determination of Band Gap of a semiconductor material.
3. Determination of Hall Co-efficient.
4. Determination of Radius of curvature of a Plano convex lens using Newton's rings Method.
5. Determination of wavelength of mercury spectrum using spectrometer and grating
6. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
7. Torsional pendulum – Determination of Moment of Inertia of the disc and Rigidity modulus of the material of the wire.

• *A minimum of FIVE experiments shall be offered.*

PART B - CHEMISTRY LABORATORY – II

COURSE OUTCOMES

The student

- can estimate the amount of alkalinity and Dissolved Oxygen (DO) present in the water sample.
- gain knowledge in the estimation of copper in an alloy and iron in rust.
- quantify electrolyte and ion by measuring the conductance and emf.

LIST OF EXPERIMENTS

1. Estimation of copper in brass by EDTA method.
2. Determination of Dissolved Oxygen (DO) in water (Winkler's method)
3. Estimation of alkalinity of Water sample
4. Estimation of Fe²⁺ ion in rust by Dichrometry
5. Conductometric titration (Mixture of acids vs NaOH)
6. Potentiometric Titration (Fe²⁺ vs K₂Cr₂O₇)
7. Estimation of Fe²⁺ ion by spectrophotometry.

TOTAL: 45 PERIODS

- *A minimum of FIVE experiments shall be offered.*
- *Laboratory classes on alternate weeks for Physics and Chemistry.*

13C28 ELECTRONIC DEVICES AND CIRCUITS LABORATORY
(Common to CSE and IT)

L T P C
0 0 3 2

COURSE OUTCOMES

Upon successful completion of this course, students will be able to

- Analyze the circuits using various network theorems and laws.
- Determine the parameters from the characteristics of diodes and transistors.

LIST OF EXPERIMENTS

1. Verification of Ohm's laws
2. Verification of Mesh and Nodal analysis
3. Verification of KVL and KCL
4. Verification of Thevenin's Theorem
5. Verification of Norton's Theorem
6. Verification of superposition Theorem
7. Verification of Maximum power transfer Theorem
11. Characteristics of CE configuration
12. Characteristics of CB configuration
8. Characteristics of PN diode
9. Characteristics of Zener diode
10. Characteristics of Photodiode

TOTAL: 45 PERIODS

13C29**ENGLISH LANGUAGE SKILL LABORATORY**
(Common to all B.E. / B.Tech., Degree Programmes)**L T P C**
0 0 3 2**COURSE OUTCOMES**

The Student will

- improve their pronunciation skill.
- gather information from any speech.
- imbibe the stress and intonation of the native speakers' accent.

1. Micro Skills

- Spotting the Homonyms / Silent letter words / mispronounced words
- Identifying the missing words in native speech
- Finding the cluster words
- Marking correct punctuation
- Marking word chunks
- Identification of sentences

2. Content Comprehension and making inferences

- Listening to audio files of Speech, Poetry, Recent Issues, News clippings, etc
 - a. True / False
 - b. Multiple Choice Questions
 - c. Filling the blanks
 - d. Filling the charts

3. Listen and Act

- Drawing the map using audio
- Picture completing task
- Transferring data to Graph

4. Interpreting the video clippings**5. Listening to Conversations****TOTAL: 30 PERIODS**

13CS31	COMPLEX ANALYSIS AND NUMERICAL METHODS	L T P C
		3 1 0 4

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Use the Cauchy Riemann equations to test analytic function and construct such a function given the real or imaginary part.
- Evaluate residues and use the Residue Theorem to evaluate contour integrals.
- Construct Fourier series of periodic function.
- Calculate Fourier Transform and its Inverse Transform.
- Use numerical techniques for solving linear system of equations and numerical integration problems.

UNIT I ANALYTIC FUNCTIONS 12

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equation and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping : $w = z + c$, cz , $1/z$ and bilinear transformation.

UNIT II COMPLEX INTEGRATION 12

Complex integration – Statement and applications of Cauchy’s integral theorem and Cauchy’s integral formula – Singular points – Residues – Residue theorem – Application of residue theorem to evaluate real integrals – Unit circle and semi-circular contour(excluding poles on boundaries).

UNIT III FOURIER SERIES 12

Dirichlet’s conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier series – Parseval’s identity – Harmonic analysis.

UNIT IV FOURIER TRANSFORMS 12

Fourier integral theorem (without proof) – Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval’s identity.

UNIT V NUMERICAL METHODS 12

LU decomposition for system of linear equations – Numerical solutions of non-linear algebraic equations: Secant method – Bisection method – Newton-Raphson method - Numerical Integration: Trapezoidal and Simpson’s rule for single and double integrals.

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

1. Grewal. B.S, “Higher Engineering Mathematics”, Khanna Publishers, 40th Edition, 2007.
2. Bali N. P. and Manish Goyal, “Text book of Engineering Mathematics”, Laxmi Publications Private Limited, 7th Edition, Reprint 2010.

REFERENCES

1. Ramana B.V, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company, 2007.
2. Jain R.K and Iyengar S.R.K, “Advanced Engineering Mathematics”, Narosa Publishing House Private Limited, 3rd Edition, 2007.
3. P. Kandasamy, K. Thilagavathy and K. Gunavathy, “Numerical Methods”, S.Chand Company Limited, 2003.

13CS32 ENVIRONMENTAL SCIENCE AND ENGINEERING
(Common to all B.E./B.Tech. Degree Programmes)

L T P C
3 0 0 3

COURSE OUTCOMES

Upon successful completion of course the student will be able to

- Understand the various ecosystem and biodiversity
- Classify the different types of natural resources and identify the role of individual in conservation of resources
- Identify and analyse the causes, effects and control measures of environmental pollution
- Identify the different types of environmental hazards and their management
- Analyse the social issues related to the environment and how human population affect the environment

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 9

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers– energy flow in the ecosystem – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) aquatic (pond) ecosystems. Field study of simple ecosystems –pond and forest. Introduction to biodiversity: definition - genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values –India as a mega-diversity nation – hot spots of biodiversity –threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation. Field study of common plants, insects, birds.

UNIT II NATURAL RESOURCES 9

Forest resources: Use and over-exploitation, deforestation, case studies- dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide Problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, case studies – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT III ENVIRONMENTAL POLLUTION 9

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Noise pollution (e) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – e-Waste: Definition-dimension of the problem - source-toxic Substances in e-waste - risks related to toxic substances–environmental problems-role of an individual in prevention of pollution.

UNIT IV ENVIRONMENTAL HAZARDS 9

Environmental hazards: Definition – Hazard- Types-Natural and man-made hazards – Natural hazards: Causes, effect and management of Earthquake, Flood, Landslide, Cyclones and Tsunami; Man-made Hazards: Hazards due to dams and reservoirs, hazards due to nuclear power plant, Industrial hazards. Case study: Chernobyl disaster, Bhopal gas tragedy.

UNIT V SOCIAL ISSUES, HUMAN POPULATION AND THE ENVIRONMENT 9

Water conservation: rain water harvesting-climate change: global warming, acid rain, ozone layer depletion-Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Ravikrishnan. A., “Environmental Science and Engineering, Sri Krishna Hitech Publishing Company Private Limited, 2010.
2. Benny Joseph, “Environmental Science and Engineering”, Tata McGraw-Hill, New Delhi, 2006.

REFERENCES

1. Gilbert M.Masters, “Introduction to Environmental Engineering and Science”, 2nd Edition, Pearson Education, 2004.
2. Rajagopalan. R, “Environmental Studies - From Crisis to Cure”, Oxford University Press, 2005.
3. Natural Hazards – Local, National, Global: G. F. White (ed), Oxford University Press.

13CS33**DATA STRUCTURES AND APPLICATIONS****L T P C****3 1 0 4****COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- Implement basic ADTs like linked list, queue and stack using both static and dynamic memory allocations.
- Recognize the data organization and applications of binary trees and binary search trees
- Analyze the importance of self-balancing trees for effective organizing the data.
- Identify suitable algorithms for solving hashing, shortest path, network link analysis, and minimum spanning tree.
- Identify data structuring strategies that are appropriate to a given contextual problem.

UNIT I LINEAR STRUCTURES**12**

Definition – Types – Applications of Data Structures - Abstract Data Types (ADT) – List ADT – Array-based implementation – Linked List implementation – Doubly-linked lists – Applications of lists – Stack ADT – Balancing Symbols – Infix to Postfix Conversion – Evaluation of Postfix Expression – Function Calls - Queue ADT – Circular Queue implementation.

UNIT II TREE STRUCTURES**12**

Non Linear Data Structures -Tree ADT – Terminologies of Trees –Binary Tree ADT – Tree Traversals - Expression Trees – Binary search Tree ADT – Threaded Binary Trees - Applications of Trees.

UNIT III BALANCED TREES**12**

AVL Trees – Single Rotation – Double Rotation – Splay Tree – Splaying – Top down Splay Trees - B Tree – Tries.

UNIT IV HASHING AND HEAPS**12**

Hash Function – Separate chaining – Open Addressing – Rehashing – Extendible hashing - Heaps – Binary Heaps – Applications of Binary Heaps – d Heaps – Leftist Heaps – Skew Heaps – Binomial Queues.

UNIT V GRAPHS**12**

Definitions – Terminologies of Graph - Topological sort – Breadth-first traversal – Depth First Traversal - Shortest Path Algorithms – Network Flow Problems - Minimum Spanning Tree – Prim's and Kruskal's Algorithms – Biconnectivity.

L: 45 T: 15 TOTAL: 60 PERIODS**TEXT BOOK**

1. M. A. Weiss, “Data Structures and Algorithm Analysis in C”, 2nd Edition, Pearson Education, 2005.

REFERENCES

1. A.V. Aho, J. E. Hopcroft, and J. D. Ullman, “Data Structures and Algorithms”, 1st Edition, Pearson Education, Reprint 2003.
2. R. F. Gilberg, B. A. Forouzan, “Data Structures”, 2nd Edition, Thomson India Edition, 2005.

13CS34 COMPUTER NETWORKS**L T P C
3 1 0 4****COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- Describe and distinguish the functionalities of layers in OSI architecture
- Illustrate the various flow and error control techniques and identify the best method for efficient data transmission.
- Enumerate different medium access control mechanisms
- Apply various routing algorithms for a network and determine the optimal path
- Integrate the working of protocols in higher level layers

UNIT I INTRODUCTION 12

Data Communications- Networks – Networks Type – Protocol Layering – TCP/IP Suite – OSI Model – Addressing- Guided Media – Unguided Media – Circuit switched networks – Packet switching – Structure of a switch - Bridges

UNIT II DATA LINK LAYER 12

Introduction – Link Layer Addressing – Error Detection and Correction – Block Coding – Cyclic Codes – Checksum – Data Link Control (DLC) – DLC Services – Data Link Layer Protocols – HDLC – PPP – Media Access Control - Wired LANs: Ethernet – Standard Ethernet – Fast Ethernet – Gigabit Ethernet – Wireless LAN – IEEE 802.11 – Bluetooth.

UNIT III NETWORK LAYER 12

Network layer Services – Packet Switching – Network Layer Performance – IPV4 Addresses - Forwarding of IP Packets – Internet Protocol(IP) - Unicast Routing Algorithms – Unicast Routing Protocols – Multicasting Basics – Intra domain and Inter domain Multicast Protocols.

UNIT IV TRANSPORT LAYER 12

Introduction - Transport layer Protocol: Stop and Wait protocol – Go Back N Protocol- Selective Repeat Protocol – Piggybacking - User Datagram Protocol: Datagram – Services - Applications – Transmission Control Protocol: Services – Features - Connections - Flow control – Error Control - Congestion control – Timers.

UNIT V APPLICATION LAYER 12

Domain Name Space (DNS) – SMTP - FTP – HTTP – WWW – Security – Cryptography – Firewall – Cellular Telephony – Satellite Networks.

L: 45 T: 15 TOTAL: 60 PERIODS**TEXT BOOK**

1. Behrouz A. Forouzan, “Data Communication and Networking”, 5th Edition, Tata McGraw-Hill, 2013.

REFERENCES

1. Andrew S. Tanenbaum, David J. Wetherall, “Computer Networks”, 5th Edition, Prentice Hall 2010.
2. William Stallings, “Data and Computer Communications”, 8th Edition, Pearson Education, 2007.
3. Nader F. Mir, “Computer and Communication Networks”, Pearson Education, 2007.
4. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, 4th Edition, Morgan Kauffmann Publishers Inc., 2007.

13CS35 OBJECT ORIENTED PROGRAMMING**L T P C
3 0 0 3****COURSE OUTCOMES**

Upon successful completion of the course, the students will be able to

- Use pointers and dynamic memory allocation in C++ classes
- Recognize and use object oriented programming constructs to write object oriented programs
- Describe encapsulation, polymorphism and inheritance
- Create and modify objects using C++ classes
- Determine the appropriate objects required to solve a programming problem
- Practice exception handling mechanisms to handle runtime errors
- Differentiate function templates and class templates
- Explain about the namespaces

UNIT I BASIC CONCEPTS 9

Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – abstract classes – polymorphism. Introduction to C++

Classes and objects: classes - structures and classes - unions and classes - friend functions - friend classes - inline functions - parameterized constructors - static class members - scope resolution operator - nested classes - local classes - passing objects to functions - returning objects - object assignment. Arrays, Pointers, References and Dynamic Allocation Operators: Arrays of Objects – Pointers to Objects – Type Checking – This Pointer – Pointers to Derived Types – Pointers to Class Members – References – Dynamic Allocation Operators.

UNIT II FUNCTION OVERLOADING AND CONSTRUCTORS 9

Function Overloading – Overloading Constructors – Copy Constructors – Finding the Address of Overloaded Functions – Overload Anachronism – Default Function Arguments – Function Overloading and Ambiguity. Operator overloading: Creating a member Operator Function – Operator Overloading Using Friend Function – Overloading New and Delete – Overloading Special Operators – Overloading Comma Operator.

UNIT III INHERITANCE AND POLYMORPHISM 9

Inheritance: Base-Class Access Control – Inheritance and Protected Members – Inheriting Multiple Base Classes – Constructors, Destructors and Inheritance – Granting Access – Virtual Base Classes. Polymorphism: Virtual Functions – Virtual Attribute and Inheritance – Virtual Functions and Hierarchy – Pure Virtual Functions – Using Virtual Functions – Early vs. Late Binding. Run-Time Type ID and Casting Operators: RTTI – Casting Operators – Dynamic_Cast.

UNIT IV TEMPLATES AND EXCEPTION HANDLING 9

Templates: Generic Functions – Applying Generic Functions – Generic Classes – Type name and Export Keywords – Power of Templates. Exception Handling: Fundamentals – Handling Derived Class Exceptions – Exception Handling Options – Understanding terminate() and unexpected() – uncaught_exception() Function – Exception and bad_exception Classes – Applying Exception Handling.

UNIT V I/O STREAMS 9

Streams and formatted I/O – Overloading << and >>. File: File Classes – File Operations. Namespaces: Namespaces – std namespace. Standard Template Library: Overview – Container Classes – General Theory of Operation – Lists – String Class – Final Thoughts on STL.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Herbert Schildt, "C++: The Complete Reference", 4th Edition, Tata McGraw – Hill Publishers, 2003.
2. Paul Deitel, Harvey Deitel, "C++ How to Program", 8th Edition, Prentice Hall Publisher, 2011.

REFERENCES

1. Ira Pohl, "Object Oriented Programming using C++", 2nd Edition, Pearson Education, Reprint 2004.
2. S. B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", 4th Edition, Pearson Education, 2005.
3. B. Stroustrup, "The C++ Programming language", 3rd Edition, Pearson Education, 2004.
4. E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw-Hill Education, 2008.

13CS36 DIGITAL PRINCIPLES AND SYSTEM DESIGN**L T P C
3 0 2 4****COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- Recall Number System and number Conversion.
- Distinguish different methods used for simplification of Boolean functions.
- Contrast combinational circuits and Sequential circuits.
- Reconstruct and implement synchronous sequential circuits.
- Compose programs in Hardware Description Language for synchronous sequential circuits.

UNIT I NUMBER SYSTEMS AND BOOLEAN ALGEBRA 12

Review of Number Systems – Number representation: Signed, Unsigned, Fixed point, Floating point. Computer codes – BCD, Gray code, Excess 3 code, Error detection and correction codes, Parity, Hamming codes. Boolean algebra – Basic Postulates and theorems, Switching functions, Canonical forms, Logic gates. Simplifications of Boolean functions using Karnaugh map and tabulation methods

UNIT II COMBINATIONAL LOGIC DESIGN (Practical) 12

Analysis and design procedures of Combinational circuits - Arithmetic Circuits: Binary / BCD adders and subtractors, Carry look ahead adder, Magnitude comparator, Code conversion Decoders, Encoders, Multiplexers and Demultiplexers.

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 12

Sequential Devices: General model of sequential circuits – Latch, Design of Flip Flops, Master slave configuration. Mealy/Moore models -Sequence detector – Concept of state, State diagram, State table, State reduction procedures using Implication chart. Design of synchronous sequential circuits – Up-down / Modulus counters, Serial adder, Binary counters.

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 12

Introduction to Asynchronous Sequential Circuits – Fundamental mode and Pulse mode circuits, Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race free state assignment - Hazards.

UNIT V PROGRAMMABLE LOGIC DEVICES AND HDL 12

Introduction to PLDs – ROM, PAL, PLA, Implementation of digital functions using PLDs. Introduction to Hardware Description Language – Behavioral, Dataflow and gate level modeling-Simple HDL codes for combinational circuits and sequential circuits (Practical).

L: 45 P: 15 TOTAL: 60 PERIODS**TEXT BOOKS**

1. M.Morris Mano, “Digital Design”, 5th Edition, Pearson Education, 2013.
2. D.A.Godse, A.P.Godse, “Digital Electronics”, 3rd Revised Edition, Technical Publications, 2008.

REFERENCES

1. Charles H.Roth, Jr. “Fundamentals of Logic Design”, 4th Edition, Jaico Publishing House, 2000.
2. Donald D.Givone, “Digital Principles and Design”, Tata McGraw-Hill, 2003.

13CS37 DATA STRUCTURES LABORATORY**L T P C**
0 0 3 2**COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- Describe the basic concept of data structures.
- Implement linked list using static and dynamic memory allocation.
- Analyze the operations of stack and queue.
- Implement the arithmetic expression using trees.
- Distinguish the opened and closed hashing techniques.

LIST OF EXPERIMENTS

1. Implement singly and doubly linked lists.
2. Represent a polynomial as a linked list and write functions for polynomial addition.
3. Implement stack and use it to convert infix to postfix expression.
4. Implement a double-ended queue (dequeue) where insertion and deletion operations are possible at both the ends.
5. Implement an expression tree. Produce its pre-order, in-order, and post-order traversals.
6. Implement binary search tree.
7. Implement insertion in AVL trees.
8. Implement priority queue using binary heap.
9. Implement hashing with open addressing.
10. Implement Prim's algorithm and Kruskal's Algorithm using priority queues to find MST of an undirected graph.
11. Implement Dijkstra's algorithm to find the shortest path.

TOTAL: 45 PERIODS**LIST OF EQUIPMENTS AND COMPONENTS FOR A BATCH OF 30 STUDENTS
(PER BATCH)****HARDWARE**

- 30 Systems with core i5 Processor

SOFTWARE

- Turbo C++/GCC Compiler – to be installed in all PC's.
- OS – LINUX/ Windows 2000/ Windows XP/ NT

13CS38 OBJECT ORIENTED PROGRAMMING LABORATORY**L T P C
0 0 3 2****COURSE OUTCOMES**

Upon successful completion of this course, students will be able to

- Design object oriented programs with static members and friend functions using C++
- Implement C++ programs with operator overloading and type conversions
- Develop class templates for various data structures like stack, queue and linked list.
- Apply function templates concepts in standard sorting algorithms such as bubble sort, insertion sort, merge sort and quick sort.
- Create classes with necessary exception handling
- Construct simple test applications using dynamic polymorphism.

LIST OF EXPERIMENTS

1. Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix-vector multiplication).
2. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
3. Implement complex number class with necessary operator overloading and type conversions such as integer to complex, double to complex, complex to double etc.
4. Overload the new and delete operators to provide custom dynamic allocation of memory.
5. Develop C++ class hierarchy for various types of inheritances.
6. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
7. Develop a template of linked-list class and its methods.
8. Develop templates of standard sorting algorithms such as bubble sort, insertion sort and quick sort.
9. Design stack and queue classes with necessary exception handling.
10. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).

TOTAL: 45 PERIODS**LIST OF EQUIPMENTS AND SOFTWARE FOR A BATCH OF 30 STUDENTS****HARDWARE**

- 30 Systems with core i5 Processor

SOFTWARE

- Turbo C++/GCC Compiler – to be installed in all PC's.
- OS – LINUX/ Windows 2000/ Windows XP/ NT

13CS39	COMMUNICATION SKILLS AND TECHNICAL SEMINAR (Common to all B.E. / B.Tech. Degree Programmes)	L T P C 0 0 3 2
---------------	--	----------------------------------

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- Express themselves fluently and appropriately in social and professional contexts.
- Develop the sub-skills required for paper presentations and group discussions.
- Acquire the soft skills and interpersonal skills which will help them to excel in their workplace.

A) LANGUAGE FUNCTIONS**(15 hrs)**

1. Compare and contrast
2. Giving reasons
3. Reporting
4. Expressing agreement and disagreement
5. Evaluating different standpoints
6. Analyzing a problem and giving solution
7. Describing daily routines, events, and weather
8. Describing Objects
9. Defending a point of view
10. Talking about future plans and intentions

Language Functions:

The teacher should build micro activities to develop the use of language required to handle these sub-functions of communication. In the process, the learners should get used to the linguistic Elements needed for these functions.

B) SPEECH PRACTICE**(15 hrs)**

The themes are:

1. Cloning
2. Artificial satellites
3. Renewable sources
4. Telecommunication
5. Cyber Revolution
6. Space research
7. Polythene pollution
8. Fossil fuels
9. Safety measures in Automobiles
10. Ecological threats
11. Water resources
12. Nuclear technology
13. Scientific farming
14. Thermal power plants
15. Nano Technology
16. Robotics
17. Artificial intelligence
18. Role of Fibre Optics
19. Exploration of Mars
20. Gas turbines
21. Indian space missions
22. Converting agricultural wastes for useful purposes
23. Developments in transportation
24. Scientific Farming
25. Impact of global warming
26. Desalination of water
27. Technology for national security

28. Industrial development and ecological issues
29. Recent trends in Automobiles
30. Hazards of E-waste
31. Mobile Jammer
32. Touch Screen Technology
33. Tidal Power
34. 3G Technology
35. Tsunami Warning System
36. Blue Tooth Technology

Seminar presentation on the themes allotted:

Each student should collect materials from Books, Internet, Journals and Newspapers for his/her theme and prepare a short Seminar Paper for 4 to 5 Pages. The presentation should be for 10 minutes using power point frames. It should be followed by a Viva Voce during which others should come forward to question, clarify, supplement or evaluate.

C) GROUP DISCUSSION / DEBATE

(10hrs)

Grouping (each group consisting of 12 members)

Topics (12 topics – 3 topics to be selected by each group - to be practiced in cycles)

Group Discussion / Debate Topics:

1. Advertising is a legalized form of lying- Discuss.
2. Communicative competency in English is the golden key for success in the Global arena.
3. Is it just to force people to retire?
4. Attitude decides one's altitude in life.
5. Should an aspiring student go for a course which is in demand or for a course which he/she likes?
6. Is westernization a cultural degradation or enrichment?
7. Is Brain drain a threat to India?
8. Can Nuclear Energy be replaced by solar energy? – Discuss.
9. Do Mobile phones spoil the youth?
10. No two generations see eye to eye- Discuss.
11. Is scientific advancement a boon or a bane?
12. Does ragging develop friendship?

D) SPEAKING ON THE GIVEN PICTURE/DIAGRAM/CHART/TABLE

(5 hrs)

RECORD LAY OUT:

Every student has to maintain a record in which he/she has to incorporate the following details.

- First page containing learner details and the topic of specialization
- Use of appropriate Language used in Language Function should be listed.
- Three news paper cuttings or journal or internet sources related to the specialized theme. (To be pasted on the pages)
- 10 Quiz questions of the specialized topic with expected answers.
- The seminar paper presented by the learner (to be pasted).
- Notes of observation - Lab. (Details about Interview skills – GD – Soft skills)
- The record should be duly signed by the course teacher and submitted to the External Examiner for verification during the semester practical.

TOTAL: 45 PERIODS

REFERENCES

1. Rizvi.M.Ashraf, "Effective Technical Communication", The MC Graw Hill Education Pvt. Ltd., Companies, New Delhi, 2010.
2. Sangeetha Sharma and Binod Mishra, "Communication Skills for Engineers and scientists", PHI Learning Private Limited, 2009.

13CS41	PROBABILITY AND QUEUEING THEORY	L T P C
		3 1 0 4

COURSE OUTCOMES

On successful completion of this course, the student should be able to

- Have a fundamental knowledge of the basic probability concepts.
- Have a well – founded knowledge of standard distributions which can describe real life phenomena.
- Acquire skills in handling situations involving more than one random variable and functions of random variables.
- Understand and characterize phenomena which evolve with respect to time in a probabilistic manner.
- Be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

UNIT I RANDOM VARIABLES 12

Discrete and continuous random variables - Moments - Moment generating functions and their properties; Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions.

UNIT II TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression - Transformation of random variables.

UNIT III MARKOV PROCESSES AND MARKOV CHAINS 12

Classification - Stationary process - Markov process - Markov chains – Transition probabilities - Limiting distributions - Poisson process.

UNIT IV QUEUEING THEORY 12

Markovian models – Birth and Death Queuing models - Steady state results: Single and multiple server queuing models - queues with finite waiting rooms - Finite source models - Little’s Formula.

UNIT V NON-MARKOVIAN QUEUES AND QUEUE NETWORKS 12

M/G/1 queue – Pollaczek - Khintchine formula, series queues - open and closed networks.

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

1. O.C. Ibe, “Fundamentals of Applied Probability and Random Processes”, Elsevier, 1st Edition, Reprint, 2007.
2. D. Gross and C.M. Harris, “Fundamentals of Queueing Theory”, Wiley Student Edition, 2004.

REFERENCES

1. T.Veerarajan, “Probability Statistics and Random Processes with Queueing theory and Queueing Networks”, Tata McGraw-Hill Education Private Limited, 3rd Edition, 2010.
2. H.A.Taha, “Operations Research”, Pearson Education, (Asia), 8th Edition, 2007.
3. K.S. Trivedi, “Probability and Statistics with Reliability, Queueing and Computer Science Applications”, John Wiley and Sons, 2nd Edition, 2002.

13CS42 DESIGN AND ANALYSIS OF ALGORITHMS**L T P C
3 1 0 4****COURSE OUTCOMES**

Upon successful completion of the course, the students will be able to

- Solve recurrence equations by considering time and space complexity.
- Analyze the complexities of various problems in different domains.
- Solve the problems using proper algorithms and design techniques.
- Synthesize efficient algorithms in common engineering design situations.

UNIT I ALGORITHM ANALYSIS**12**

Algorithm Analysis – Time Space Tradeoff – Asymptotic Notations – Conditional asymptotic notation – Removing condition from the conditional asymptotic notation – Properties of big-Oh notation – Recurrence equations – Solving recurrence equations – Analysis of linear search.

UNIT II PROBLEM SOLVING TECHNIQUES**12**

Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort – Greedy Algorithms: General Method – Container Loading – Knapsack Problem.

UNIT III DYNAMIC PROGRAMMING**12**

Dynamic Programming: General Method – Multistage Graphs – Bellman–Ford–Moore algorithm - All-Pair shortest paths – Floyd’s–Warshall algorithm - Optimal binary search trees – 0/1 Knapsack – Traveling salesperson problem.

UNIT IV BACKTRACKING**12**

Backtracking: General Method – N-Queens problem – Sum of subsets – Graph coloring – Hamiltonian problem – Knapsack problem.

UNIT V ANALYSIS OF GRAPH**12**

Graph Traversals – Connected Components – Spanning Trees – Biconnected components – Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem – Introduction to NP-Hard and NP-Completeness.

L: 45 T: 15 TOTAL: 60 PERIODS**TEXT BOOKS**

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, “Computer Algorithms / C++”, 2nd Edition, Universities Press, 2007. (UNITS II to V)
2. K.S. Easwarakumar, “Object Oriented Data Structures using C++”, Vikas Publishing House Private Limited, 2000. (UNIT I)

REFERENCES

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, “Introduction to Algorithms”, 2nd Edition, Prentice Hall of India Private Limited, 2003.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “The Design and Analysis of Computer Algorithms”, Pearson Education, 1999.

13CS43**OPERATING SYSTEMS****L T P C
3 0 0 3****COURSE OUTCOMES**

Upon successful completion of the course, the students will be able to

- Identify the functions of Operating Systems.
- Discuss the concepts of process management.
- Predict and analyze deadlocks.
- Describe the importance of storage management.
- Understand the basics of file systems and I/O systems.

UNIT I PROCESSES**9**

Introduction to operating systems – operating system structures – system calls – system programs – system structure - Processes: Process concept – Process scheduling – Operations on processes – Cooperating processes – Interprocess communication – Communication in client-server systems.

UNIT II THREADS, PROCESS SCHEDULING AND SYNCHRONIZATION**10**

Threads: Multi-threading models – Threading issues - CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple processor scheduling – Real time scheduling – Algorithm Evaluation. Process Synchronization: The critical-section problem – Semaphores – Classic problems of synchronization – critical regions – Monitors.

UNIT III DEADLOCK**8**

Deadlock: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock.

UNIT IV STORAGE MANAGEMENT**9**

Memory Management: Background – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging - Virtual Memory: Background – Demand paging – Process creation – Page replacement – Allocation of frames –Thrashing.

UNIT V FILE SYSTEMS AND I/O SYSTEMS**9**

File System Interface: File concept – Access methods – Directory structure – File system mounting – Protection - File-System Implementation: Directory implementation – Allocation methods – Free space management – efficiency and performance - I/O Systems – kernel I/O subsystem – streams – performance. Mass Storage Structure: Disk scheduling – Disk management – Swap space management.

TOTAL: 45 PERIODS**TEXT BOOK**

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne “Operating System Principles”, 6th Edition, John Wiley & Sons (Asia) India Private Limited, 2009.

REFERENCES

1. Andrew S. Tanenbaum, “Modern Operating Systems”, 2nd Edition, Pearson Education, 2004.
2. Gary Nutt, “Operating Systems”, 3rd Edition, Pearson Education, 2004.
3. Harvey M. Deitel, “Operating Systems”, 3rd Edition, Pearson Education, 2004.
4. Dhananjay M.DhamDhere, “Operating Systems A Concept – Based Approach”, 3rd Edition, McGraw Hill Education (India) Private Limited, New Delhi, 2003.

13CS44**JAVA PROGRAMMING****L T P C
3 1 0 4****COURSE OUTCOMES**

Upon successful completion of the course, the students will be able to

- Write Java programs with properly-designed constants, variables, methods and string handling to solve simple problems.
- Design Java object classes based on Object-Oriented concepts
- Use simple try-catch blocks for Exception Handling and manage I/O streams oriented interactions.
- Develop multi-thread programming for concurrency control based applications
- Construct user interfaces for Java applications and applets using GUI elements

UNIT I JAVA BASICS AND OOPS 12

The Genesis of Java - Overview of Java - Data Types, Variables, and Arrays - Operators - Control Statements - Introducing Classes - Methods and Classes - Inheritance: Basics - Using Super – Creating a Multilevel Hierarchy - Method overriding – Using Abstract Classes.

UNIT II MULTITHREADED PROGRAMMING IN JAVA 12

Packages and Interfaces: Packages - Access Protection - Importing Packages - Interfaces Definitions and Implementations - Exception Handling: Types - Try and Catch - Throw - Multithreaded Programming: Creating Threads – Creating Multiple Threads - Thread Priorities –Synchronization - Inter Thread Communication - Suspending, Resuming and Stopping Threads.

UNIT III I/O AND EXPLORING JAVA.IO 12

I/O Basics - Reading Console Input - Writing Console output - Native Methods - I/ O Classes and Interfaces - File - The Byte Streams - The Character Streams - Using Stream I/ O - Serialization. String Handling - Special string operations - Character extraction - string comparison - Modifying a String.

UNIT IV APPLETS, EVENT HANDLING AND AWT 12

Applet Basics - Applet Architecture - Applet Display Methods – Passing parameters to applets - Event Handling - Delegation Event Model - Event Classes - Event Listener Interfaces – Working with Windows, Graphics, Colors and Fonts – Using AWT Controls, Layout Managers and Menus.

UNIT V JDBC, RMI AND SERVLETS 12

The Design of JDBC - The Structured Query Language - JDBC Configuration - Executing SQL - Query Execution Statements - Scrollable and Updatable Result Sets - Row Sets – Metadata – RMI - Architecture – A simple client/server application using RMI – Servlets - Life cycle of a servlet - The javax.servlet Package - The javax.servlet.http Package - Handling HTTP Requests and Responses.

L: 45 T: 15 TOTAL: 60 PERIODS**TEXT BOOKS**

1. D.Norton, Herbert Schildt, “Java 2 - The Complete Reference” 5th Edition, Tata McGraw Hill, 2011.
2. Hortsman & Cornell, “CORE JAVA 2 Advanced Features – VOL-II”, Pearson Education, 2002.

REFERENCES

1. Deitel & Deitel, “Java How to Program”, Prentice Hall of India, 2010.
2. Herbert Schildt, “Java: A Beginner's Guide”, Tata McGraw Hill, 2007.
3. Keyur Shah, “Gateway to java programmer sun certification”, Tata Mc Graw Hill, 2002.

13CS45 DATABASE MANAGEMENT SYSTEMS**L T P C**
3 0 0 3**COURSE OUTCOMES**

Upon successful completion of the course, students will be able to

- Understand the structure and functions of a database management system
- Exemplify the concept of E-R model
- Demonstrate the basics of SQL and construct queries using SQL.
- Describe the relational database theory, and apply relational algebra Expressions for queries
- Comprehend the concept of database schema normalization rules and techniques
- Understand the basic issues of transaction processing and concurrency control.
- Grasp data storage, indexing and query processing techniques.

UNIT I INTRODUCTION**9**

Purpose of Database System – Views of data – Data Models – Database Languages —Database System Architecture – Database users and Administrator – Entity–Relationship(E-R) model– Constraints - Keys - E-R Diagrams – Weak Entity Sets– Extended E-R features - Design of E-R database schema – E-R schema to tables

UNIT II RELATIONAL MODEL**9**

Structure of relational database – Relational Algebra: Fundamental operations – Additional Operations – Extended Relational-Algebra operations. Tuple Relational Calculus – Domain Relational Calculus. SQL: Basic structure – Set operations – Aggregate functions – Null Values – Nested subqueries – Views – Data Definition Language – Embedded SQL – Dynamic SQL. Domain Constraints – Referential Integrity – Assertions – Triggers – Security and Authorization.

UNIT III DATABASE DESIGN**9**

Functional Dependencies: First, Second, Third Normal Forms - Closure – Armstrong’s Axioms - Canonical cover – Decomposition – Properties of Decomposition - Dependency Preservation. Boyce-Codd Normal Form - Fourth Normal Form – Fifth Normal Form.

UNIT IV TRANSACTION MANAGEMENT**9**

Transaction Concepts - ACID Properties , Recovery: System Recovery – Media Recovery – Two Phase Commit – Save Points – SQL Facilities for recovery. Concurrency: Locking Protocols – Two Phase Locking – Intent Locking – Recovery Isolation Levels – SQL Facilities for Concurrency. Deadlocks - issues

UNIT V DATA STORAGE AND QUERYING**9**

Storage structures: RAID. File Organization: Organization of Records– Indexing – Ordered Indices – B+ tree Index Files – B tree Index Files. Query Processing: Overview – Measures of Query Cost - Selection Operation – Evaluation of Expressions. Introduction to Big Data Analysis.

TOTAL: 45 PERIODS**TEXT BOOKS**

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, 4th Edition, Tata McGraw Hill, 2002.
2. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, 8th Edition, Pearson Education, 2006.

REFERENCES

1. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, 4th Edition, Pearson / Addison wesley, 2007.
2. Raghu Ramakrishnan, “Database Management Systems”, 3rd Edition, Tata McGraw-Hill, 2003.
3. S.K.Singh, “Database Systems Concepts, Design and Applications”, 1st Edition, Pearson Education, 2006.
4. Jeffrey Stanton, “An Introduction to Data Science”, an interactive eBook from iTunes.

13CS47**OPERATING SYSTEMS LABORATORY****L T P C****0 0 3 2****COURSE OUTCOMES**

Upon successful completion of the course, the students will be able to

- Understand the system calls and I/O system calls in UNIX
- Evaluate the process scheduling algorithms FCFS, SJF, Priority and Round robin
- Simulate the process communication through various techniques
- Simulate memory management schemes
- Simulate File allocation Techniques

(Implement the following on LINUX or other UNIX like platform. Use C for high level language implementation)

LIST OF EXPERIMENTS

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, stat, opendir, readdir
2. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
3. Write C programs to simulate UNIX commands like ls, grep, etc.
4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 Sessions).
6. Developing Application using Inter Process communication (using shared memory and pipes)
7. Simulate the Producer – Consumer problem using semaphores (using UNIX system calls).
8. Simulate First fit, best fit and Worst fit memory management algorithms.
9. Simulate Page Replacement Algorithms(FIFO, LRU and Optimal)
10. Simulate Paging memory management scheme
11. Simulate file allocation techniques (Linked, Indexed or Contiguous)

TOTAL: 45 PERIODS

13CS48 JAVA DATABASE ACCESS LABORATORY**L T P C
0 0 3 2****COURSE OUTCOMES**

Upon successful completion of the course, the students will be able to

- Declare and enforce integrity constraints on a database using RDBMS.
- Devise a complex query using SQL DML/DDDL commands.
- Create views and use in-built functions to query a database.
- Write PL/SQL programs with various types of control structure.
- Develop programs using object oriented concepts, exception handling and multi-threading.
- Design and implement data driven applications and assign responsibilities.

LIST OF EXPERIMENTS

1. DDL and DML commands
2. In-built functions and views
3. Nested Queries & Join Queries
4. PL/ SQL programs to implement various types of control structure.
5. Programs to illustrate the use of method overloading & overriding.
6. Programs to implement the concept of interfaces and packages.
7. Program to implements exception handling and multithreading techniques.
8. Configuring JDBC project and create a database connection.
9. Perform simple database query and view results using Result Sets.
10. Create a servlet application which receive the Id of an employee from the html page and retrieving the details from the database.

Mini-project (Any One)

(Front End: Java, Back End: Oracle, Define classes for the application and assign responsibilities)

- Central Library OPAC Engine
- ATM Banking
- Online Shopping
- E-Ticketing System
- Student Information Management System
- City Info Browser
- E-mail Server

TOTAL: 45 PERIODS**SUGGESTED SOFTWARES**

- Front end : JAVA
- Back end: Oracle 11g / MY SQL / DB2
(DB server could be loaded and can be connected from individual PCs)
- Platform: Windows 2000 Professional/XP

13CS51	DISCRETE MATHEMATICS	L T P C
		3 1 0 4

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- CO 1: Formulate and interpret statements presented in normal forms and determine their validity by applying the rules and methods of propositional calculus.
- CO 2: Determine when a relation is reflexive, symmetric, anti symmetric, or transitive and apply the different properties of functions.
- CO 3: Apply fundamental counting algorithms to solve problems related to permutations, combinations and recurrence relations.
- CO 4: Explain the various concepts of Lattices.
- CO 5: Interpret the basic concepts of graphs in modeling and other applications.

UNIT I LOGIC AND PROOFS 12

Propositions and Logical operators – Truth table-Propositions generated by a set-Equivalence and implication – Basic laws-Some more connectives—Functionally complete set of connectives-Normal forms-Proofs in Propositional calculus.

UNIT II SETS, RELATIONS AND FUNCTIONS 12

Basic Definitions-Set operations – Laws of set theory – Partitions - Relations – Properties of relations – Matrices of relations – Closure operations on relations – Functions - injective, surjective and bijective functions.

UNIT III COMBINATORICS 12

The basics of counting – The pigeonhole principle - Permutations and combinations – Recurrence relations - Solving Linear recurrence relations – Generating functions - Principles of inclusion and exclusion.

UNIT IV LATTICE THEORY 12

Partial ordering – Posets - Lattices as Posets – Properties of lattices – Lattices as Algebraic systems - Sub lattices – Direct product and Homomorphism – Some Special lattices.

UNIT V GRAPH THEORY 12

Graphs and graph models – Graph terminology and special types of graphs – Representing graphs and graph isomorphism - connectivity - Euler and Hamiltonian graphs.

L: 45 T:15 TOTAL:60 PERIODS

TEXT BOOKS

1. Kenneth H. Rosen, “Discrete Mathematics and its Applications (with Combinatorics and Graph Theory)”, 6th Edition, Special Indian Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi (5th Reprint, 2008).
2. Trembly J.P and Manohar.R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw-Hill Pub. Company Limited, New Delhi, 35th Reprint 2008.

REFERENCES

1. Ralph.P.Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, 4th Edition, Pearson Education Asia, Delhi, 2002.
2. A.Tamilarasi and A.M.Natarajan, “Discrete Mathematics and its Applications”, Khanna Publishers, 3rd Edition 2008.
3. T.Veerarajan “Discrete Mathematics with Graph Theory and Combinatorics”, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, 2007.

13CS52**THEORY OF COMPUTATION****L T P C****3 1 0 4****COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

CO 1: Understand the basics of finite automata and their capabilities.

CO 2: Construct finite state machines and the equivalent regular expressions.

CO 3: Construct and prove the equivalence of languages described by pushdown automata and context free grammars

CO 4: Prove the equivalence of languages described by Turing machines.

CO 5: Understand the key results in algorithmic computability and solvability of problems.

UNIT I AUTOMATA**10**

Finite Automata (FA) - Deterministic Finite Automata (DFA) - Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

UNIT II REGULAR EXPRESSIONS AND LANGUAGES**13**

Regular Expression - FA and Regular Expressions - Proving languages not to be regular – Closure properties of regular languages - Equivalence and minimization of Automata.

UNIT III CONTEXT-FREE GRAMMARS AND LANGUAGES**13**

Context-Free Grammar (CFG) - Parse Trees - Ambiguity in grammars and languages – Definition of the Pushdown Automata - Languages of a Pushdown Automata - Equivalence of Pushdown Automata and CFG.

UNIT IV PROPERTIES OF CONTEXT-FREE LANGUAGES**12**

Normal forms for CFG - Pumping Lemma for CFL - Closure Properties of CFL – Turing Machines - Programming Techniques for TM: Subroutines.

UNIT V UNDECIDABILITY**12**

A language that is not Recursively Enumerable (RE) - An un-decidable problem that is RE- Undecidable problems about Turing Machine - Post's Correspondence Problem.

L: 45 T: 15 TOTAL: 60 PERIODS**TEXT BOOK**

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", 3rd Edition, Pearson Education, 2007.

REFERENCES

1. Thomas A. Sudkamp, "An Introduction to the Theory of Computer Science, Languages and Machines", 3rd Edition, Pearson Education, 2007.
2. J. Martin, "Introduction to Languages and the Theory of computation", 3rd Edition, Tata McGraw Hill, 2007.

13CS54**C# AND .NET TECHNOLOGIES****L T P C****3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Perceive awareness about .NET Environment.

CO 2: Develop C# program based on the features of .Net Framework.

CO 3: Identify the file types and serialization mechanisms in C#.

CO 4: Demonstrate the applications of XML in .NET and ADO.NET.

CO 5: Build web pages using ASP.NET with session management.

UNIT I OVERVIEW OF .NET**8**

Building blocks of .Net platform – Type system - Language specification - Type distinction – Runtime deployment - .Net aware programming languages - Independent nature of .NET

UNIT II CONCEPTS OF C#**10**

Data types –Arrays-Strings-Control Statements-Classes and Objects- this keyword – Static Keyword - Namespace - Inheritance –Interface-Polymorphism: Method Overloading- Operator Overloading – Property – Indexes – Delegates - Exception handling.

UNIT III FILE I/O AND OBJECTS**9**

Directory and file types – Programming with file I/O – Object serialization – Configuration of objects – Serialization mechanisms.

UNIT IV ADO .NET**9**

ADO.NET Architecture - ADO.NET- Connected Layer: Data Provider Model-Data Readers - Data Transaction - Disconnected layers: Dataset- Data Column- Data Row- Table Data.

UNIT V ASP.NET**9**

Building ASP.NET web pages – ASP.NET web controls – Master pages – Themes – State management: Session data – Cookies.

L: 45 TOTAL: 45 PERIODS**TEXT BOOK**

1. Andrew Troelsen, “Pro C# 2010 and the .NET 4 Platform”, 5th Edition, APress, 2010.

REFERENCES

1. Jesse Liberty, Donald Xie, “Programming C# 3.0”, 5th Edition, O’Reilly Press, 2008.
2. Robinson et al, “Professional C#”, 3rd Edition, Wrox Press, 2002.
3. Herbert Schildt, “The Complete Reference: C#4.0”, Tata McGraw Hill, 2012.
4. Thuan Thai, Hoang Q. Lam, “.NET Framework Essentials”, 3rd Edition, O’Reilly Press, 2003.
5. Stephen C. Perry, “Core C# and .NET”, Pearson Education, 2009.

13CS55	PROFESSIONAL ETHICS AND HUMAN VALUES (13ME55, 13CE55, 13CS55, 13IT55,13EE55, 13EI55,13EC55)	L T P C 3 0 0 3
(Common to all branches)		

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

CO1: recognize the core values that shape the ethical behavior of an engineer

CO2: expose awareness on professional ethics and human values.

CO3: distinguish their role in technological development

UNIT I HUMAN VALUES 9

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality

UNIT II ENGINEERING ETHICS 9

Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9

Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and chernobyl case studies. Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) - discrimination.

UNIT V GLOBAL ISSUES 9

Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -Moral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE),India, etc.

L:45 TOTAL: 45PERIODS

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.
3. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint)

REFERENCES

4. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
5. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
6. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

13CS57 MICROCONTROLLER AND EMBEDDED SYSTEMS LABORATORY L T P C
0 0 3 2

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- CO 1: Acquire the basic knowledge of Arithmetic operations using 8051 microcontroller kit
- CO 2: Analyze the various interface techniques
- CO 3: Develop embedded programming in C language and apply real-time systems design techniques to various software programs.
- CO 4: Utilize a top-down modular design process to complete a medium complexity embedded system design project under instructor specified design constraints.

LIST OF EXPERIMENTS

1. Basic Arithmetic operations using 8051 microcontroller kit
2. Design with 8051 Microcontrollers: I/O programming, ADC/DAC, Timers, Interrupts, Serial port
3. To rotate motor in clockwise direction and anticlockwise direction for infinite number of times
4. Develop Assembly language programs using Keil software
5. I/O porting on ARM Processor for external peripheral devices using High level language programming
6. Transmission from Kit and reception from PC using Serial Port
7. Mini Projects (implementation of a wireless communication protocol on an embedded system) (a group of students would be required to work on an any one of following embedded system design project) Though the emphasis would be on implementation, they would be required to go through all aspects of system design including drawing up proper specifications as well as evaluation of alternatives.
 - i. Design of Vehicle Positioning System based on Arm.
 - ii. Anti Theft Control System Design using embedded system.
 - iii. The Design of Total Station Handhold Device based on Arm
 - iv. Design and Implementation of the Lab Remote Monitoring System Based on Embedded Technology.
 - v. Microcontroller based automation of variable electronic speed governor
 - vi. The Intelligent Embedded control warning system for car reversing
 - vii. Real-time temperature measuring system for the joint less rail
 - viii. Wheel chair pressure monitors alert system for the reduction of the occurrence of pressure sores.

P:45 TOTAL: 45 PERIODS

LIST OF EQUIPMENTS AND COMPONENTS

HARDWARE

- 8051 Trainer Kit

SOFTWARE

- Keil μ Vision3-IDE(MDK 301a)(www.keil.com/uvision/)
- Open source(Ubuntu)-GCC

13CS58

C# and .NET TECHNOLOGIES LABORATORY

L T P C
0 0 3 2**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Demonstrate the fundamental concept of C# and .NET
- CO 2: Experiment and examine runtime errors using exception Handling
- CO 3: Create database using ADO.NET
- CO 4: Model .NET components in a windows form based applications
- CO 5: Design online applications using ASP .NET

LIST OF EXPERIMENTS

1. Develop a polymorphic banking program using Account hierarchy. Create class for SavingsAccount and CheckingAccount. For each Account, allow the user to specify an amount of money to withdraw from the Account and an amount of money to deposit into the Account. While processing each Account, determine its type. If an Account is a SavingsAccount, calculate the amount of interest owed to the Account using member function calculateInterest, and then add the interest to the account balance. After processing an Account, print the updated account balance obtained by invoking base class member function getBalance.
2. Develop an Insurance application which calculates interest of an applicant under various insurance policy schemes like pension plans, health plans, individual plans, group schemes and also choose the best insurance policy according to the customer requirement. Allow the applicant to join in more than one scheme and calculate his premium on yearly basis or monthly basis using multiple inheritance.
3. Develop an application that allows the user to buy and sell stock by setting a buy value and a sell value using Delegates and events.
4. Develop a library system and handle all the possible exceptions which occur in cataloging and circulation of books, journals, CDs.
5. Write a program to demonstrate file conversion. Convert a binary file to a text file.
6. Develop an employee database for an organization to store information about employees, departments and project associated with the employees. Employees work in departments and each department is managed by an employee. When a project is completed the associated employees table should be updated accordingly. Design a normalized table to perform the described actions. Use database wizards and tools that read, display, and allow viewing and editing a specific table in a database. *Note: The attributes of employee table includes ssn, salary, address and phone number, department table includes dno, dname and current project, project table includes pno, pname, project duration, associated employee, budget.*
7. Develop a payroll processing application which calculates the wages of employees at all level. Calculate Overtime Rate, Gross Pay and Net Pay of employees and display all the necessary information of an employee in the user interface. Use standard Windows controls to create a user interface. *Note: Consider the employee income tax deduction, paid and non paid vacations while calculating the employee salary.*
8. Create a web application with consistent look on all the pages, forms and controls.
9. Create a client login page for a voter ID registration system, design a server page which stores the client information and display the session details on request
10. **Mini Projects (As per SRS guidelines)**
 - a. Develop an online shopping application
 - b. Develop an online banking application
 - c. Develop an online education system
 - d. Develop an online ticket reservation System
 - e. Develop an online inventory management system
 - f. Develop an online expert counseling system

- g. Develop an online passport application system
- h. Develop an online examination system
- i. Develop an online bus tracking system

P: 45 TOTAL: 45 PERIODS

SUGGESTED SOFTWARE TOOLS

Operating System: Windows XP

Frontend: Microsoft Visual Studio

Backend: Oracle 9i/SQL Server/MySQL

13CS61	PRINCIPLES OF MANAGEMENT (13CS61,13EE71, 13EI71, 13EC81,13CE81,13IT81,13ME71) (Common to all branches)	L T P C 3 0 0 3
---------------	---	----------------------------------

COURSE OUTCOMES

Upon completion of this course the students will be able to

- CO1: Discuss the development of management thoughts and different types of Business Organization.
- CO2: Practice the process of planning and decision making in an industrial situations.
- CO3: Design the suitable selection process for a particular job description.
- CO4: Apply different motivational techniques and leadership skills in the organization.
- CO5: Justify the various controlling techniques and tools in the organization.

UNIT I INTRODUCTION 9

Historical developments – approaches to management – Management and Administration – Development of Management Thoughts – Contribution of Taylor and Fayol – Functions of Management – Types of Business Organization, Meaning, features merits and demerits - Social responsibilities of business organisation.

UNIT II PLANNING 9

Nature and Purpose – Steps in Planning Process – Objectives – Setting Objectives – Process of Managing through Objectives – Strategies – Policies and Planning Premises – Forecasting – Importance, Methods of Forecasting - Decision-making, Decision making Process & Types of Decisions.

UNIT III FUNCTIONAL AREA OF ORGANISATION 9

Formal and Informal organization – Organization Chart – Structure and Process – Departmentation by different strategies – Line and Staff authority – Benefits and Limitations – De-Centralization and Delegation of Authority – Staffing – Selection Process - Techniques – HRD – Managerial Effectiveness.

UNIT IV DIRECTION 9

Objectives– Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Communication – Process of Communication – Types of Communication – Barriers and Breakdown - Effective Communication - Electronic Media in Communication.

UNIT V CONTROLLING STRATEGIES 9

System and process of Controlling – Requirements for effective control – The Budget as Control Technique – Information Technology– Computers in handling the information – Productivity – Problems and Management – Control of Overall Performance – Direct and Preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS:

1. Harold Koontz & Heinz Weihrich, “Essentials of Management – An International Perspective”, 8th Edition, Tata Mcgraw Hill, 2009.
2. Hellriegel, Slocum & Jackson, “Management – A Competency Based Approach”, 11th Edition Thomson South Western, 2008.

REFERENCES:

1. Stephen P. Robbins and Mary Coulter, “Management”, 8th Edition, Prentice Hall of India”, 2012.
2. Charles W.L Hill, Steven L McShane, “Principles of Management”, Mcgraw Hill Education, Special Indian Edition, 2007.
3. Vijayaraghavan G.K & Sivakumar M. “Principles of Management”, 1st Edition, Lakshmi Publications, 2012.
4. Ramachandran. S. “Principles of Management”, 1st Edition, Air Walk Publications, 2012.
5. Andrew J. Dubrin, “Essentials of Management”, 9th Edition, Thomson South western, 2011.

13CS62	INTERNET AND WEB TECHNOLOGY (In Collaboration with InfoSys) (Common to CSE, ECE and IT)	L T P C 3 0 0 3
---------------	---	----------------------------------

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- CO 1: Understand the complexity of the real world objects
- CO 2: Learn the best practices for designing Web forms and Usability Reviews
- CO 3: Understand the Principles behind the design and construction of Web applications
- CO 4: Develop and Deploy an Enterprise Application

UNIT I REVIEW OF OBJECT ORIENTED CONCEPTS 7

Object oriented concepts – object oriented programming (review only) — advanced concept in OOP – relationship – inheritance – abstract classes – polymorphism – Object Oriented design methodology – approach – best practices. UML class diagrams – interface – common base class.

UNIT II INTERNETWORKING 9

Internetworking – Working with TCP/IP – IP address – sub netting – DNS – VPN – proxy servers – firewalls – Client/Server concepts - World Wide Web – components of web application – MIME types, browsers and web servers – types of web content – URL – HTML – HTTP protocol – Web applications – performance – Application servers – Web security. User Experience Design – Basic UX terminology – UXD in SDLC – Rapid prototyping in Requirements.

UNIT III CLIENT BASED TECHNOLOGIES 9

Client Tier using HTML – Basic HTML tags – Look and feel using CSS – Client side scripting using Java Script and Validations - Document Object Model (DOM).

UNIT IV WEB DATABASE PROGRAMMING 10

Business tier using POJO (Plain Old Java Objects) – Introduction to Frameworks – Introduction to POJO – Multithreaded Programming – Java I/O – Java Database Connectivity (JDBC).

UNIT V SERVER BASED TECHNOLOGIES 10

Presentation tier using JSP – Role of Java EE in Enterprise applications – Basics of Servlets - To introduce server side programming with JSP - Standard Tag Library.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

1. Douglas E Comer, Internet Book, “The: Everything You Need to Know About Computer Networking and How the Internet Works”, 4th Edition, Prentice Hall, 2007
2. Jeffrey C. Jackson, “Web Technologies: A Computer Science Perspective”, Prentice Hall, 2007

REFERENCES

1. <http://www.ietf.org/>
2. <http://www.w3.org/>
3. <http://www.vpnc.org/vpn-standards.html>
4. <http://java.sun.com/docs/books/tutorial/>
5. Michael Nash, Java Frameworks and Components, Cambridge University Press, 2002.
6. Ted Wugofski, XML Black Book 2nd Edition, Certification Insider Press
7. Developing Web Applications with JavaServer Faces found online at <http://java.sun.com/developer/technicalArticles/GUI/JavaServerFaces/>
8. Short introduction to log4j found online at <http://logging.apache.org/log4j/1.2/manual.html>
9. JUnit Cookbook by Kent Beck, Erich Gamma at <http://junit.sourceforge.net/>
10. <http://java.sun.com/>
11. <http://www.junit.org/>
12. Marty Hall and Larry Brown, Core Servlets and JavaServer Pages Vol.1: Core Technologies 2nd Edition, Sun Microsystems.

13. Bryan Basham, Kathy Sierra, and Bert Bates, Head First Servlets and JSP, SPD O'Reilly, 2005.
14. The Complete reference - JSP
15. Servlet Tutorial can be found online at <http://java.sun.com/docs/books/tutorial>
16. <http://java.sun.com/javaee/javaserverfaces/reference/docs/index.html>
17. JSF Tutorial can be found online at
<http://java.sun.com/j2ee/1.4/docs/tutorial/doc/JSFIntro.html>
18. Herbert Schildt, "Java: The Complete Reference", McGraw-Hill Professional, 2006.

13CS63 SOFTWARE ENGINEERING METHODOLOGIES**L T P C
3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Identify appropriate software design model based on requirement analysis.
- CO 2: Formulate Software Requirements Specification (SRS) reports for the real world application
- CO 3: Translate a specification into a design, and identify the components to built the architecture
- CO 4: Plan a software engineering process to account for quality issues and non-functional requirement
- CO 5: Estimate the work to be done, resources required and the schedule for a software project plan

UNIT I INTRODUCTION TO SOFTWARE ENGINEERING 9

Introduction: Definition of terms - The Evolving role of software - Software characteristics -Software applications - Software myths. The Software process: A generic view of process. Process models: Prescriptive Models- Water fall model – Incremental process model – Specialized process models. Software engineering practice: Communication Practices – Planning practices – Deployment.

UNIT II SOFTWARE PROJECT ANALYSIS 9

System engineering: Computer based system – System engineering hierarchy – Business process engineering – Product engineering – System modeling. Requirements engineering: Requirements engineering tasks – Initiating the requirements engineering process–Negotiating and validating requirements.

Analysis modeling: Analysis modeling approaches – Data modeling concepts – Flow oriented modeling – Behavioral model.

UNIT III SOFTWARE DESIGN CONCEPTS 9

Design engineering: Design in the context of software engineering – Design process and design quality. Creating architectural design: Software architecture – Data design – Architectural styles and design. Modeling Component level design: Component - Conducting component design. Golden rules of User Interface design.

UNIT IV IMPLEMENTATION ISSUES 9

Implementation issues: Introduction – Structured coding techniques – Coding style – Standards and guidelines – Documentation guidelines. Estimation: Observations on estimation – Project planning process – Software scope and feasibility – Resources – Software project estimation –Decomposition techniques – Empirical estimation models.

UNIT V PROJECT SCHEDULING AND CHANGE MANAGEMENT 9

Project scheduling: Basic concepts – Project scheduling – Defining a task set for software project. Risk Management: Risk mitigation, monitoring and management. Change management: Software Configuration Management – SCM repository and process.

L: 45 TOTAL: 45 PERIODS**TEXT BOOK**

1. Roger S.Pressman, “Software Engineering: A Practitioner's Approach”, 6th Edition, Tata McGraw Hill Edition, 2010.

REFERENCES

1. Shari Lawrence Pfleeger, Joanne M.Atle, “Software Engineering: Theory and Practice”, Pearson Education, 4th Edition, 2010.
2. Waman S Jawadekar, “Software Engineering: Principles and Practice”, Tata McGraw Hill Edition, 2008 (Reprint).

13CS64

PRINCIPLES OF COMPILER DESIGN**L T P C****3 1 0 4****COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- CO 1: Analyze the source program and recognize the tokens
- CO 2: Illustrate and compare the various types of parser and their role for the design of compiler.
- CO 3: Generate three address code from the given program code
- CO 4: Generate code from directed acyclic graphs
- CO 5: Optimize the source code using suitable code optimization techniques

UNIT I LEXICAL ANALYSIS 11

Introduction to Compiling - Compilers-Analysis of the source program - The phases – Cousins - The grouping of phases - Compiler construction tools. The role of the lexical analyzer - Input buffering - Specification of tokens - Recognition of tokens.

UNIT II SYNTAX ANALYSIS 13

Syntax Analysis - The role of the parser - Context-free grammars - Writing a grammar – Top down parsing - Bottom-up Parsing - LR parsers. Type Checking - Type Systems - Specification of a simple type checker.

UNIT III INTERMEDIATE CODE GENERATION 12

Intermediate languages – Declarations - Assignment statements - Boolean expressions - Case statements – Backpatching - Procedure calls.

UNIT IV CODE GENERATION 12

Issues in the design of a code generator - The target machine - Run-time storage management - Basic blocks and flow graphs - Next-use information - A simple code generator - Register allocation and assignment - The Directed Acyclic Graph (DAG) representation of basic blocks - Generating code from DAGs.

UNIT V CODE OPTIMIZATION 12

Introduction - The principle sources of optimization - Peephole optimization - Optimization of basic blocks - Loops in flow graphs - Introduction to global data-flow analysis - Code improving transformations.

L:45 T:15 TOTAL: 60 PERIODS**TEXT BOOK**

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, “Compilers- Principles, Techniques, and Tools”, Pearson Education Asia, 2008.

REFERENCES

1. David Galles, “Modern Compiler Design”, Pearson Education Asia, 2007.
2. Steven S. Muchnick, “Advanced Compiler Design & Implementation”, Morgan Kaufmann Publishers, 2000.
3. C. N. Fisher, R. J. LeBlanc “Crafting a Compiler with C”, Pearson Education, 2000.
4. <http://dinosaur.compilertools.net>
5. <http://epaperpress.com/lexandyacc>.

13CS65**NETWORK SECURITY****L T P C**
3 1 0 4**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Identify the various attacks and its issues.
- CO 2: Learn usage of cryptographic algorithms for avoiding basic level threats.
- CO 3: Comprehend the issues involved in Integrity, Authentication and Key Management techniques.
- CO 4: Realize the importance of user authentication and Kerberos concepts.
- CO 5: Acquire the knowledge of network security and its applications.

UNIT I INTRODUCTION 12

Introduction - Need for security - Principles of Security - Types of Attacks: Passive attack - Active attack - Attacks on confidentiality - Security services and mechanisms and Techniques- Substitutional Ciphers - Transposition Ciphers.

UNIT II SYMMETRIC AND ASYMMETRIC KEY ALGORITHMS 12

Principle of Symmetric and Asymmetric key algorithms - Stream and Block Ciphers - RC4 - Data Encryption Standards (DES) - Advanced Encryption Standard (AES), Rivest Shamir Adleman(RSA) algorithm.

UNIT III AUTHENTICATION AND KEY MANAGEMENT 12

Hash functions: Message Digest 5(MD5) – Secure Hash Algorithm (SHA) - Digital signatures, Symmetric key distribution: Symmetric Encryption-Asymmetric Encryption – Diffie Hellman key Exchange – X.509 certificates – Public key infrastructure.

UNIT IV USER AUTHENTICATION AND KERBEROS 12

Introduction - Authentication basics – Passwords - Authentication Tokens - Certificate-based Authentication - Biometric Authentication - Kerberos.

UNIT V NETWORK SECURITY AND ITS APPLICATIONS 12

Firewalls - Secure Socket Layer (SSL) - Transport Layer Security (TLS) - Secure Electronic Transaction (SET) - Security: E-mail.

L: 45 T: 15 TOTAL: 60 PERIODS**TEXT BOOKS**

1. William Stallings, “Cryptography and Network Security”, 5th Edition, Pearson Education, 2011.
2. Atul Kahate, “Cryptography and Network Security”, 2nd Edition, Tata McGraw-Hill Publishers, 2011.

REFERENCES

1. Behrouz Forouzan, Debdeep Mukhopadhyay, “Cryptography and Network Security” 2nd Edition, Tata McGraw Hill, 2010.
2. Bernard Menezes, “Network Security and Cryptography”, Cengage Learning, India Edition, 2010.
3. Eric Maiwald, “Fundamentals of Network Security”, Tata McGraw Hill, 2011.

13CS67

NETWORK SECURITY LABORATORY

L T P C
0 0 3 2

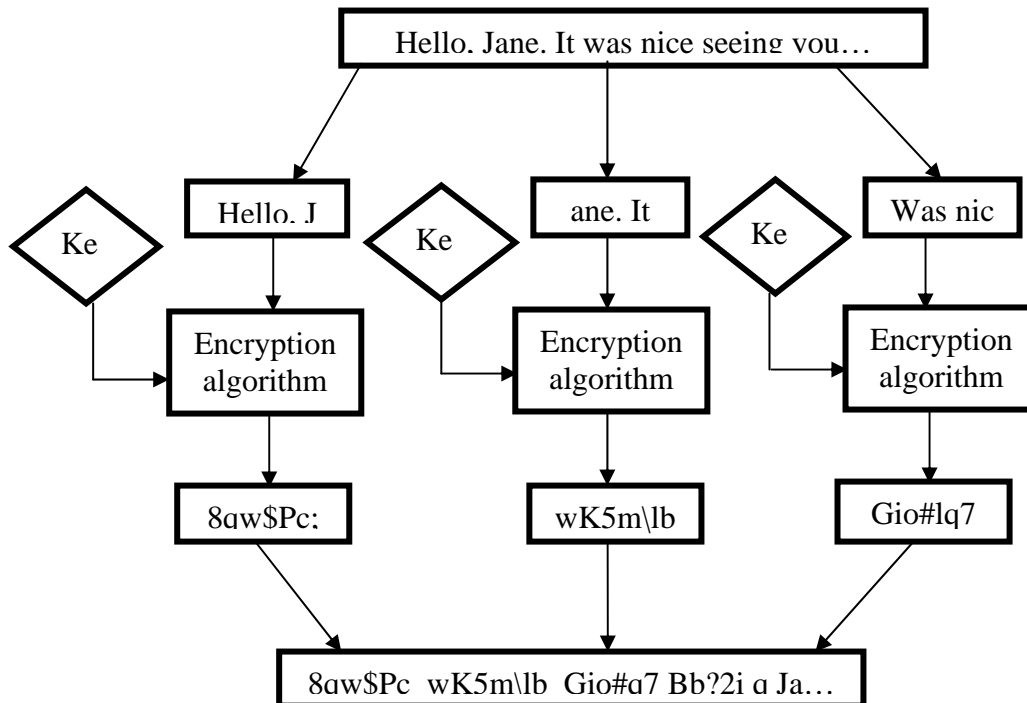
COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- CO 1: Understand the basic concepts of cryptographic and network security algorithms.
- CO 2: Experiment and analyze important cryptographic algorithms.
- CO 3: Experiment security algorithms with efficiently implement key exchange algorithm.
- CO 4: Configure the mail agent, firewall and secure shell (SSH) for providing secure environment.
- CO 5: Install and explain the purpose of a protocol analyzer (Wireshark and Snort).
- CO 6: Perform basic protocol data unit (PDU) capture, analysis and display filtering using Wireshark features.

LIST OF EXERCISES

1. Implementation of DES and IDEA Algorithms as per the following requirement shown in the figure.



2. Implementation of AES and Asymmetric RSA algorithm.
3. Implementation of Key Exchange using Diffie-Hellman Approach and Elliptic Curves.
4. Study of SHA-1 and MD5 hash function and implement the hash code using SHA-1 and hash code using MD5.
5. Authentication using Digital Signature Algorithm - Configure a mail agent to support Digital Certificates, send a mail and verify the correctness of this system using the configured parameters.
6. Configure a firewall to block the following for 5 minutes and verify the correctness of this system using the configured parameters:

- a. Two neighborhood IP addresses on your LAN
 - b. All ICMP requests
 - c. All TCP SYN Packets
7. Configure SSH (Secure Shell) and send/receive a file on this connection to verify the correctness of this system using the configured parameters.
 8. Case Study on Wireshark Installation and Setup.
 9. Perform basic PDU capture, analysis and display filtering for a simple scenario using Wireshark.
 10. Examine how networking packets are transferred and exchanged in a TCP/IP network. Student will develop an understanding of the protocols in packets transfer and corresponding protocols like Address Resolution Protocol (ARP), and Internet Control Message Protocol (ICMP) using Wireshark software.
 11. Case Study on Snort Installation and Setup.
 12. Perform Simple experiments using the sniffer mode, the packet logger mode, and the Network Intrusion Detection mode of Snort.

P:45 TOTAL: 45 PERIODS

Note:

- The first four exercises (1- 4) have to be implemented in Ubuntu 12.04 using C language.
- The exercises 5, 6 and 7 have to be implemented using built-in utilities available in Ubuntu 12.04.

List of Equipments and Components for a batch of 30 Students (Per Batch)

HARDWARE

- 30 Systems with core i3 Processor

SUGGESTED SOFTWARES

- Operating System - Linux (Ubuntu 12.04)
- Wireshark
- Snort or WinIDS AIO software pack

REFERENCES

1. <http://www.wireshark.org/download.html>
2. <http://elc.fhda.edu>
3. <http://www.winsnort.com/>
4. http://www.snort.org/docs/snort_manual/
5. http://ussrback.com/docs/papers/IDS/snort_rules.htm.html
6. <http://www.winpcap.org/install/default.htm>
7. http://www.internetsecurityguru.com/documents/Snort_Base_Minimal_CentOS_5.pdf
8. http://sourceforge.net/project/downloading.php?groupname=wireshark&filename=wireshark-setup-0.99.6a.exe&use_mirror=superb-west.

13CS68

INTERNET AND WEB TECHNOLOGY LABORATORY
(In Collaboration with InfoSys)
 (Common to CSE and IT)

L T P C
0 0 3 2

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- CO 1: Understand, analyze and apply the role of languages HTML, Javascript, JSP in the workings of the web and web applications
- CO 2: Analyze a web page and identify its elements and attributes.
- CO 3: Able to develop web pages using JDBC
- CO 4: Able to build web applications using JSP.
- CO 5: Develop and Deploy an Enterprise Application.

LIST OF EXERCISES

1. Develop a java application for Bank Transaction with different constraints.
2. Develop a java program to get employees details with given constraints.
3. Analyze and design the java code for given problems.
4. Compute Body Mass Index.
5. Implement Body Mass Index Calculator.
6. Simpsons Database: There is a database for Springfield Elementary School with the following tables:
 - a. Courses(id, name, teacher_id)
 - b. Grades(student_id, course_id, grade)
 - c. Students(id, name, email, password)
 - d. Teachers(id, name)
7. World Database: There is a world database with the following tables:
 Countries (code, name, continent, surface_area, population, life_expectancy, gnp, ...)
 Cities (id, name, country_code, district, population)
 CountriesLanguages(country_code, language, official, percentage)
8. Design a web page for an Online voting Form with various HTML components.
9. Design a web page for an Email Registration Form with various HTML components. Develop a Servlet application to receive the email registration information and store the details into a table.
10. Design a web page for integrating the RMI server program to find minimum and maximum of three numbers send by the client program. Design a GUI Form for the RMI client to collect three numbers and display the result of minimum, maximum using Text Field.
11. Mini Project.

P: 45 TOTAL: 45 PERIODS

LIST OF EQUIPMENTS AND COMPONENTS

Sl. No	Course	S/W on Students Machine
1.	OOO (Java)	Eclipse 3.2
2.	Client tier (HTML/JS) & Business tier (JDBC)	Eclipse 3.2
3.	Presentation tier (JSP)	Tomcat server in Eclipse 3.2

An alternate Software requirement can be WAMPP (Windows, Apache, MySQL, Perl / PHP) combination. WAMPP is an open source package, hence free too.

13CS69

COMPREHENSION

L T P C
0 0 3 1**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Pursue their higher education and research.
- CO 2: Undergo GATE, GMAT like entrance exams.
- CO 3: Evaluate the comprehensive knowledge being acquired through core engineering courses.
- CO 4: Develop Aptitude and analytical skills towards placement.

I. COURSE CONTENT AND LAYOUT

The students will select a particular SIG (Special Interest Group) of subjects as mentioned below to review their competency level:

SIG 1: Computing

It is a Goal-oriented activity requiring, benefiting from, or creating algorithmic processes e.g. through computers.

- Data Structures and Algorithms
- Compiler Design
- Digital Logic Design
- C and OOP Programming
- Theory of Computation

SIG 2: Networking

It is to interact with others to exchange information and develop professional or social contacts.

- Computer Networks
- Web Technology
- Operating System
- Computer Organization and Architecture
- Social Networks

SIG 3: Data Analytics

It is the science of examining raw data with the purpose of drawing conclusions about that information.

- Database Management Systems
- Software Engineering
- Distributed Computing
- Advanced Database Technology
- Data Warehouse and Data Mining

II. ASSESSMENT PROCEDURE

- The staff-coordinator per group is responsible for scheduling the session plans, monitoring the activities and recording the continual assessments.
- The technical seminars, group discussions and comprehensive viva will be conducted and assisted by subject experts in the department.
 1. **Technical Seminars:** Each student will be required to make one technical presentation for minimum 15 minutes duration in this course. Individual topics will be assigned to the students by the department.
 2. **Group Discussion:** Assessment must focus on evaluating Team spirit and Body Language of student's participation.
 3. **Comprehensive Viva:** Viva should be handled on their area of interest in both written / oral mode.
- Each student must participate in the suggested activities and their performance assessment must be recorded.

Suggested Activities for improving placements:**1. Written Test:****a. Verbal**

- Synonyms
- Antonyms
- Sentence completion
- Passage writing

b. Aptitude

- Quantitative and Logical

c. Analytical

- Critical Reasoning

2. Mock Interviews:**a. Pure HR Panel:**

- Communication Skills
- Attitude
- Interpersonal Skills
- Openness to learn
- Eligibility Check
- **Stress test**
- Co-curricular achievements
- Extra-curricular achievements

b. Management Interview:

- Industry Orientation
- Industry Trends
- Career Goals
- Adaptability
- Culture Fitment

c. Tech Panel:

- Programming languages you know about.
- Data Structures
- Project related
- Subject knowledge
- Practical applicability of basic concepts
- Certifications
- Problem Solving

Suggested Activities for Encouraging Higher Studies**1. Mock GATE Examination**

- Solving previous year question papers
- Objective type test for Aptitude and Verbal practices.

2. Technical Review

To comprehend the core engineering concepts

- Debate
- Presentation
- Technical Report

P:45 TOTAL: 45 PERIODS

13CS71	COMPUTER GRAPHICS AND VISUALIZATION	L	T	P	C
		3	1	0	4

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- CO 1: understand the mathematical function for 2D graphics and formulate algorithms.
- CO 2: implement appropriate clipping algorithms for various 2D shapes.
- CO 3: analyze the effects of perspective and orthographic projections of scenes in 3D space.
- CO 4: apply proper rendering, lighting and color models to enhance the objects
- CO 5: acquire knowledge and skills in computer animation tool.

UNIT I GRAPHICS PRIMITIVES AND ATTRIBUTES 13

Graphics output primitives – Line, Circle and Ellipse generating algorithms – Attribute Implementations for Straight-Line Segments and Curve – Two dimensional Geometric transformations – Matrix representations and homogeneous coordinates - Composite transformations - Reflection – shear.

UNIT II WINDOWING AND CLIPPING 12

Two-Dimensional Viewing Pipeline - Clipping Window - Normalization and Viewport Transformations - OpenGL Two-Dimensional Viewing Functions - Clipping Algorithms – Point Clipping - Line Clipping: Cohen-Sutherland - Liang-Barsky - Polygon Fill-Area Clipping: Sutherland-Hodgman - Weiler-Atherton.

UNIT III THREE DIMENSIONAL PRIMITIVES 13

Three-Dimensional Translation, Rotation, Scaling - Composite Three-Dimensional Transformations - Reflection – shear - Affine Transformations - OpenGL Geometric-Transformation Functions - Three-Dimensional Viewing Concepts: Overview – Pipeline - Coordinate Parameters - Transformation from World to Viewing Coordinates - Projection Transformations - OpenGL Three-Dimensional Viewing Functions.

UNIT IV SURFACE RENDERING AND COLOR MODELS 11

Light Sources - Surface Lighting Effects - Basic Illumination Models - Transparent Surfaces- Atmospheric Effects - Shadows - Polygon Rendering Methods - OpenGL Illumination and Surface - Rendering Functions - Properties of Light - Color Models - Standard Primaries and the Chromaticity Diagram - RGB Color Model - HSV Color Model - Color Selection and Applications - Interactive Input Methods and Graphical User Interfaces.

UNIT V VISUALIZATIONS 11

Animation tool: User interface – Learn to work in 3D space – Workspace – Modeling – Animation – Shading – Lighting – Rendering.

L: 45 ; T:15; TOTAL: 60 PERIODS

TEXT BOOKS

1. Donald Hearn, M.Pauline Baker, Warren R. Carithers, “Computer Graphics with OpenGL”, 4th Edition, Pearson Education, 2011.
2. John Edgar Park, “Understanding 3D Animation using Maya”, Springer, 2005.

REFERENCES

1. Edward Angel, “Interactive Computer Graphics - A Top-Down Approach Using OpenGL”, 5th Edition, Pearson Education, 2009.
2. John F.Hughes, Andries Van Dam, Morgan McGuire, David F.Sklar, “Computer Graphics: Principles and Practice”, 3rd Edition, 2013.
3. Marc-Andre Guindon, “Autodesk Maya 2010: The Modeling & Animation Handbook”, Autodesk Official Training Guide, Autodesk Inc., 2009.
4. Steven J. Gortler, “Foundations of 3D Computer Graphics”, 2012.

13CS72	MOBILE APPLICATION DEVELOPMENT	L	T	P	C
		3	0	0	3

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- CO 1: apply the application models and architectures used to develop mobile applications.
- CO 2: describe the components and structure of a mobile development frameworks (Android SDK and Android Development Tools (ADT))
- CO 3: recognize how and when to apply the different components of mobile application to develop an application.
- CO 4: develop Android Operating System based mobile applications with the basic and advanced features
- CO 5: identify database and networking features that are suitable for mobile applications development

UNIT I INTRODUCTION 9

Mobile Applications - Characteristics and Benefits - Application Model - Android Overview - Features, Architecture - Dalvik Virtual Machine - Application frameworks - Libraries - Runtime - Kernel - Mobile devices Profiles - Mobile Software Engineering

UNIT II TOOLS 9

Google Android Platform - Android Development Tools - Android SDK, Eclipse Simulator - Android emulator - Frameworks and Tools - Event based programming Tools - UI tool kit Handlers and Listeners - Graphics and Animation Tools

UNIT III USER INTERFACE 9

Android UI Controls - Creating the Activity - Exploring the Activity lifecycle - Views - Exploring common views - Using a List view - Creating custom view - Android UI Layouts - Using resources - Exploring Android Manifest file - Gesture based UIs

UNIT IV APPLICATION DESIGN AND DEVELOPMENT 9

Intents and Services - Defining Intents - Implicit and explicit Invocation - Adding external links - Broadcasting Intents - Creating a receiver - Android Interface Definition Language - Exposing a remote interface - Binding to a service - service life cycle - Android Text to Speech techniques

UNIT V DATABASE AND NETWORKING 9

Storing and Retrieving data using preferences - File Systems - Accessing and storing database data - Content Provider - Overview of Networking in Mobile Applications - Web Services for Mobile Applications

L: 45; TOTAL: 45 PERIODS

TEXT BOOK

1. C. Enrique Ortiz, Chris King, Robi Sen, W. Frank Ableson, "Android in Action", 3rd Edition, Manning Publication Co.,2011

REFERENCES

1. Zigurd Mednieks, Laird Dornin, G.Blake Meike and Masumi Nakamura, "Programming Android", O'Reilly, 2011.
2. Reto Meier, "Professional Android 2 Application Development", Wrox Wiley, 2010.
3. Wei-Meng Lee, "Beginning iPhone SDK Programming with Objective-C", Wrox Wiley, 2010.
4. Poslad, "Ubiquitous Computing: Smart Devices, Environments and Interactions", Wiley, 2010
5. http://www.tutorialspoint.com/android/android_architecture.html
6. <https://developer.android.com/training/index.html>

13CS73**ARTIFICIAL INTELLIGENCE AND ROBOTICS**
(Common to CSE, ECE and Mechanical)**L T P C**
3 0 0 3**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: demonstrate the understanding of the problem solving techniques involved in artificial intelligence.
- CO 2: understand the logical reasoning in realization of artificial intelligence.
- CO 3: summarize the importance of planning and learning with respect to artificial intelligence and robotics.
- CO 4: understand the terminologies used in robotic systems and understand the robotics programming.

UNIT I	PROBLEM SOLVING	9
Introduction - agents - problem formulation - uninformed search strategies - heuristics -informed search strategies.		
UNIT II	LOGICAL REASONING	9
Logical agents - propositional logic - inferences - first-order logic - forward chaining - backward chaining.		
UNIT III	PLANNING	9
Planning with state-space search - partial-order planning - planning graphs - planning and acting in the real world.		
UNIT IV	LEARNING	9
Learning from observation - inductive learning - decision trees - explanation based learning - statistical learning methods.		
UNIT V	ROBOTICS	9
Introduction to robotics - robot Components - Robotic programming: Architecture - Planning - Languages - OS - Sample robots.		

L: 45; TOTAL: 45 PERIODS**TEXT BOOKS**

1. S. Russel, P. Norvig, "Artificial Intelligence - A Modern Approach", 3rd Edition, Prentice Hall, 2010.
2. Mataric Maja J, "The Robotics Primer", 1st Edition, Massachusetts Institute of Technology Press, 2007.

REFERENCES

1. Scott Preston, "Robotics Programming 101", Copy right material, 2011.
2. David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence: A logical approach", Oxford University Press, 2004.
3. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", 4th Edition, Pearson Education, 2002.
4. J.Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers, 1998.

13CS77	COMPUTER GRAPHICS AND VISUALIZATION LABORATORY	L T P C
		0 0 3 2

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- CO 1: create 2D objects using Bresenham's algorithms.
- CO 2: draw 2D and 3D scenes using geometrical transformations.
- CO 3: create different 2D shapes using various clipping algorithms.
- CO 4: implement rendering and lighting transformation.
- CO 5: construct 3D visualization based animations (architectural, medical, biological, etc).

LIST OF EXERCISES

1. Implementation of Bresenham's Algorithm – Line, Circle and Ellipse generation.
 - a. Apply Bresenham's Line Drawing algorithm to draw tic-tac-toe board, chess board, etc and also use appropriate attributes.
 - b. Apply Bresenham's Circle Drawing algorithm to draw the phases of moon, wall clock, Olympic ring pattern, etc and also use appropriate attributes.
 - c. Apply Bresenham's Ellipse Drawing algorithm to draw the wrist watch, mirror, etc and also use appropriate attributes.
2. Two Dimensional transformations – Translation, Rotation and Scaling.
 - a. Draw a 2D scene like flight moving on the sky with the translation transformation.
 - b. Draw a solar system and rotate the planets along the elliptical path and also perform scaling transformation when it is rotating.
 - c. Create a plant and apply scaling transformation to make it enlarge.
3. Two Dimensional Reflection and Shear transformations.
 - a. Draw a 2D building (eg. Tajmahal) and reflect it along x-axis.
 - b. Design a 2D butterfly with single side and get the other side by reflecting along y-axis.
 - c. Create a 2D playing card and apply shear transformation for 5 times.
 - d. Create a 2D building and apply shear transformation on it.
4. Create a 2D Object and perform 2D Composite Transformations - Design an aquarium with fishes and apply translation transformation for movement of fishes and rotate it and also show increase in size by scaling transformation.
5. Create a line with the world coordinates and display it in the device by mapping world coordinates to device coordinates using Cohen-Sutherland Line Clipping Algorithm.
6. Create a line with the world coordinates and display it in the device by mapping world coordinates to device coordinates using Liang Barsky Line clipping algorithm.
7. Create a 2D concave polygon in the word and then map it to device coordinates by clipping it against the clipper window using Sutherland – Hodgeman's Polygon clipping algorithm.
8. Three dimensional transformations - Translation, Rotation and Scaling.
 - a. Design a 3D scene which consists of trees with fruits hanging on it. Apply the translation transformation for falling of leaves and fruits.
 - b. Design a 3D scene which consists of houses and windmills in a village. Rotate the wings of windmill either clockwise or anticlockwise by applying rotation

- transformation.
- c. Demonstrate the effect of scaling transformation for blowing of air inside the balloon.
9. Composite 3D transformations - Create a 3D ship floating in the sea. Assume a ship at a distance in which the size of an object is smaller at initial position and make it enlarge by applying scaling transformation when the ship moves with the translation transformation. Make the ship to sink gradually by applying the rotation transformation.
 10. Draw a 3D house and display it in projection plane when the projection vector is perpendicular to projection plane.
 11. Implement a program to show the projection of 3D objects using Standard Perspective Projection with respect to an Arbitrary Plane and Center of Projection.
 12. Write a program to draw a sphere and ellipsoid using parametric equation.
 13. Demonstrate when to issue lighting and transformation commands to render a model with a light which is moved by a modeling transformation (rotate or translate).
 14. Draw a simple shaded scene consisting of a tea pot on a table. Define suitably the position and properties of the light source along with the properties of the surfaces of the solid object used in the scene.
 15. Create the visual effects using Maya design tool - Animation, Modeling, Lighting, Effect and Rendering.
 - a. Create a realistic candle flame.
 - b. Model and apply shaders to get realistic eyes.
 - c. Create realistic water fountain, with effects, from Particle.
 - d. Create a realistic tree.
 - e. Model a space ship.

P:45;TOTAL: 45 PERIODS

SUGGESTED SOFTWARE TOOLS

- OpenGL
- Maya

13CS78 MOBILE APPLICATION DEVELOPMENT LABORATORY**L T P C
0 0 3 2****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: develop a working knowledge of Android application development tool.
- CO 2: apply the different types of application models used to develop mobile software applications.
- CO 3: create android applications using various UI controls by considering the concepts and techniques involved in mobile application development.
- CO 4: deploy the developed android applications on the repositories like Google Play store, Samsung store by following step of publishing procedures and payment constraints.

LIST OF EXERCISES

1. Case Study on configuring android application development environment and develop an application for displaying your name.
2. Develop an android application to find the square and cube of a given number and display the result in EditText Control. Use event handling concept to perform this application.
3. Develop an application to display a text entered in an EditText in another EditText. Do not use button for performing this application.
4. Develop an android application to display a text entered in an EditText using Toast. Handle the event by using KeyListener.
5. Design and develop a simple calculator using mobile application tools.
6. Create a module converter for height and weight in the same application. Selection of height/weight can be done using a spinner.
7. Design user interface for a text editor and include the menus with icons. While clicking the menu item, the name of the clicked menu item will be displayed in the Toast.
8. Create an android application for calculating age. Pick the date from the layout using the respective control and display the age in the form of years, months and days.
9. Create a registration form for College Admission System using various UI controls.
10. Create a login form and validate the username and password and send OTP to the registered mobile number.
11. Develop an android application to generate a Voice SMS. Read the text message from the user and convert the text into speech.
12. Develop an android application for Alarm Clock in which the alarm tone will be played until the user answers correctly for the displayed question.
13. Create a camera application, where you can click a picture and then save it as the wallpaper.

P:45; TOTAL: 45 PERIODS**MINI PROJECT**

- Design and development of an android application by using Sqlite as backend.

SUGGESTED SOFTWARE TOOLS

- JDK, Eclipse Android SDK, Android Emulator, Sqlite-3 and ADT.

13CS81**SOFTWARE TESTING TECHNIQUES****L T P C
3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: recognize the behavior of the testing techniques to detect the errors in the software.
- CO 2: design suitable test cases for the given scenario.
- CO 3: acquire skills in various levels of testing strategies.
- CO 4: identify the suitable test plan components for finding the bugs in the software.
- CO 5: explore the test automation concepts and tools.

UNIT I INTRODUCTION**9**

Testing as an Engineering Activity – Testing as a Process – Overview of the Testing Maturity Model– TMM levels –Basic Definitions –Software Testing Principles – Tester’s Role in a Software Development Organization –Origins of Defects – Cost of Defects - Defect Classes – Defect Repository and Test Design.

UNIT II TEST CASE DESIGN**9**

Test Case Design Strategies – Black Box Approach to Test Case Design: Random Testing – Equivalence Class Partitioning – Boundary Value Analysis – Cause-and-Effect Graphing - White Box Approach to Test Design: Test Adequacy Criteria –Coverage and Control Flow Graphs – Covering Code Logic – Role of Paths.

UNIT III LEVELS OF TESTING**9**

Need for Levels of Testing – Unit Test: Planning –Designing -Test Harness –Running and Recording Results – Integration Test: Test Strategies for Procedure and Functions - Designing Integration Tests – Integration Test Planning - System Testing: Functional Testing– Performance Testing – Stress Testing – Configuration Testing– Security Testing - Recovery Testing – Regression Testing- Alpha, Beta and Acceptance Testing.

UNIT IV TEST MANAGEMENT**9**

Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – Test Management – Test Process - Reporting Test Results – Role of Critical Groups and Policy Development – Test Specialist: Introduction– Skills Needed – Building a Testing Group.

UNIT V TEST AUTOMATION**9**

Software Test Automation: Skills – Scope– Design and Architecture– Requirements for a Test Tool – Challenges in Automation - Test Metrics and Measurements – Project, Progress and Productivity Metrics

L: 45; TOTAL: 45 PERIODS**TEXT BOOKS**

1. Ilene Burnstein, “Practical Software Testing: A Process-Oriented Approach”, Springer International Edition, 2003.
2. Srinivasan Desikan, Gopaldaswamy Ramesh, “Software Testing – Principles and Practices”, 1st Edition, Pearson education, 2006.

REFERENCES

1. Ron Patton, “Software Testing”, 2nd Edition, Sams Publishing, Pearson Education, 2007.
2. Renu Rajani, Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2004.
3. M.G.Limaye, “Software Testing: Principles, Techniques and Tools”, 1st Edition, Tata McGraw-Hill, 2009.
4. Aditya P. Mathur, “Foundations of Software Testing – Fundamental algorithms and techniques”, Dorling Kindersley (India) Private Limited, Pearson Education, 2008.

13CS82	MOBILE AND PERVASIVE COMPUTING	L	T	P	C
		3	0	0	3

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- CO 1: identify various wireless communication standards used in mobile computing.
- CO 2: understand the various telecommunication systems architecture.
- CO 3: experiment the protocols for accessing the information through wireless networks.
- CO 4: know about the technologies, tools and infrastructure used in the implementation of pervasive computing environment.
- CO 5: write basic programs on embedded language like nesC.

UNIT I WIRELESS COMMUNICATION FUNDAMENTALS 9

Introduction to Wireless Transmission - Frequencies for radio transmission – Signals – Multiplexing – Modulations - Spread Spectrum – MAC – SDMA – FDMA – TDMA – CDMA - Cellular Wireless Networks.

UNIT II TELECOMMUNICATION NETWORKS AND WIRELESS LAN 9

Telecommunication systems – GSM – GPRS - Satellite Networks – Wireless LAN - IEEE 802.11 – Architecture – services – HIPERLAN - Bluetooth.

UNIT III NETWORK AND APPLICATION LAYER 9

Mobile IP - Dynamic Host Configuration Protocol – Introduction to Routing - DSDV – DSR – WAP - WAP Architecture – WDP – WTLS – WTP – WSP – WML - WML Script – WAE - WTA.

UNIT IV BASICS OF PERVASIVE COMPUTING 9

Introduction to pervasive computing – Principles - Access devices Smart identification - Embedded control – Device Control - Device Connectivity - Protocols - Security and Device Management.

UNIT V PERVASIVE COMPUTING DEVICES AND TECHNOLOGY 9

3G Devices - J2ME enabled devices - Embedded languages – Introduction to nesC – Interface – Module Implementation – Component Specification - Case Study on Pervasive Environment (Shopping, Airport and Conference Meeting).

L: 45; TOTAL: 45 PERIODS

TEXT BOOKS

1. Jochen Schiller, “Mobile Communications”, 2nd Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S.Nicklous, Thomas Stober, “Pervasive Computing: The Mobile World”, 2nd Edition, Springer Professional Computing, 2003.

REFERENCES

1. Stefan Poslad, “Ubiquitous Computing: Smart Devices, Environments and Interactions”, 1st Edition, John Wiley & Sons, 2009.
2. Jochen Burkhardt, Dr.Horst Henn, Stefan Hepper, Klaus Rindtorff, Thomas Schack, “Pervasive Computing: Technology and Architecture of Mobile Internet Applications”, 6th Impression, Pearson Education, 2009.
3. F.Adelstein, S.K.S.Gupta, “Fundamentals of Mobile and Pervasive Computing”, McGraw-Hill, 2005.
4. Case Study on Pervasive Environment (Shopping, Airport, Conference Meeting) - <http://www.nptel.ac.in/courses/108102045/37>
5. Vijay. K. Garg, “Wireless Communication and Networking”, Morgan Kaufmann Publishers, 2007. (<http://books.elsevier.com/9780123735805>)
6. <http://www.tinyos.net/papers/nesc.pdf> (Material for nesC)

13CSAA**ADVANCED DATABASE TECHNOLOGY**

(Common to CSE and IT)

L T P C**3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Understand about different database system architectures.

CO 2: Identify the various databases such as distributed, parallel and object oriented databases.

CO 3: Develop in-depth knowledge about web and intelligent database.

CO 4: Understand the data storage structure in emerging information systems.

UNIT I INTRODUCTION**8**

Database System Architectures: Centralized and Client-Server Architectures - Parallel Systems – Distributed Systems – Network Types.

UNIT II DISTRIBUTED AND PARALLEL DATABASES**9**

Distributed Database Concepts: Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Query Processing - Distributed Transactions – Commit Protocols – Concurrency Control - Recovery.

Parallel Databases: Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design of Parallel Systems.

UNIT III OBJECT ORIENTED DATABASES**8**

Concepts of Object Oriented Databases - ODMG Model – Object Definition Language - Object Query Language – Conceptual Design - Object Relational features in SQL, Oracle.

UNIT IV INTELLIGENT DATABASES**10**

Active Databases Concepts and Triggers - Deductive Databases - Temporal Database - Spatial Databases - Data Mining: Overview.

UNIT V EMERGING DATABASE TECHNOLOGIES AND APPLICATIONS**10**

Mobile Database. Multimedia Databases. Geographic Information Systems. Genome Data Management.

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, 6th Edition, McGraw Hill, 2011. (Unit – I, II & V)
2. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, 6th Edition, Pearson Education, Addison Wesley, 2010. (Unit – III, IV & V)

REFERENCE

1. Thomas Connolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, 5th Edition, Pearson Education 2013.

13CSAB ADVANCED JAVA PROGRAMMING**L T P C
3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Understand advanced Java programming concepts like collections, swing etc
- CO 2: Develop network programs in Java.
- CO 3: Understand distributed programming techniques in java.
- CO 4: Understand Java database connectivity and develop web applications using JSP and Servlets.
- CO 5: Design and develop enterprise applications.

UNIT I JAVA BASICS REVIEW 9

Java Basics: Enumerations - Regular Expressions – Autoboxing and Auto-unboxing - Streams: Pipes - Filters- Collections: Stack - Queue – Sets - Maps.

UNIT II NETWORK PROGRAMMING IN JAVA 9

Looking up internet address: InetAddress class – Inet4Address- NetworkInterface Class – URL class: URL Encoder and Decoder classes- URI Class- Socket Class – Sockets for client – Sockets for server- Multicast Sockets-Java Messaging Services.

UNIT III APPLICATIONS IN DISTRIBUTED ENVIRONMENT 9

Remote Method Invocation – RMI Activation Models - Object Serialization – RMI –IIOP Implementation – CORBA – IDL technology – Naming Services – CORBA Programming Models.

UNIT IV MULTI-TIER APPLICATION DEVELOPMENT 9

Servlets: A simple Servlets - The Servlet API - Servlet Package - Handling HTTP Request and Response- Applet to Servlet Communication. JSP : Evolution of the Web Application - JSP Overview - JSP syntax and semantics - Expressions, Scriptlets and Declarations.

UNIT V ENTERPRISE APPLICATIONS 9

Server Side Component Architecture – Introduction to J2EE – Session Beans – Entity Beans – Persistent Entity Beans – Transactions.

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Paul. Deitel, Harvey Deitel, “Java How to Program” 9th Edition, Prentice Hall Publications, 2011.
2. Elliotte Rusty Harold, “Java Network Programming”, 4th Edition, O’Reilly Media Inc., 2013.
3. Cay S.Hortsmann, Gray Cornell, “Core Java: Volume II – Advanced Features”, 9th Edition, Pearson Education, 2012.
4. Phil Hanna, “JSP 2.0: The Complete Reference”, Tata McGraw Hill Publishing Company Limited, 2nd Edition, 2003.
5. Ed Roman, Rima Patel Sriganesh, Gerold Brose, “Mastering Enterprise Java Beans”, 3rd Edition, John Wiley & Sons Inc., 2005.

REFERENCES

1. Patrick Naughton, “Complete Reference: Java 2”, Tata McGraw-Hill, 2003.
2. Web reference: <http://java.sun.com>.

13CSAC**UNIX INTERNALS****L T P C****3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Explore the design concepts of UNIX OS
- CO 2: Learn the buffer representation, kernels and system calls.
- CO 3: Identify with appropriate system calls and file system
- CO 4: Understand the system process management and process control.
- CO 5: Gain knowledge on UNIX segmentation, paging and disk drivers

UNIT I OVERVIEW OF UNIX OS**8**

General Review of the System - History - System structure - User Perspective – Operating System Services - Assumptions About Hardware. Introduction to the Kernel – Architecture - System Concepts - Data Structures - System Administration.

UNIT II KERNEL DATA STRUCTURES**9**

The Buffer Cache - Headers - Buffer Pool - Buffer Retrieval - Reading and Writing Disk Blocks - Advantages and Disadvantages. Internal Representation of Files - Inodes - Structure - Directories - Path Name to Inode - Super Block - Inode Assignment - Allocation of Disk Blocks - Other File Types.

UNIT III FILE SYSTEM**10**

System Calls for the File System - Open - Read - Write - Lseek - Close - Create - Special file Creation - change directory and change root - change owner and change mode - stat - fstat - pipes - dup - mount - umount - link - unlink - File System Abstraction - Maintenance.

UNIT IV PROCESS MANAGEMENT AND CONTROL**9**

The System Representation of Processes - States - Transitions - System Memory – Context of a Process - Saving the Context - Sleep - Process Control - signals - Process Termination – Awaiting process - Invoking other Programs – The Shell - System Boot and the INIT Process - Process scheduling.

UNIT V MEMORY AND I/O SUBSYSTEM**9**

Memory Management Policies - Swapping - Demand Paging - a Hybrid System - I/O Subsystem - Driver Interfaces - Disk Drivers - Terminal Drivers.

L:45 TOTAL: 45 PERIODS**TEXT BOOK**

1. Maurice J. Bach, “The Design of the Unix Operating System”, Pearson Education, 2008.

REFERENCES

1. Marshall Kirk McKusick, George V. Neville-Neil, “The Design and Implementation of the FreeBSD Operating System”, Addison-Wesley, 2007.
2. Richard Stevens, “UNIX Network Programming”- Volume I- Pearson Education, New Delhi, 2006.
3. Uresh Vahalia, “UNIX Internals: The New Frontiers”, Prentice Hall, 2000.

13CSAD**NEURO FUZZY SYSTEMS****L T P C**
3 0 0 3**COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- CO 1: Acquire basic concepts in Fuzzy set operations, fuzzy relations, and fuzzy inferences.
- CO 2: Realize the significance of Fuzzy Systems for learning the variability in models.
- CO 3: Familiarize variety of Neural Network structures and its learning principles.
- CO 4: Appreciate the Neuro-Fuzzy System development cycle with tuning and deployment.
- CO 5: Demonstrate the real-world applications of Neuro-Fuzzy Systems.

UNIT I FUZZY LOGIC**9**

Classical Set – Fuzzy Set – Classical Relations – Fuzzy Relations: Cardinality – Operations – Properties – Membership Functions: Features – forms – Fuzzification – Defuzzification – Fuzzy Logic – Approximate Reasoning.

UNIT II FUZZY SYSTEMS FOR CLASSIFICATION**9**

Fuzzy Systems – Decision making with Fuzzy Information – Fuzzy Classification: Equivalence relations – Cluster analysis – c-Means – hard-c-Means – fuzzy-c-Means – Classification metric.

UNIT III NEURAL NETWORKS**11**

Adaptive Networks: Architecture – Back propagation for Feed-forward Networks – Hybrid Learning. Supervised Learning: Perceptrons – Adaline – Multilayer Perceptrons – Radial Basis Function Networks. Unsupervised Learning: Competitive Learning – Self Organizing Networks – Learning Vector Quantization – Hebbian Learning – Hopfield Network.

UNIT IV NEURO FUZZY MODELING**8**

Adaptive Neuro Fuzzy Inference Systems (ANFIS): Architecture – Learning Methods. Coactive Neuro-Fuzzy Modeling: Framework – Neuron Functions for Adaptive Networks – Neuro-Fuzzy Spectrum - Classification and Regression Trees (CART): Decision Trees – CART Algorithm for Tree Induction – Using CART for ANFIS.

UNIT V NEURO FUZZY CONTROL APPLICATIONS**8**

Neuro-Fuzzy Controls: Feedback Control Systems – Neuro-Fuzzy Control - ANFIS Applications: Printed Character Recognition – Inverse Kinematics Problem – CANFIS modeling for Color Recipe Prediction: Fuzzy Partitioning – Architecture – Knowledge-embedded Structures.

L: 45 TOTAL:45 PERIODS**TEXT BOOKS**

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, 3rd Edition (Paperback), Wiley India Ltd, 2011.
2. Jang Jyh-Shing Roger, Sun Chuen-Tsai, Mizutani Eiji, “Neuro-fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence”, PHI, 2007.

REFERENCES

1. Bart Kosko, “Neural Networks and fuzzy systems-A dynamical systems approach to machine Intelligence”, PHI, 2008.
2. S. N. Sivanandam, S. Sumathi and S. N. Deepa, “Introduction to Fuzzy Logic using MATLAB”, Springer, 2007.
3. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, Pearson Education, 2003.

13CSAE**DISTRIBUTED COMPUTING****L T P C****3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Acquire the theoretical and conceptual foundations of distributed computing.
- CO 2: Conceptualize the ideas of distributed operating systems and its issues.
- CO 3: Understand the issues involved in distributed resource environment
- CO 4: Realize the importance of transaction and how to recovery the system from deadlocks.
- CO 5: Explore the principles of fault tolerance and its protocols.

UNIT I DISTRIBUTED ENVIRONMENT**9**

Introduction – Various Paradigms in Distributed Applications – Remote Procedure Call – Remote Object Invocation – Message-Oriented Communication – Unicasting, Multicasting and Broadcasting – Group Communication.

UNIT II DISTRIBUTED OPERATING SYSTEMS**11**

Issues in Distributed Operating System – Threads in Distributed Systems – Clock Synchronization – Causal Ordering – Global States – Election Algorithms – Distributed Mutual Exclusion – Distributed Transactions – Distributed Deadlock – Agreement Protocols - Exploiting code bugs- Malware security management

UNIT III DISTRIBUTED RESOURCE MANAGEMENT**9**

Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models – Ivy – Munin – Distributed Scheduling – Distributed File Systems – Sun NFS.

UNIT IV DISTRIBUTED TRANSACTION PROCESSING**9**

Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Overview of Replication And Distributed Multimedia Systems.

UNIT V FAULT TOLERANCE AND CONSENSUS**7**

Introduction to Fault Tolerance – Distributed Commit Protocols – Byzantine Fault Tolerance – Impossibilities in Fault Tolerance.

L:45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. A.S.Tanenbaum, M.Van Steen, “Distributed Systems”, Pearson Education, 2007.
2. Mukesh Singhal, Niranjana G.Shivaratri “Advanced Concepts in Operating Systems”, McGrawHill Series in Computer Science, 2011.

REFERENCES

1. George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design”, 3rd Edition, Pearson Education Asia, 2002.
2. M.L.Liu, “Distributed Computing Principles and Applications”, Pearson Addison Wesley, 2004.
3. Andrew S.Tanenbaum “Modern Operating system”, 3rd Edition, Pearson Addison Wesley, 2008.
4. <http://www.ischool.berkeley.edu/courses/i206>.

13CSAF**COMPUTATIONAL GRAPH THEORY****L T P C
3 0 0 3****COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- CO 1: Comprehends the graphs as a modeling and analysis tool in computer science & Engineering.
- CO 2: Illustrate the structures such as graphs & trees and techniques of counting and combinations.
- CO 3: Apply the concepts in number theory based computing and network security studies in Computer Science.

UNIT I INTRODUCTION**9**

Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness – Components – Euler graphs – Hamiltonian paths and circuits – Trees – Properties of trees – Distance and centers in tree.

UNIT II TREES, CONNECTIVITY AND PLANARITY**9**

Spanning trees – Fundamental circuits – Spanning trees in a weighted graph – cut sets – Properties of cut set – All cut sets -Connectivity and separability – Network flows – Combinational and geometric graphs – Planer graphs –Representation of a planer graph.

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH**8**

Chromatic number – Chromatic partitioning – Chromatic polynomial – Matching – Covering – Four color problem – Directed graphs – Types of directed graphs – Digraphs and binary relations – Directed paths and connectedness.

UNIT IV PERMUTATIONS AND COMBINATIONS**9**

Fundamental principles of counting - Permutations and combinations - Binomial theorem - Combinations with repetition - Combinatorial numbers - Principle of inclusion and exclusion.

UNIT V FUNCTIONS AND RELATIONS**10**

Generating functions - Partitions of integers - Exponential generating function - Summation operator - Recurrence relations - First order and second order – Non-homogeneous recurrence relations.

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Narsingh Deo, Graph Theory: With Application to Engineering and Computer Science, Prentice Hall of India, 2004.
2. Ralph P.Grimaldi , Discrete and Combinatorial Mathematics: An Applied Introduction, Addison Wesley, 2004.

REFERENCES

1. Clark J. & Holton D.A., A First Look at Graph Theory, Allied Publishers, 1995.
2. Mott J.L., Kandel A. & Baker T.P., Discrete Mathematics for Computer Scientists and Mathematicians, Prentice Hall of India, 1996.
3. Liu C.L., Elements of Discrete Mathematics, McGraw Hill, 1985.
4. Rosen K.H., Discrete Mathematics and Its Applications, McGraw Hill, 2007.

13CSAG

APPLIED GAME THEORY**L T P C****3 0 0 3****COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

CO 1: Provide a conceptual overview to the tools of game theory and some of its applications.

CO 2: Incorporate the concepts of Game theory in Wireless Network Applications.

CO 3: Analyze situations in which two or more individuals (or firms, political parties, countries) interact in a strategic manner.

CO 4: Help better understand situations involving conflict and/or cooperation.

UNIT I STATIC GAMES OF COMPLETE INFORMATION 9

Introduction – Decision Theory – Strategic Game - Nash Equilibrium – Multiple Nash Equilibrium Applications - Mixed Strategy Equilibrium.

UNIT II DYNAMIC GAMES WITH COMPLETE INFORMATION 9

Extensive Form Games – strategies and equilibrium in extensive form games - Backward Induction and sub game perfection.

UNIT III STATIC GAMES OF INCOMPLETE INFORMATION 9

Bayesian Games – Bayesian Nash Equilibrium - Applications

UNIT IV DYNAMIC GAMES WITH INCOMPLETE INFORMATION 9

Perfect Bayesian Equilibrium – Signaling Games – Applications

UNIT V APPLICATIONS FOR WIRELESS NETWORKS 9

Routing- Power control - Access control - Game theoretic solutions for cooperation in adhoc networks.

L:45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Martin Osborne, “An Introduction to Game Theory”, 2nd Edition, Oxford University Press, 2004.
2. J. Zander et al, “Radio Resource Management for Wireless Networks”, 1st Edition, Artech House, 2001.

REFERENCES

1. Robert Gibbons, “Game Theory for Applied Economists”, 2nd Edition, Princeton University, 1992.
2. Fudenberg and D.K. Levine, “The theory of Learning in Games (Economic Learning and Social Evolution)”, 2nd Edition, The MIT Press, MA, 1998.
3. R. Meyerson, “Game Theory: Analysis of Conflict”, 2nd Edition, Harvard University Press, Cambridge, 1994.
4. Drew Fudenberg and Jean Tirole, “Game Theory”, 1st Edition, MIT press, 1991.

13CSAH BUSINESS INTELLIGENCE AND ITS APPLICATIONS L T P C
 (Common to CSE, ECE and IT) **3 0 0 3**

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to,

- CO 1: Develop a foundation in Business Intelligence (BI) for Business Analysis.
- CO 2: Understand the different aspects of the BI environment, and key success factors.
- CO 3: Understand Technology enabling process in an organization.
- CO 4: Identify and analyze the new Techniques in BI.
- CO 5: Be able to apply the techniques in the context of a business problem.

UNIT I INTRODUCTION TO BUSINESS INTELLIGENCE 9

Business intelligence and its impact - Factors driving Business Intelligence – Business Intelligence and Related Technologies – Case Study - Obstacles to Business Intelligence.

UNIT II BUSINESS INTELLIGENCE CAPABILITIES 9

Introduction – Core Capabilities of BI - – Synergistic Business Intelligence Capability - Information Integration – Factors Necessitating Information Integration Capability – Technology Enabling Information Integration Capability - Presentation.

UNIT III TECHNOLOGY ENABLING BUSINESS INTELLIGENCE 9

Technology enabling Organizational Memory – Information Integration – Enabling Insights and Decision – Enabling Presentation - OLAP Cube, Data Slice and Dice - BI in Practice - Performance Dashboards - Balanced Scorecards - IT Governance - Case Study.

UNIT IV BUSINESS INTELLIGENCE IMPLEMENTATION: INTEGRATION AND EMERGING TRENDS 9

Implementing BI – Overview – BI and Integration Implementation – Connecting BI System to Database and other Enterprise Systems – On-Demand BI – Issues of Legality, Privacy, and Ethics – Emerging Topics in BI – The Rise of Collaborative Decision Making.

UNIT V MANAGEMENT AND FUTURE OF BUSINESS INTELLIGENCE 9

Development of BI - Business Intelligence System - Reporting system - Data Warehouse - Data Mart - Knowledge Management Systems - Discussion and Case Study – The Future of Business Intelligence.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

1. Rajiv Sabherwal, Irma Becerra-Fernandez “Business Intelligence Practices, Technologies, and Management”, Wiley, 2011.
2. Efraim Turban, Ramesh Sharda, Jay E.Aronson, David King, “Business Intelligence: A Managerial Approach”, Pearson Education, 2011.

REFERENCES

1. Rajiv Sabherwal, “e-Study Guide for Business Intelligence”, 2014. [Kindle Edition]
2. Swain Scheps, “Business Intelligence for Dummies”, Wiley, 2008.

13CSAJ**WINDOWS INTERNALS****L T P C
3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Identify the concepts and tools of Windows.
- CO 2: Understand the internal architecture and mechanism of Windows.
- CO 3: Discuss the concepts of process management.
- CO 4: Describe the components of I/O systems.
- CO 5: Analyse the working of file systems.

UNIT I INTRODUCTION 9

Concepts and Tools : Windows operating System Versions - Foundation Concepts and Terms: Windows API - Services, Functions and Routines - Processes - Threads and Jobs - Virtual Memory - Kernel Mode vs User Mode - Terminal Services and Multiple Sessions - Objects and Handles - Unicode - Digging into Windows Internals - Kernel Debugging - Windows Software Development Kit - Windows Driver Kit - Sysinternals Tools.

UNIT II SYSTEM ARCHITECTURE AND MECHANISMS 9

Requirements and Design Goals – Operating System Model – Architecture Overview – Key System Components – Trap Dispatching – Object Manager – Hypervisor.

UNIT III PROCESS MANAGEMENT MECHANISMS 9

Registry – Services – Process Internals: Data Structures – Protected processes – Flow of Create Process – Processor Share-Based Scheduling – Dynamic Processor Addition and Replacement.

UNIT IV I/O SYSTEMS 9

I/O System Components - Device Drivers – I/O processing – Kernel-Mode Driver Framework (KMDF) - User-Mode Driver Framework (UMDF) - The Plug and Play Manager – The Power Manager.

UNIT V FILE SYSTEMS 9

Windows file system formats - File System Driver Architecture - Troubleshooting File System Problems – NTFS design goal and features - NTFS drivers - NTFS On-Disk Structure.

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Mark Russinovich, David Solomon, “Windows Internals”, Microsoft Press, 6th edition part1, 2012. [Units 1,2 &3]
2. Mark Russinovich, David Solomon, “Windows Internals”, Microsoft Press, 6th edition part2 , 2012. [Units 4 & 5]

REFERENCE

1. Mark Russinovich, Aaron Margosis, “Windows Sysinternals Administrator's Reference”, Microsoft press, 2011.

13CSAK ADVANCED COMPUTER ARCHITECTURE**L T P C
3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Identify the limitations of ILP and need for Dynamic Scheduling.
- CO 2: Discuss the Hardware support issues related to multiprocessing and suggest solutions.
- CO 3: Analyze the symmetric and distributed memory architecture and thread level applications.
- CO 4: To study the Memory and I/O systems and their performance issues.
- CO 5: Point out the salient features of different multi core architectures and how they exploit parallelism.

UNIT I INSTRUCTION LEVEL PARALLELISM 9

Pipeline – Pipeline hazards – Pipeline performance - ILP - Concepts and challenges - Hardware and software approaches - Dynamic scheduling - Speculation - Compiler techniques for exposing ILP - Branch prediction.

UNIT II HARDWARE SUPPORT 9

VLIW and EPIC - Advanced compiler support - Hardware support for exposing parallelism - Hardware versus software speculation mechanisms - IA64 and Pentium processors - Limits on ILP.

UNIT III MULTIPROCESSORS AND THREAD LEVEL PARALLELISM 9

Symmetric and distributed shared memory architectures - Performance issues - Synchronization - Models of memory consistency - Snooping Protocol-Introduction to Multithreading and its various applications – Hyper threading.

UNIT IV MEMORY AND I/O 9

Cache performance - Reducing cache miss penalty and miss rate - Cache optimization techniques - Reducing hit time - Main memory and performance - Memory technology. Types of storage devices - Buses - I/O performance measures - Designing an I/O system.

UNIT V MULTI-CORE ARCHITECTURES 9

Software and hardware multithreading - SMT and CMP architectures - Design issues - Case studies - Intel Multi-core architecture - SUN architecture - heterogeneous multi - core processors - case study: IBM Cell Processor.

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. John L. Hennessey, David A. Patterson, “Computer Architecture A Quantitative Approach”, 4th Edition, Morgan Kaufmann, 2007.
2. David E. Culler, Jaswinder Pal Singh, “Parallel computer architecture: A Hardware/Software approach”, Morgan Kaufmann Publishers, 2011.

REFERENCE

1. Kai Hwang, ZhiWei Xu, “Scalable Parallel Computing”, 3rd Edition, Tata McGraw Hill, 2003.

13CSAL COMPUTER ORIENTED OPTIMIZATION TECHNIQUES L T P C
3 0 0 3

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- CO 1: Comprehend the basics of optimization principles.
- CO 2: Recognize the importance of optimization algorithms.
- CO 3: Apply the methods with mathematical influence in optimization problems.
- CO 4: Analyze the computational models for implementing optimization techniques.
- CO 5: Formulate optimal solutions for real-world problems.

UNIT I OVERVIEW OF OPTIMIZATION 11

Conjugate Gradient - Unconstrained and Constrained Optimization - Computational Optimization - Optimization Procedure – Optimizer – Simulator.

UNIT II OPTIMIZATION ALGORITHMS 9

Calculating derivatives - Derivative-based Algorithms – Derivative-free Algorithms – Metaheuristic Algorithms - Surrogate-based Methods – Surrogate Models.

UNIT III OPTIMIZATION TECHNIQUES 9

Surrogate-based Optimization Techniques - Derivative-Free Optimization – Local Optimization – Global Optimization – Constrained Optimization.

UNIT IV COMPUTATIONAL MODELS 9

Evolutionary Computation - Genetic Algorithms – Ant Colony Optimization – Swarm Optimization - Particle Swarm dynamic Optimization.

UNIT V APPLICATION DESIGN WITH OPTIMIZATION 7

Model for Classification and Rule Generation - Data Preprocessing - Parameter Determination by Metaheuristics - Rule Extraction - Empirical Results.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

1. Slawomir Koziel and Xin-She Yang (Eds.), “Computational Optimization, Methods and Algorithms”, Studies in Computational Intelligence, Volume 356, Springer, 2011.
2. Leandro N.De Castro, Fernando J.Von Zuben, “Recent Developments in Biologically Inspired Computing”, Idea Group Inc., 2005.

REFERENCES

1. Jorge Nocedal Stephen J. Wright, “Numerical Optimization”, Springer Series in Operations Research.
2. Fletcher R., Practical Methods of Optimization, John Wiley, 2000
3. Optimization for Machine Learning, Suvrit Sra, Sebastian Nowozin and Stephen Wright (Editors), The MIT Press, Dec. 2011.
4. Thomas Weise, Global Optimization Algorithms: Theory and Application, 2009.

13CSAM**DATA MINING****L T P C**
3 0 0 3**COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- CO 1: Identify the issues in data mining applications
- CO 2: Apply preprocessing methods for given raw data
- CO 3: Apply classification algorithms
- CO 4: Identify the clustering technique and analyze the data
- CO 5: Use association rule mining to generate rules

UNIT I DATA MINING 9

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues.

UNIT II DATA PREPROCESSING 9

Data Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction: overview of data reduction strategies – Attributes subset selection – Regression and Log-Linear Models: Parametric data reduction – Histograms – Clustering – Sampling – Data Cube Aggregation - Data Transformation and Data Discretization.

UNIT III CLASSIFICATION 9

Basic Concepts – Decision Tree induction – Bayes Classification Methods – Rule Based Classification – Model Evaluation and Selection – Techniques to improve Classification Accuracy – Classification: Advanced concepts – Bayesian Belief Networks - Classification by Back Propagation – Support Vector Machine – Classification using frequent Patterns.

UNIT IV CLUSTER ANALYSIS 9

Cluster Analysis: Basic concepts and Methods – Cluster Analysis – Partitioning methods - Hierarchical methods – Density Based Methods – Grid Based Methods Evaluation of Clustering – Advanced Cluster Analysis: Probabilistic model based clustering – Clustering High Dimensional Data – Clustering Graph and Network Data.

UNIT V ASSOCIATION RULE MINING 9

Association Rule Mining: Market Basket Analysis - Frequent pattern mining – Apriori algorithm - Generating Association rules from frequent items - Improving the efficiency of Apriori algorithm – Mining Multilevel association rules - Multidimensional association rules - Constraint based association Mining.

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Jiawei Han and Micheline Kamber, Jian Pei “Data Mining: Concepts and Techniques”, 3rd Edition, Elsevier, 2012.
2. Alex Berson and Stephen J. Smith, “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, 10th Reprint 2007.

REFERENCES

1. Margarat H. Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education, 2004.
2. David Hand, Heikki Manila and Padhraic Smyth, “Principles of Data Mining”, Prentice Hall of India, 2004.

13CSAN	CYBER FORENSICS AND ETHICAL HACKING	L	T	P	C
		3	0	0	3

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- CO 1: Understand the principles of Computer Forensics and Cyber Forensics
- CO 2: Analyze the forensics activities in digital devices
- CO 3: Explore Organizational implications on cyber security
- CO 4: Learn and Summarize about various Ethical Hackers.
- CO 5: Understand about various types of hacking

UNIT I UNDERSTANDING CYBER FORENSICS 9

Introduction to Cyber forensics-Digital Forensics Science – Need for Computer Forensics – Cyber forensics and Digital Evidence – Forensics Analysis of E-Mail –Digital Forensics Life Cycle –Network Forensics – Challenges – Forensics Auditing – Anti-forensics.

UNIT II FORENSICS OF HAND-HELD DEVICES 9

Hand-Held Devices and Digital Forensics – Toolkits for Hand-Held Device Forensics – Forensics of iPods and Digital Music Devices – Techno Legal Challenges with Evidence from Hand-Held Devices – Organizational Guidelines on Cell Phone Forensics.

UNIT III CYBERSECURITY: ORGANIZATIONAL IMPLICATIONS 9

Cost of Cybercrimes and IPR Issues - Web Threats for Organizations - Security and Privacy Implications from Cloud Computing - Protecting People's Privacy in the Organization - Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy - Incident Handling: An Essential Component of Cyber security - Media and Asset Protection - Importance of Endpoint Security in Organizations.

UNIT IV INTRODUCTION TO ETHICAL HACKING 9

Introduction to Hacking – Penetration Testing-Legal and Ethical Considerations – Creating and Implementing a Test Plan – Social Engineering –Google Hacking – Foot printing.

UNIT V ETHICAL HACKING TYPES 9

Web Server Attacks – Database Attacks-Password Cracking – Network Devices & Attacks –Wireless Network Attacks – Trojans and Backdoor Applications – OS Specific Attacks – Buffer Overflows – Denial of Service Attacks.

L:45 TOTAL: 45 PERIODS

TEXT BOOKS

1. Nina Godbole, Sunit Belapure, “Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Wiley India (P) Ltd., 2011. (UNIT I- UNIT III)
2. Whitaker, Newman, “Penetration Testing and Network Defense”, Cisco Press, Indianapolis, 2006. (UNIT IV – UNIT V)

REFERENCES

1. Nelson, Bill, Amelia Phillips, Frank Enfinger, Christopher Steuart, “Guide to Computer Forensics and Investigations”, 2nd Edition, Thompson Course Technology, Boston, 2006.
2. Mandia, Kevin, Prosis, Chris, Pepe, Matt, “Incident Response & Computer Forensics”, 2nd Edition, McGraw-Hill/Osborne, Emeryville, 2003.
3. Beebe, Nicole Lang, Jan Guynes Clark, “A Hierarchical, Objectives-Based Framework for the Digital Investigations Process”, Digital Investigation, 2005.
4. Eoghan Casey and Gary Palmer, “Digital Evidence and Computer Crime”, 2nd Edition, Elsevier, 2004.

13CSAP**SIMULATION THEORY AND PRACTICES****L T P C
3 0 0 3****COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- CO 1: Explore the methods for modeling of systems using event simulation.
- CO 2: Emphasis on modeling and on the use of simulation software.
- CO 3: Apply the image processing techniques
- CO 4: Apply the LAN switches
- CO 5: Simulate the Networks routing and analysis algorithms

UNIT I INTRODUCTION TO SIMULATION 9

Introduction - Simulation terminologies - Application areas - Model classification - Types of Simulation - Steps in a simulation study - Concepts in discrete event simulation - Simulation examples.

UNIT II MATHEMATICAL MODELS 9

Statistical Models: Concepts - Discrete distribution - Continuous distribution - Poisson process - Empirical distributions .Queuing models: Characteristics – Notation - Queuing systems - Markovian Models. Properties of random numbers - Generation of Pseudo Random numbers - Tests for random numbers. Random-variate Generation: Inverse transform technique - Acceptance-rejection technique.

UNIT III LOCAL AREA NETWORK SIMULATION 9

Operation and necessity of using private and public IP addresses for IPv4 addressing - IPv6 addressing scheme to satisfy addressing requirements in a LAN/WAN environment - IPv4 addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment - Technological requirements for running IPv6 in conjunction with IPv4 such as dual stack - IPv6 addresses

UNIT IV DIGITAL IMAGE PROCESSING SIMULATOR 9

Images: Additive and Subtractive Primary Colours - Line dropout and Salt and Pepper noise removal - Image Differencing (subtraction) – Linear Edge Enhancement - Supervised Classification

UNIT V NETWORK SIMULATOR 9

NS3 – Introduction - Modeling the Network Elements -Simulating a Computer Network - Smart Pointers -Representing Packets - Object Aggregation - Events - Compiling and Running the Simulation-Animating the Simulation - Analyzing the Results .

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol, “Discrete-Event System Simulation”, 5th Edition, Pearson Education, 2010.
2. Geoffrey Gordon, “System Simulation”, 2nd Edition, Prentice Hall, 2006.
3. Modeling and Tools for Network Simulation, **Wehrle**, Klaus, **Günes**, Mesut, **Gross**, James (Eds.) 2010.

REFERENCES

1. Frank L. Severance, “System Modeling and Simulation: An Introduction”, 1st Edition, John Wiley & Sons, 2001.
2. Averill M. Law and W.David Kelton, “Simulation Modeling and Analysis”, 5th Edition, McGraw-Hill, 2014.
3. Online Book, Jerry Banks, “Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice”, 1st Edition, John Wiley & Sons, 2007.
4. <http://www.freeccnastudyguide.com/study-guides/ccna/>
5. CCNA Routing and Switching Study Guide: Exam 100-101, 200-101, 200-120
6. www.iifm.ac.in/downloads/dips/

13CSAR	SOFTWARE QUALITY MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- CO 1: To study the concept of Software quality models.
- CO 2: To learn about Quality plan, implementation and documentation.
- CO 3: To analyze the need for Quality tools and CASE tools.
- CO 4: To introduce few International quality standards – ISO, CMM, Six Sigma.

UNIT I INTRODUCTION TO SOFTWARE QUALITY 9

Software Quality – Hierarchical Models of Boehm and McCall – Quality Measurement – Metrics Measurement and Analysis – Gilb’s Approach – GQM Model.

UNIT II SOFTWARE QUALITY ASSURANCE 9

Quality Tasks – SQA plan – Teams – Characteristics – Implementation – Documentation – Reviews and Audits.

UNIT III QUALITY CONTROL AND RELIABILITY 9

Tools for Quality – Ishikawa’s Basic Tools – CASE tools – Defect Prevention and Removal – Reliability Models – Rayleigh Model – Reliability Growth Models for quality Assessment.

UNIT IV QUALITY MANAGEMENT SYSTEM 9

Elements of QMS – Rayleigh Model Framework – Reliability Growth Models for QMS –Complexity metrics and models – Customer Satisfaction Analysis.

UNIT V QUALITY STANDARDS 9

Need for standards – ISO 9000 Series – ISO 9000-3 for Software Development – CMM and CMMI – Six Sigma Concepts.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

1. Alan C.Gillies, “Software Quality: Theory and Management”, 3rd Edition, Thomson Learning, 2011.
2. Stephen H.Kan, “Metrics and Models in Software Quality Engineering”, 2nd Edition, Addison Wesley, 2014.

REFERENCES

1. Schulmeyer G. Gordon, “Handbook of Software Quality Assurance”, 4th Edition, Prentice Hall, 2008.
2. Watts S. Humphery, “Managing the Software Process”, 5th Impression, Pearson Education, 2008.
3. Thomas Pyzdek, Paul Keller, “The Six Sigma Handbook, 3rd Edition, McGraw-Hill Publication, 2009.

13CSAS**M-COMMERCE**
(Common to CSE and IT)**L T P C**
3 0 0 3**COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- CO 1: Comprehend the underlying economic mechanisms and driving forces of E-Commerce
- CO 2: Understand the critical building blocks and network infrastructure of E-Commerce
- CO 3: Realize the infrastructure and types of M-Commerce Services
- CO 4: Recognize the availability of latest technologies of M-commerce in various domains.
- CO 5: Show Competency in business application services of M-Commerce.

UNIT I	E-COMMERCE	9
Electronic Commerce Framework – Electronic Commerce and Media Convergence – Anatomy of E-Commerce Applications – Consumer Application -Electronic Commerce organization application.		
UNIT II	NETWORK INFRASTRUCTURE	9
Introduction - Market forces influencing the I-Way - Components of the I-Way- Network access equipment - The Last Mile: Local Roads and Access Ramps - Global information distribution networks - Public policy issues shaping the i-way.		
UNIT III	M-COMMERCE: BASICS	9
Introduction, Infrastructure of M-Commerce, Types of Mobile Commerce Services, Technologies of Wireless Business, Benefits and Limitations, Support, Mobile Marketing & Advertisement, Non-Internet Applications in M-Commerce, Wireless/Wired Commerce Comparisons		
UNIT IV	TECHNOLOGIES	9
Mobile Communications: A Quick Primer - Historical perspective – Basic Architecture – Multiplexing Schemes, 2G Landscape, Closer look at GSM, Roaming and Billing, Transition Toward 3G-GSM, TDMA, PDC Migration and CdmaOne Migration.		
UNIT V	BUSINESS APPLICATIONS AND SERVICES	9
Mobile Information Services, Directory Services, Banking and Trading, E-Tailing and E-Ticketing, Entertainment, Business Applications and Services, Next Generation M-commerce Scenarios, Personalization, Location-Based Services.		
L: 45 TOTAL: 45 PERIODS		

TEXT BOOKS

1. Ravi Kalakota, B.Andrew Whinston, “Frontiers of Electronic Commerce”, Pearson Education, 9th Impression, 2009.
2. Paul May, “Mobile Commerce: Opportunities, Applications and Technologies of Wireless Business”, Cambridge University Press, 2001.

REFERENCES

1. Norman Sadeh, “M-Commerce: Technologies, Services and Business models”, John Wiley & Sons, 2002.
2. P. J. Louis, “M-commerce Crash Course”, McGraw – Hill Companies, 2001.
3. P.Candace Deans, “E-Commerce and M-Commerce Technologies”, Idea Group Inc (IGI), 2005.
4. Brian E. Mennecke, Troy J. Strader, “Mobile Commerce: Technology, Theory and Applications”, Idea Group Inc., IRM press, 2003.

13CSAV**MEDICAL IMAGING****L T P C****3 0 0 3****COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- CO 1: Acquire the knowledge of different methods and modalities used for medical imaging.
- CO 2: Demonstrate imaging methods using advanced modalities.
- CO 3: Synthesize knowledge and skills essential to the successful practice of diagnostic medical imaging.
- CO 4: Understand the ionizing radiation related risks and radiation protection principles in medical imaging and utilize the problem solving process effectively.
- CO 5: Implement methods to analyze medical images as part of a term project.

UNIT I BASIC CONCEPTS**9**

Introduction to Medical Imaging: The Modalities and Image Properties - Image Quality: Spatial Resolution- Convolution-Frequency Domain-Contrast-Physical mechanisms of Blurring- Medical Imaging Informatics.

UNIT II DIAGNOSTIC RADIOLOGY**9**

X-Ray Computed Tomography: Introduction-Rays detectors in CT- Imaging- Cardiac CT-Dual energy CT- Biological affects and safety. Ultrasound Imaging: Introduction- Physics of Acoustic waves- Generation and Detection of Ultrasound- Doppler Imaging-Biological effects and safety.

UNIT III MAGNETIC RESONANCE IMAGING (MRI) & NUCLEAR IMAGING**9**

MRI: Advanced Image Acquisition Methods, Artifacts-Spectroscopy- Quality Control- Siting- Bioeffects and Safety. Nuclear Imaging: Positron Emission Tomography and Dual Modality Imaging- SPECT/CT, PET/CT.

UNIT IV MEDICAL IMAGE ANALYSIS AND VISUALIZATION**9**

Introduction- Manual Analysis- Automated Analysis- Computational strategies for Automated Medical Image Analysis-Pixel Classification- Geometric model matching using a Transformation Matrix- Flexible Geometric Model Matching. Visualizaion for Diagnosis and Therapy: Introduction- 2D Visualization-User Interaction-Intraoperative Navigation.

UNIT V RADIATION BIOLOGY AND PROTECTION**9**

Radiation Biology: Overview-Interaction of radiation with tissue - Whole body response to radiation: The acute radiation syndrome- Hereditary Effects of Radiation Exposure- Radiation Protection: Sources of exposure to ionizing radiation- Radiation detection equipment in radiation safety-Medical emergencies involving ionizing radiation.

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Paul Suetens, "Fundamentals of Medical Imaging", 2nd Edition, Cambridge University Press, UK, 2009.
2. Jerrold T.Bushberg, J.Anthony Seibert, Edwin M.Leidholdt, Jr.John M.Boone, "Essential Physics of Medical imaging", 3rd Edition, Lippincott Williams & Wilkins, USA, 2012.

REFERENCES

1. Steve Webb, "The Physics of Medical Imaging", Adam Hilger, Philadelphia, 2012.
2. Jerry L.Prince, Jnathan M.Links,"Medical Imaging Signals and Systems", Pearson EI, 2006.
3. Anil. K. Jain, "Fundamentals of Digital Image Processing", Pearson Education, Indian Reprint, 2003.

13CSBA**SOCIAL COMPUTING**
(Common to IT, ECE and CSE)

L	T	P	C
3	0	0	3

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

CO 1: Describe the key concepts of analysis and design of social computing systems.

CO 2: Discuss the range of social computing applications.

CO 3: Apply the knowledge of social interaction technologies like blogs, wikis, podcasts, etc.,

CO 4: Show Proficiency in the general social network research process from data collection to mining.

UNIT I FUNDAMENTAL CONCEPTS AND THEORIES 9

Social Influence and Human Interaction with Technology- flow of information - Boundary roles and Innovation - Innovation and Information networks - Innovation Success Factors. Social Networking. Social Networks in Information Systems - SNA- Representations- visualization. Social Software.

UNIT II DESIGN METHODOLOGIES 9

Distributed Learning Environments - building a conceptual Framework - technical and Conceptual challenges. A Methodology for Integrating the Social Web Environment. Software Architectural Design.

UNIT III DEVELOPMENT 9

Information Systems Development – Framework .Social Networks Applied to E-Gov- Introduction - Stages and Services - Social Networks of Citizens – Ontology - Development of Adaptive Systems - DemonD: A Social Search Engine- Actor Network Theory in Information Retrieval Activity.

UNIT IV TOOLS AND TECHNOLOGIES 9

ERP-Systems- Modern Socio-Technical Systems Design - The design order Principle - The minimal Critical Specification Principle- The Task Completeness Principle - Evaluating the Effectiveness of Social Visualization Within Virtual Communities .The Hybrid Course.

UNIT V SOCIAL COMPUTING AND COMMUNITY DETECTION 9

Basic Concepts - social computing task. Nodes, ties and Influence- Importance of Nodes - Strengths of Ties - Influence Modeling. Node-Centric Community Detection - Group-Centric Community Detection .Social Media Mining-Classification with Network Data.

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Subhasish Dasgupta George, “Social Computing: Concepts, Methodologies, Tools, and Applications”, Washington University, USA,2010.
2. Lei Tang, Huan Liu, “Community Detection and Mining in Social Media”, Morgan & Claypool Publishers, 2010.

REFERENCES

1. Soumen Chakrabarti, “Mining the Web - Discovering Knowledge from Hypertext Data”, Morgan Kaufmann, 2003.
2. Bing Liu, “Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data”, Springer Berlin Heidelberg; 1st Edition, 2007.

13CSBB**ANALYTIC COMPUTING**
(Common to IT, ECE and CSE)**L T P C**
3 0 0 3**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Apply statistical analysis methods in Big Data Platform.
- CO 2: An ability to analyze a problems appropriate to mining data streams.
- CO 3: Apply the knowledge of clustering techniques in data mining.
- CO 4: Explain about social networking data analytics.
- CO 5: Use Visualization techniques for Distributed file systems

UNIT I INTRODUCTION TO BIG DATA 9

Introduction to Big Data Platform – Challenges of conventional systems - Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting - Modern data analytic tools, Stastical concepts: Sampling distributions, resampling, statistical inference, prediction error.

UNIT II MINING DATA STREAMS 9

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform(RTAP) applications - real time sentiment analysis, stock market predictions.

UNIT III FREQUENT ITEMSETS AND CLUSTERING 9

Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern based clustering methods – Clustering in non-euclidean space – Clustering for streams and Parallelism.

UNIT IV SOCIAL NETWORKING DATA ANALYTICS 9

An introduction to social network data Analytics-Introduction, Online Social Networks: Research Issues, Research Topics in Social Networks. Data mining in social media-Data mining in a Nutshell, Social Media, Motivations for Data Mining in Social Media, Data Mining Methods for Social Media, visualizing social networks, A Taxonomy of Visualizations, The Convergence of Visualization, Interaction and Analytics.

UNIT V FRAMEWORKS AND VISUALIZATION 9

MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.

REFERENCES

1. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics”, John Wiley & sons, 2012.
2. Glenn J. Myatt, “Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O’Reilly, 2011.
3. Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.
4. Charu C. Aggarwal, “Social Network Data Analytics”, Springer, 2011.

13CSBC

CLOUD COMPUTING
(Common to IT, ECE, CSE and EEE)

L T P C
3 0 0 3

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- CO 1: Explain the fundamentals of cloud computing
- CO 2: Distinguish the various cloud services
- CO 3: Explore some important cloud computing driven commercial systems such as GoogleApps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

UNIT I UNDERSTANDING CLOUD COMPUTING 9

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT II DEVELOPING CLOUD SERVICES 9

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

UNIT III CLOUD COMPUTING FOR EVERYONE 9

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT IV USING CLOUD SERVICES 9

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files

UNIT V OTHER WAYS TO COLLABORATE ONLINE 9

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

1. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, August 2008.

REFERENCE

1. Haley Beard, “Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Emereo Private Limited, July 2008.

13CSBD

HIGH SPEED NETWORKS
(Common to ECE, IT and CSE)**L T P C**
3 0 0 3**COURSE OUTCOMES**

Upon successful completion of this course, the students will be able to

- CO 1: Develop an in-depth understanding, in terms of architecture, protocols and applications, of major high-speed networking technologies.
- CO 2: Apply queuing analysis to control the effect of the congestion in high speed networks.
- CO 3: Compare the various approaches of the Integrated and Differentiated Services.
- CO 4: Discuss the protocols which provide QoS support for Real Time Applications.

UNIT I HIGH SPEED NETWORKS 9

Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LANs – Fast Ethernet – Gigabit Ethernet – Fibre Channel – Wireless LAN's applications, requirements – Architecture of IEEE 802.11.

UNIT II QUEUING ANALYSIS AND CONGESTION CONTROL 9

Single Server Queues – Multiserver Queues – Queues with Priorities – Networks of Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III ATM CONGESTION CONTROL 9

Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Framework – Traffic Control – ABR traffic Management – ABR rate control – RM cell formats – ABR Capacity allocations – GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 9

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

UNIT V PROTOCOLS FOR QOS SUPPORT 9

RSVP – Goals and Characteristics, Data Flow, RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – Operations – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol – RTCP.

L: 45 TOTAL: 45 PERIODS**TEXT BOOKS**

1. William Stallings, "High-speed Networks and Internet", Pearson Education, 2nd Edition, 2002.
2. Jean Warland, Pravin Varaiya, "High-performance Communication Networks", Jean Harcourt Asia Private Limited, 2nd Edition, 2000.

REFERENCES

1. Irvan Pepelnjk, Jim Guichard and Jeff Aparcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.
2. Abhijit S. Pandya, Ercan Sen, "ATM Technology for Broadband Telecommunications Networks", CRC Press, 2004

13CSBE	SERVICE ORIENTED ARCHITECTURE (Common to IT and CSE)	L	T	P	C
		3	0	0	3

COURSE OUTCOMES

Upon successful completion of this course, the students will be able to

- CO 1: Explain about principles of Service Orientation
- CO 2: Describe about service oriented analysis techniques
- CO 3: Describe the Service Oriented Design concepts
- CO 4: Explain the parts of the development and runtime ends of a distributed technology platform for SOA.
- CO 5: Describe about various Web service specification standards

UNIT I PRINCIPLES OF SERVICE ORIENTATION 9

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA - How components in an SOA interrelate - Principles of service orientation

UNIT II SERVICE ORIENTED ANALYSIS TECHNIQUES 9

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination – Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer

UNIT III SERVICE ORIENTED DESIGN 9

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task-centric business service design

UNIT IV SOA PLATFORM BASICS 9

SOA platform basics – SOA support in J2EE – Java API for XML based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC) - Web Services Interoperability Technologies (WSIT) – SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

UNIT V WEB SERVICE SPECIFICATION STANDARDS 9

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WS-Security.

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

1. Thomas Erl, “Service-Oriented Architecture: Concepts, Technology and Design”, Pearson Education, 2006.

REFERENCES

1. Thomas Erl, “SOA Principles of Service Design”, The Prentice Hall, 2007
2. Eric Newcomer, Greg Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005.
3. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services, An Architect’s Guide”, Prentice Hall Professional, 2005.
4. Dan Woods and Thomas Mattern, “Enterprise SOA Designing IT for Business Innovation”, 1st Edition, O’REILLY, 2006.

13TD01E**INDIAN BUSINESS LAWS****L T P C****0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: explain the elements of a valid contract.
- CO 2: discuss main provisions relating to Sale of Goods Act and Negotiable Instruments Act.
- CO 3: explain provisions relating to incorporation and functioning of company and partnership firm.
- CO 4: understand the fundamentals of Consumer Protection Act and Foreign Exchange Management Act.
- CO 5: understand the basic knowledge of Information Technology Act and RTI Act.

UNIT I THE INDIAN CONTRACT ACT, 1872

Definition of a Contract and its essentials - Formation of a valid Contract - Offer and Acceptance, Consideration - Capacity to Contract - Free consent - Legality of object - Discharge of a Contract by performance - Impossibility and Frustration - Breach, Damages for breach of a contract - Quasi contracts - Special Contracts - Contract of Indemnity and Guarantee - Contract of Bailment and Pledge - Contract of Agency.

UNIT II THE SALE OF GOODS ACT, 1930

Definition of a Contract of Sale - Conditions and Warranties - Passing of Property - Right of Unpaid Seller against the Goods - Remedies for Breach - The Negotiable Instrument Act, 1881
Definition and characteristics - Kinds of negotiable instruments - Promissory Note - Bill of Exchange and Cheques - Holder and Holder in due course - Negotiation, Presentment, Discharge from Liability - Noting and Protest – Presumption - Crossing of Cheques - Bouncing of Cheques.

UNIT III THE COMPANIES ACT, 1956

Nature and Definition of a Company - Registration and Incorporation - Memorandum of Association - Articles of Association – Prospectus - Kinds of Companies - Directors: Their powers and duties – Meetings - Winding up - The Indian Partnership Act, 1932 - Definition of Partnership and its essentials - Rights and Duties of Partners: Types of Partners - Minor as a partner - Doctrine of Implied Authority - Registration of Firms - Dissolution of firms - Limited Liability Partnership Act, 2000.

UNIT IV THE CONSUMER PROTECTION ACT, 1986

Aims and Objects of the Act - Redressal Machinery and Procedure for complaints under the Act – Remedies – Appeals - Enforcement of orders and Penalties - Foreign Exchange Management Act 2000 - Definition and Main Provisions.

UNIT V THE INFORMATION TECHNOLOGY ACT

Definition, Digital Signature - Electronic Governance – Attribution - Acknowledgment and Dispatch of Electronic Records - Sense Electronic Records and Sense Digital Signatures - Regulation of Certifying Authorities Digital Signature Certificates - Duties of Subscribers - Penalties and Offences - The Right to Information Act, 2005 - Right to know - Salient Features of the Act - Obligation of Public Authority - Designation of Public Information Officer - Request for obtaining information - Duties of a PIO - Exemption from Disclosure of Information - Partial Disclosure of Information - Information Commissions - Powers of Information Commissions - Appellate Authorities – Penalties - Jurisdiction of Courts.

TEXT BOOKS

1. Kuchhal M.C, “Business and Industrial Laws”, 3rd Edition, JBA Publishers, New Delhi, 2013.
2. Gulshan S.S, “Merchantile Law”, 3rd Edition, JBA Publishers, New Delhi, 2007.

REFERENCES

1. Mulla D.F, “The Sale of Goods Act and the Indian Partnership Act”, 10th Edition, LexisNexis Ltd., India, 2012.
2. Dabas J, “Negotiable Instruments Act”, 2nd Edition, JBA Publishers, New Delhi, 2013.
3. Avtar S, “The Principles of Mercantile Law”, 9th Edition, Eastern Book Company, India, 2011.

13TD02E LEADERSHIP AND PERSONALITY DEVELOPMENT**L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: identify the various leadership skills.
- CO 2: understand group dynamics and factors influencing the team performance.
- CO 3: describe the personality dimensions based on personality theories.
- CO 4: explain personality determinants and personality types.
- CO 5: apply effective training program for personality development.

UNIT I INTRODUCTION

Leadership – Meaning, Concepts and Myths about Leadership, Components of Leadership- Leader, Followers and Situations - Leadership Skills – Basic Leadership Skills - Building Technical Competency - Advanced Leadership Skills - Team Building for Work Teams - Building High Performance Teams.

UNIT II TEAMS AND LEADERSHIP

Assessing Leadership & Measuring Its Effects - Group- Nature, Size, Roles, Norms, Cohesion, and Stages of Group Development - Teams and their Leadership – Effective Team Characteristics and Team Building - Ginnetts Team Effectiveness Leadership Model.

UNIT III PERSONALITY

Personality - Meaning, Concept, Personality Patterns, Symbols of Self, Moulding the Personality Pattern, Persistence & Change - Personality & Personal Effectiveness - Psychometric Theories – Cattelle and Big Five - Psychodynamic Theories - Carl Jung and MBTI - Transactional Analysis - Johari – Window - Personal Effectiveness.

UNIT IV PERSONALITY DETERMINANTS

Personality Determinants – Heredity and Environment – Types of personality.

UNIT V PERSONALITY TRAINING

Concept, Role, Need, Importance and types of personality Training - Understanding Process of Learning - Developing an Integrated Approach of Learning in Training Programme - Training Needs Assessment.

TEXT BOOKS

1. Yukl G, “Leadership in Organisations”, 8th Edition, Pearson Education Ltd., England, 2013.
2. Lall M, Sharma S, “Personal Growth Training & Development”, Kindle Edition, USA, 2009.

REFERENCES

1. Janakiraman B, “Training and Development”, Wiley Dream tech, Biztantra, 2005.
2. Pareek U, “Understanding Organizational Behaviour”, 2nd Edition, Oxford University Press, USA, 2007.

13TD03E**INTERNATIONAL BUSINESS MANAGEMENT****L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: understand the global business environment.
- CO 2: explain the impact of economic, legal, cultural, geographical and political factors on international business.
- CO 3: discuss the issues and problems of Multinational Enterprises.
- CO 4: discuss the role of various international financial institutions.
- CO 5: discuss about important aspects of WTO and GATT agreement.

UNIT I INTERNATIONAL BUSINESS ENVIRONMENT

International Business Environment - Globalization - Forces, Meaning, Dimensions and Stages in Globalization - Trading Environment of International Trade - Tariff and Non-tariff Barriers - Trade Blocks.

UNIT II RISK ANALYSIS AND PRACTICES

Country Risk Analysis - Political, Social and Economic - Cultural and Ethical practices - Responsibilities of International Business - Economic crisis in foreign countries.

UNIT III MULTINATIONAL ENTERPRISES

Managing Multinational Enterprises - Problems and Potential - Multinational Service Organizations - Indian companies becoming multinationals - Potential, Need and Problems.

UNIT IV INTERNATIONAL FINANCIAL MANAGEMENT

Introduction to International Financial Management - Balance of Trade and Balance of Payment - International Monetary Fund, Asian Development Bank and World Bank - Financial Markets and Instruments - Introduction to Export and Import Finance - Methods of Payment in International Trade.

UNIT V INTERNATAIONAL AGREEMENT

General Agreement on Trade and Tariffs, (GATT) - World Trade Organization - Seattle and Doha Round of Talks - Dispute Settlement Mechanism under WTO - Problems of Patent Laws - International Convention on Competitiveness - Global Sourcing and its Impact on Indian Industry - Globalization and Internal Reform Process.

TEXT BOOKS

1. Bhalla V.K, Shivaramu S, "International Business Environment", 9th Edition, Anmol Publications Pvt. Ltd., Delhi, 2005.
2. Apte P.G, "International Financial Management", 5th Edition, Tata McGraw Hill, India, 2008.
3. Cherulinam F, "International Business", 5th Edition, Prentice Hall of India, New Delhi, 2010.

REFERENCES

1. Rao, Rangachari, "International Business", Himalaya Publishing House, New Delhi, 2010.
2. Hill C, "International Business", 10th Edition, Tata McGraw Hill Education, New Delhi, 2014.
3. Daniels J.D, "International Business Environment", 15th Edition, Prentice Hall of India, New Delhi, 2014.

13TD04E**BASICS OF MARKETING****L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: describe the basic concepts of marketing.
- CO 2: discuss the significance of consumer behavior and market segmentation.
- CO 3: discuss brand, trade mark, after- sales service and product life cycle concepts.
- CO 4: formulate strategies for pricing and channels of distribution.
- CO 5: analyze and selection of best promotional technique.

UNIT I INTRODUCTION

Nature and Scope of Marketing - Importance of Marketing – Concepts: Traditional and Modern - Selling Vs. Marketing - Marketing Mix - Marketing Environment.

UNIT II CONSUMER BEHAVIOR AND MARKET SEGMENTATION

Nature, Scope and Significance of Consumer Behavior - Market Segmentation - Concept and Importance - Bases for Market Segmentation.

UNIT III PRODUCT PLANNING

Concept of Product - Consumer and Industrial Goods - Product Planning and Development - Packaging - Role and Functions - Brand Name and Trade Mark - After- Sales Service - Product Life Cycle Concept.

UNIT IV PRICING AND PHYSICAL DISTRIBUTION

Price - Importance of Price in the Marketing Mix - Factors Affecting Price of a Product/Service - Discounts and Rebates - Distribution Channels - Concept and Role - Types of Distribution Channels - Factors Affecting Choice of a Distribution Channel - Retailer and Wholesaler - Distributions Channels and Physical Distribution.

UNIT V PROMOTION

Definition - Methods of Promotion - Optimum Promotion Mix - Advertising Media - Their Relative Merits and Limitations - Characteristics of an Effective Advertisement - Personal Selling - Selling as a Career - Classification of a Successful Sales Person - Functions of Salesman.

TEXT BOOKS

1. Etzel M.J, Walker B.J, Stanton W.J, “Fundamentals of Marketing”, 13th Edition, McGraw Hill, New York, 2004.
2. Tanner J, Raymond M, “Principles of Marketing”, University of Minnesota Libraries Publishing, New York, 2015.

REFERENCES

1. Rajan Nair N, Varma M.M, “Marketing Management”, 2nd Edition, S.Chand & Sons, New Delhi, 2005.
2. Ramaswamy V.S, Namakumari S, “Marketing Management”, 3rd Edition, Macmillan India Limited, London, 2002.

13TD05E RETAILING AND DISTRIBUTION MANAGEMENT**L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: explain the concepts of retailing and distribution management.
- CO 2: analyze and solve retailers' problems to make decisions in retail organizations.
- CO 3: plan and formulate strategy for retail management process.
- CO 4: discuss about various distribution technology and stores management.
- CO 5: analyze the issues and challenges in Logistic Management

UNIT I INTRODUCTION

Meaning and Nature of Distribution and Retail Industry - Future of Retailing and Distribution in India - Distribution Channels – Concept, Role and Types - Factors Affecting Choice of Distribution Channel.

UNIT II TYPES OF RETAILING

Stores Classified by Owners - Stores Classified by Merchandising Categories - Wheel Of Retailing - Traditional Retail Formats Vs. Modern Retail Formats in India - Store and Non-Store Based Formats - Cash and Carry Business - Retailing Models – Franchiser Franchisee, Directly Owned - Wheel of Retailing and Retailing Life Cycle – Issues in Retailing.

UNIT III MANAGEMENT OF RETAILING OPERATIONS

Meaning - Functions of Retail Management - Strategic Retail Management Process - Retail Planning - Importance and Process - Developing Retailing Strategies.

UNIT IV TECHNOLOGY IN DISTRIBUTION

Bar-Coding – RFID – Electronic Payment Systems - Store Administration - Floor Space Management – Managing Store Inventories and Display Action Plans - Pricing Strategies and Location Strategies.

UNIT V LOGISTICS OF RETAIL MANAGEMENT

Components and Functions; Distribution Related Issues and Challenges - Gaining Competitive Advantage through Logistics Management.

TEXT BOOKS

1. Agrawal D. K., “Distribution & Logistics Management: A Strategic Marketing Approach”, Macmillan Publishers India Limited, New Delhi, 2007.
2. Berman B, Evans J.R, “Retail Management – A Strategic approach”, 12th Edition, Pearson Education Ltd., England, 2013.
3. Cox R, Brittan P, “Retailing an introduction, Financial Times Management”, 5th Edition, Pearson Education Limited, England, 2004.

REFERENCES

1. Rushton A, Croucher P, Baker P, “The Handbook of Logistics & Distribution Management”, Kogan Page Limited, London, 2006.
2. Coughlan A.T, Anderson E, Stern L.W, El-Ansary A.I, “Marketing Channels”, 7th Edition, Prentice Hall, New Jersey, 2006.
3. Sinha P. K, Uniyal D.P, “Managing Retailing”, Oxford University Press, India, 2007.

13TD06E**INTERNATIONAL ECONOMICS****L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: discuss the impact of globalization.

CO 2: identify and analyze different theoretical models of international economics in light of 'real world' situations.

CO 3: examine the consequences of trade policies.

CO 4: explain the importance of international financial markets.

CO 5: discuss the important aspects of international banking.

UNIT I INTRODUCTION

Background of International Business Economics - Globalization and International Business – The Emergence of Global Institutions – Drivers of Globalizations - The Globalization Debate.

UNIT II THE INTERNATIONAL TRADE THEORY

The Law of Comparative Advantage – The Demand and Supply, Offer Curves - The Terms of Trade – Factor Endowments and the Heckscher – Ohlin Theory – Implications of Trade Theories - Economics of Scale - Imperfect Competition.

UNIT III INTERNATIONAL TRADE POLICY

Trade Restrictions - Tariffs, Non –Tariff Trade Barriers - Tariff Vs. Quota - The New Protectionism – Economic Integration - Custom Unions and Free Trade Areas - Major Regional Trade Agreements - Foreign Exchange Market – Types of Foreign Exchange Transactions – Reading Foreign Exchange Quotations – Forward and Futures Market – Foreign - Currency Options – Exchange Rate Determination – Arbitrage – Speculation and Exchange - Market Stability.

UNIT IV WORLD FINANCIAL ENVIRONMENT

Global Foreign Exchange Markets – Economic Theories of Exchange - Rate Determination - International Regime for FDI and MNC - Consequences of Economic Globalization.

UNIT V INTERNATIONAL BANKING

Reserves, Debt and Risk - Nature of International Reserves – Demand for International Reserves – Supply of International Reserves – Gold Exchange Standard – Special Drawing Rights – International Lending Risk – The Problem of International Debt – Financial Crisis and The International Monetary Fund – Eurocurrency Market.

TEXT BOOKS

1. Krugman P.R, Obstfeld M, “International Economics Theory and Policy”, 8th Edition, Prentice Hall, Boston, 2008.
2. Carbaugh R.J, “International Economics”, 15th Edition, South Western College publication, USA, 2014.

REFERENCES

1. Daniels J, Radebaugh L, Sullivan D, Salwan P, “International Business”, 12th Edition, Pearson Education, New Delhi, 2010.
2. Suranovic S, “International Economics: Theory and Policy”, Flat World Knowledge, USA, 2010.

13TD07E**INDIAN ECONOMY****L T P C**
0 0 0 3**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: discuss the current economic development in India
- CO 2: describe the key indicators of estimation of national income
- CO 3: explain elementary concepts of economic planning and development in India
- CO 4: discuss the concept of public finance and preparation of budget
- CO 5: discuss the influence of infrastructure growth on economic development

UNIT I ECONOMIC DEVELOPMENT

Meaning - Measurement of Economic Development - Characteristic of underdeveloped and developed economies - Causes for Indian economic underdevelopment - Major issues in development - Strategies for economic development Import substitution and Export oriented strategies - Determinants of economic development.

UNIT II NATIONAL INCOME

The National Income and its estimates in India - Limitations of National income estimation - Trends in National income of India: Growth and Structure - Inter-state variations in National income - Income distribution - Measurement of poverty in India.

UNIT III ECONOMIC PLANNING

Planning and economic development in India - Planning models in India (Elementary concepts) - Capital formation - Growth of Public and Private sector in India – Industrial policies an assessment - Capital formation and domestic saving.

UNIT IV INDIAN PUBLIC FINANCE

Budgetary policies of the central government - Composition and trends in public revenue and expenditure - Expenditure control and government consumption expenditure - concepts of Budgetary deficits and implications - state budget.

UNIT V INFRASTRUCTURE AND ECONOMIC DEVELOPMENT

Power and energy - Transport system in India's economic development - Communication system in India - Urban infrastructure - Science and technology - Private investment in infrastructure - Outlook and prospects.

TEXT BOOKS

1. Dutt R, Sundaram K.P.M, "Indian Economy", S.Chand and Co., New Delhi, 2006.
2. Agarwal A.N, Agarwal M.K, "Indian Economy: Problems of Development and Planning", 41st Edition, New Age International Ltd., New Delhi, 2016.

REFERENCES

1. Arvind P, "India: The Emerging Giant", Oxford University Press, USA, 2008.
2. Government of India, Economic Survey, (2010 -11 to 2014 -15).

13TD08E**RURAL ECONOMICS****L T P C**
0 0 0 3**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: discuss the role and importance of agriculture in economic development of India.
- CO 2: describe the impact of agricultural forming in rural employment, wage policy, technological change and green revolution.
- CO 3: analyze the relationship between rural and urban society.
- CO 4: recognize the formation and system of rural social institutions.
- CO 5: compare the social changes in the rural society after modernization and globalization.

UNIT I INTRODUCTION

Nature and Scope of Rural Economy - Importance of Agriculture in Economic Development of India - Nature of Land Problems - Evolution of Policy – Land Tenure System - Land Reform Measures.

UNIT II AGRICULTURE AND FARMING

Agricultural Holdings - Fragmentation and Sub-Division of Holdings, Cooperative Farming-Rural Labour Problems - Nature of Rural Unemployment - Employment and Wage Policy - Sources of Technological Change and Green Revolution.

UNIT III RURAL SOCIETY

Rural Society Structure and Change - Village and its Social Organization - Indian Village and its Types - Rural-Urban Continuum and Rural-Urban Relationships.

UNIT IV RURAL SOCIAL INSTITUTIONS

Rural Social Institutions - Family, Property, Caste, Class, Agrarian Structure - Indebtedness and Poverty - Jajmani System - Religion, Village, Panchayat Raj and Community Development Programmes – Problems.

UNIT V SOCIAL CHANGES

Social Change in Rural India-Impact of Westernization - Secularization, Urbanisation, Industrialisation, Migration, Transportation, Modernization of Indian Rural Society - Post Modernization and Globalization and Indian Villages.

TEXT BOOKS

1. Carver T.N, “The Principles of Rural Economics”, Ginn and company, USA, 1911.
2. Desai A.R, “Rural Sociology in India”, 5th Edition, Popular Prakashan Ltd., Mumbai, 2011.

REFERENCES

1. Dube S.C., “India’s changing villages”, Psychology Press, UK, 2003.
2. Datt R, Sundharam K.P.M, Datt G, Mahajan A, “Indian Economy”, 72nd Edition, S.Chand & Co., New Delhi, 2016.
3. Chaudhari, C.M., “Rural Economics”, Sublime Publication, Jaipur, 2009.

13TD09E**INTERNATIONAL TRADE****L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: discuss the importance of international trade in developing countries.
- CO 2: describe the impact of Trade agreements in international Business environment.
- CO 3: explain the role of foreign exchange and their impact on trade and investment flows.
- CO 4: discuss the benefits of Multinational Corporation in Internal Trade
- CO 5: analyze the key role of globalisation in Indian economy.

UNIT I INTRODUCTION

International Marketing - Trends in International Trade - Reasons - Global Sourcing and Production Sharing - International Orientations - Internationalization Stages and Orientations - Growing Economic Power of Developing Countries – International Business Decision.

UNIT II INTERNATIONAL BUSINESS ENVIRONMENT

Trading Environment - Commodity Agreements – State Trading - Trading Blocks and Growing Intra-Regional Trade - Regional Groupings – SAARC, BRICS, ECM, ASEAN - Trade Liberalization - The Uruguay Round-Evaluation – UNCTAD – GATT – WTO.

UNIT III INTERNATIONAL FINANCIAL ENVIRONMENT

International Money and Capital Markets - Foreign Investment Flows – Pattern, Structure and Effects - Movements in Foreign Exchange and Interest Rates and their Impact on Trade and Investment Flows - Exchange Rate Mechanism and Arrangement.

UNIT IV MULTINATIONAL CORPORATIONS

Definition - Organizational Structures - Dominance of MNC's - Recent Trends - Code of Conduct - Multinationals in India - Issue in Investment, Technology Transfer, Pricing and Regulations - International Collaborations and Strategic Alliances.

UNIT V INDIA IN THE GLOBAL SETTING

India an Emerging Market - India in the Global Trade - Liberalization and Integration with Global Economy - Factors Favouring and Resisting Globalization - Trade Policy and Regulation in India - Trade Strategies - Export-Import Policy - Regulation and Promotion of Foreign Trade in India.

TEXT BOOKS

1. Daniels J.D, Radebaugh L.H, Sullivan D.P, “International Business: Environment and Operations”, 12th Edition, Prentice Hall, USA, 2009.
2. Ricky W.G, Michael W.P, “International Business: A Managerial Perspective”, Prentice Hall, USA, 2009.

REFERENCES

1. Bhattacharya B, Varshney R.L, “International Marketing Management”, 25th Revised Edition, S. Chand & Sons, New Delhi, 2015.
2. Verma M.L, “International Trade”, Common wealth Publisher, New Delhi, 2010.

13TD10E**GLOBAL CHALLENGES AND ISSUES****L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: understand the various global issues.
- CO 2: demonstrate a reasonable understanding of environmental debates and issues.
- CO 3: explain the developmental issues relating to food, health and energy.
- CO 4: demonstrate the economical issues in international trade.
- CO 5: describe the civilization issues relating to human rights and social justice.

UNIT I SECURITY ISSUES

Nuclear Issues - Global and South Asian Context - Small Weapons Proliferation and Internal Arms Race - Chemical and Biological Weapons – Terrorism - Causes, Consequences And Trends - Cyber Terrorism – Counter Terrorism.

UNIT II ENVIRONMENTAL ISSUES

Global Warming and Climate Change - Threats to Bio-Sphere and Space - Pollutions, De-Forestation, Solid, Chemical and Nuclear Wastes and their Management - Preserving the Green Cover and Wild Life.

UNIT III DEVELOPMENTAL ISSUES

Food Security - Poverty and Hunger - Energy Security - Supply and Demand - Traditional and Alternative Sources of Energy – ITER - Health Security – Health for all - Development Vs. Environment - Sustainable Development.

UNIT IV ECONOMIC ISSUES ON INTERNATIONAL TRADE

International Trade - GATT, WTO - Regional Associations - ECM, ASEAN, OPEC, BRICS - Financial Crisis - ASEAN, Mexico and Greece - Global Issues in Trade and Commerce.

UNIT V CIVILIZATION ISSUES

Human Rights - Issues Relating to Freedom of Speech and Expression - Right to Self Determination - Preservation of Cultures and Cultural Diversities - Rights of Women and Children - Dividends of Globalization and Social Justice – Good Governance.

TEXT BOOKS

1. Payne R, “Global Issues”, 4th Edition, Pearson Education Ltd., New York, 2013.
2. Owens P, Baylis J, Smith S, “The Globalization of World Politics”, 3rd Edition, Oxford University Press, USA, 2013.

REFERENCE

1. Chirco J.A, “Globalization: Prospects and Problems”, Sage Publications, New Delhi, 2013.

13TD11E**INDIAN CULTURE AND HERITAGE****L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO1: describe Indian culture, civilization and its features.
- CO2: demonstrate stone age, Indian races and their contribution in pre-historic culture.
- CO3: explain historical development of Indian culture.
- CO4: explain the significance, conditions and development of Vedic culture.
- CO5: analyze the advent of Islam and European culture.

UNIT I INTRODUCTION

Introduction to Culture - Meaning and Scope - Culture and Civilization - General Characteristics Features of Indian Culture - Geographical Impact on Indian Culture.

UNIT II PRE-HISTORIC CULTURE

Dravidian Culture - Old Stone Age - New Stone Age - Metal Age - Indian Races and their Contribution to Indian Culture.

UNIT III HISTORICAL DEVELOPMENT OF INDIAN CULTURE

Indus Valley Culture - City Planning - Social and Religious Conditions - Vedic and Later Vedic Cultures - Dharmasastras and Caste Systems - Comparison of Indus and Vedic Culture - Importance of Indus Valley and Vedic Cultures.

UNIT IV CULTURE IN SANGAM AGE AND POST SANGAM AGE

Sangam Literature - Society - Political and Economical Conditions - Trade - Religion and Fine Arts.

UNIT V ADVENT OF ISLAM AND EUROPEAN CULTURE

Impact on Indian Culture and Heritage – Reform Movements - Brahma Samaj, Ariya Samaj, Self Respect Movement – Post Colonial Development.

TEXT BOOKS

1. Luniya B.N, “Evolution of Indian Culture”, Lakshmi Narain Agarwal Publishers, Agra, 1986.
2. Jeyapalan N, “History of Indian culture”, Atlantic publishers, New Delhi, 2001.
3. Sharma H.C, “Indian Culture and Heritage”, Neha Publishers & Distributors, New Delhi, 2012.

REFERENCES

1. John G.A, “Dictionary of Indian Philosophy (Sanskrit-English)”, University of Madras, Madras, 1998.
2. Misra R.S, “Studies in philosophy and Religion”, Bharathiya Vidya Prakasans, Varanasi, 1991.
3. Misra S.K, “Culture and Rationality”, Sage publications India pvt. Ltd., New Delhi, 1988.
4. Suda J.P, “Religious in India”, Sterling Publishers Pvt. Ltd., New Delhi, 1978.

13TD12E**INDIAN HISTORY****L T P C**
0 0 0 3**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO1: illustrate the basics of Indian cultural heritage.
- CO2: describe interaction between Ancient Indian cultural heritage and Islamic culture.
- CO3: demonstrate Innovation by rulers of medieval period in the area of Administration, and their contact with the Europeans.
- CO4: analyse modern Indian movements, Economic history and Impact of the British rule on India.
- CO5: demonstrate the concepts of Indian National Movement and the history of freedom struggle in India.

UNIT I ANCIENT INDIAN CULTURE

Ancient Indian Cultural Heritage - Social, Political, Legal and in the Area of Religion and Philosophy.

UNIT II LAW RELATING TO CULTURE

Law Givers and Dispute Resolution Systems in Ancient India (Administration of Justice in Ancient India - Pre-Islamic Period) - Law Relating to Culture - The Advent of Islam - Interaction between Ancient Indian Cultural Heritage and Islamic Culture - The Emergence of Synthetic Indian Culture.

UNIT III ADMINISTRATION IN ANCIENT INDIA

Innovation by Rulers of Medieval Period in the Area of General and Revenue Administration - District Administration - Court Systems - Indian Contact with the Europeans.

UNIT IV SOCIO-ECONOMIC HISTORY

Socio-Religious Reform Movements in Modern India and its Legal Culture - Economic History of India During British Period - Impact of the British Rule on India – Education.

UNIT V EUROPEAN CULTURE IMPACT

Impact of European Culture and Liberal Thought on India – The Indian National Movement - The History of Freedom Struggle in India upto 1947.

TEXT BOOKS

1. Sreenivasa M.H.V, “History of India Part I and II”, JBA Publishers, New Delhi, 2015.
2. Agarwal R.C, Bhatnagar M, “Constitutional Development and National Movement of India”, S. Chand Publishers, New Delhi, 2005.

REFERENCES

1. Altekar S, “State and Government in Ancient India”, Motilal Banarsidass Publishers, New Delhi, 2002.
2. Majumdar R.C, “History and Culture of the Indian People”, Vol. 2, The Age of Imperial Unity, Bharatiya Vidya Bhavan, New Delhi, 2001

13TD13E SUSTAINABLE DEVELOPMENT AND PRACTICES**L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: recognize the sustainable development and the way to achieve the sustainable development.
- CO 2: outline the concept, factors governing the sustainability and their linkages.
- CO 3: explain the environmental impact assessment and environmental audit.
- CO 4: describe the environmental planning and managing the resources.
- CO 5: acquire the knowledge about the environmental problems and their solutions.

UNIT I SUSTAINABLE DEVELOPMENT

Need for Sustainability - Nine Ways to Achieve Sustainability - Economics as the Dismal Science - Population, Resources and Environment.

UNIT II CHALLENGES OF SUSTAINABLE DEVELOPMENT

Concept of Sustainability - Factors Governing Sustainable Development - Linkages among Sustainable Development, Determinants of Sustainable Development - Case Studies on Sustainable Development.

UNIT III ENVIRONMENT IMPACT ASSESSMENT AND AUDIT

Concepts-process-evaluation methodology-EIA and EMS integration-setting up of audit programme - typical audit process - carrying out the audit-benefits of environmental auditing-environmental audit programmes in India.

UNIT IV ENVIRONMENTAL PLANNING

Introduction - Perspective of Environmental Planning - land resource development planning - Planning and managing the natural resources - landscape ecological planning - information and decision of environmental planning - Land use policy in India.

UNIT V ENVIRONMENTAL EDUCATION

Knowledge about the environment - Knowledge about the environment and population growth - Knowledge about the solution and environmental problems - Environmental education (EE) – Strategies for EE – Models for future Environmental Education Systems.

TEXT BOOKS

1. Rogers P, Jalal K.F, Boyd J.A, “An introduction to sustainable development”, Earthscan Publications Ltd., UK, 2006.
2. Santra S.C, “Environmental Science”, 3rd Edition, New Central Book Agency (P) Ltd., London, 2013.

REFERENCES

1. Stavins R.N. “Economics of the Environment: Selected Readings”, 5th Edition, W.W. Norton and Company, New York, 2005.
2. Sachs J.D, “The Age of Sustainable Development”, Columbia University Press, New York, 2015.

13TD14E**WOMEN IN INDIAN SOCIETY****L T P C
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO1: Demonstrate historical perspective about women in Indian society.
- CO2: Explain social problems of women.
- CO3: Understand the legislation for women protection in India.
- CO4: Demonstrate the involvement of women literacy, career and politics.
- CO5: Analyse the role of NGO's in women empowerment.

UNIT I INTRODUCTION

A Historical Perspective - Early Vedic, Colonial and Modern Periods - Position of Women in Contemporary India.

UNIT II SOCIAL ISSUES

Issues of Girl Child - Female Infanticide and Foeticide, Sex Ratio, Child Marriage, Dowry and Property Rights - Women's Health and Birth Control - Reproduction - Violence against Women - Domestic Violence - Female Headed Households - Women in the Unorganized Sector of Employment - Women's Work- Status and Problems - Problems of Dalit Women.

UNIT III PROTECTIVE LEGISLATION FOR WOMEN

Protective Legislation for Women in the Indian Constitution - Anti Dowry, SITA, PNDT, And Prevention Sexual Harassment At Workplace (Visaka Case) - Domestic Violence(Prevention) Act.

UNIT IV WOMEN AND EDUCATION

Formal and Non-Formal Literacy - Post Literacy - Vocational Training - Dual Career Modernization – Women and Politics - Political Status - Global Movements and Indian Movements.

UNIT V ROLE OF NGO'S IN WOMEN EMPOWERMENT

Gender Economy - All India Women's Conference (AIWC) – Women's India Association (WIA) - National Council of Women in India (NCWIE) - Indian Association of Women's Studies – Women Development Cells - Self Help Groups.

TEXT BOOKS

1. Majumdar M, "Social Status of Women in India", Wisdom Press, New Delhi, 2012.
2. Harish R, Harishankar V.B, "Re-Defining Feminisms", Rawat Publications, Jaipur, 2011.

REFERENCES

1. Rathod P.B, "An Introduction to Women's Studies", ABD Publishers, Jaipur, 2010.
2. Ray R, "Hand Book of Gender", Oxford University Press, New Delhi, 2012.

13TD15E**INDIAN CONSTITUTION****L T P C**
0 0 0 3**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO1: describe the basic understanding of the Indian Constitution.
- CO2: understand the structure and functions of parliament.
- CO3: demonstrate the organization and working of the Judiciary.
- CO4: understand the structure and functions of state legislature.
- CO5: understand the 73rd and 74th Constitutional Amendments.

UNIT I INDIAN CONSTITUTION

Salient Features - Preamble - Fundamental Rights – Directive Principles of State Policy - Fundamental Duties.

UNIT II PARLIAMENTARY SYSTEM

Powers and Functions of President and Prime Minister - Council of Ministers - The Legislature Structure and Functions of Lok Sabha and Rajya Sabha – Speaker.

UNIT III THE JUDICIARY

Organisation and Composition of Judiciary - Powers and Functions of the Supreme Court - Judicial Review – High Courts.

UNIT IV STATE GOVERNMENTS

Powers and Functions of Governor and Chief Minister – Council of Ministers - State Legislature.

UNIT V LOCAL GOVERNMENTS

73rd and 74th Constitutional Amendments – Federalism - Center – State Relations.

TEXT BOOKS

1. Basu D.D,” Introduction to Indian Constitution”, Prentice Hall of India, New Delhi, 2015.
2. Gupta D.C, “Indian Government and Politics”, Vikas Publishing House, New Delhi, 2010.

REFERENCES

1. Pylee M.V, “Introduction to the Constitution of India”, Vikas Publishing House, NewDelhi, 2011.
2. Kashyap S, “Our Constitution”, National Book Trust, New Delhi, 2010.

13TD16E**BIO MECHANICS IN SPORTS****L T P C**
0 0 0 3**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO1: discuss the basics of biomechanics in sports & movement technique accurately.
- CO2: discuss the basics of linear kinematics and its applications in the field of sports.
- CO3: demonstrate the linear kinematics in the field of sports.
- CO4: discuss the basics of angular kinematics and its applications in the field of sports.
- CO5: demonstrate the angular kinematics in the field of sports.

UNIT I INTRODUCTION

Meaning, Aim and Objectives, Importance of Biomechanics in Sports - Types of Motion Linear, Angular, Curvilinear and Circular Motion.

UNIT II LINEAR KINEMATICS

Speed, Velocity, Acceleration, Motion, Projectile Motion – Application of Linear Kinematics in The Field of Physical Education and Sports.

UNIT III ANGULAR KINEMATICS

Angular Speed - Angular Velocity - Angular Acceleration - Relationship between Linear and Angular Motion – Application of Angular Kinematics in the Field of Physical Education and Sports.

UNIT IV LINEAR KINETICS

Mass, Weight, Force, Pressure, Work, Power, Energy, Impulse, Momentum, Impact, Friction, Newton's Law of Motion - Law of Inertia and Types of Inertia.

UNIT V ANGULAR KINETICS

Levers, Equilibrium and Centre of Gravity – Friction and its Types, Centrifugal and Centripetal Force Bio Mechanical Principles Involved in Designing Sports Equipments.

TEXT BOOKS

1. Singh S.K, "Biomechanics in Sports", Neha Publishers & Distributors, New Delhi, 2009.
2. McGinnis P.M, "Biomechanics of Sports and Exercise", 2nd Edition, Human Kinetics Publishers, USA, 2004.

REFERENCES

1. Saxena A, "Biomechanics in Sports", Neha Publishers & Distributors, New Delhi, 2011.
2. Heyward V.H, Gibson A.L, "Advanced Fitness Assessment and Exercise Prescription", 7th Edition, Human Kinetics, USA, 2014.