ANNA UNIVERSITY CHENNAI
CHENNAI - 600 025

UNIVERSITY DEPARTMENTS

REGULATIONS 2012

CURRICULA AND SYLLABI FOR I TO VIII SEMESTERS

B.E. COMPUTER SCIENCE & ENGINEERING
(FULL TIME)

ANNA UNIVERSITY:: CHENNAI - 600 025.

UNIVERSITY DEPARTMENT

R - 2012

B.E. COMPUTER SCIENCE & ENGINEERING

I – VIII SEMESTERS CURRICULA AND SYLLABI

SEMESTER I

Course Code	Course Title	L	T	P	C
THEORY					
HS8151	Technical English I	3	1	0	4
MA8151	Mathematics I	3	1	0	4
PH8151	Engineering Physics	3	0	0	3
CY8151	Engineering Chemistry	3	0	0	3
GE8151	Computing Techniques	3	0	0	3
GE8152	Engineering Graphics	2	0	3	4
PRACTICAL					
PH8161	Physics Laboratory	0	0	2	1
CY8161	Chemistry Laboratory	0	0	2	1
GE8161	Computer Practices Laboratory	0	0	3	2
GE8162	Engineering Practices Laboratory	0	0	3	2
	TOTAL CREDITS	**17**	**2**	**13**	**27**

SEMESTER II

Course code	Course Title	L	T	P	C
THEORY					
HS8251	Technical English II	3	1	0	4
MA8251	Mathematics II	3	1	0	4
PH8253	Physics for Information Science	3	0	0	3
CS8201	Digital Principles and System Design	3	0	0	3
CS8202	Principles of Computer Engineering	3	0	0	3
CS8203	Programming using C++	3	0	0	3
PRACTICAL					
CS8211	Digital Laboratory	0	0	3	2
CS8212	Programming Laboratory	0	0	3	2
	TOTAL CREDITS	18	2	6	24

SEMESTER III

Course Code	Course Title	L	T	P	C
THEORY					
MA8351	Algebra and Number Theory	3	1	0	4
GE8351	Environmental Science and Engineering	3	0	0	3
CS8301	Computer Architecture	3	1	0	4
CS8302	Data Structures	3	0	0	3
CS8303	Database Management Systems	3	0	0	3
EC8303	Electronic Devices and Circuits For Computer Engineers	3	0	0	3
PRACTICAL					
CS8311	Data Structures Laboratory	0	0	3	2
CS8312	Database Management Systems Laboratory	0	0	3	2
	TOTAL CREDITS	18	2	6	24

SEMESTER IV

Course Code	Course Title	L	T	P	C
THEORY					
MA8354	Probability and Queueing Theory	3	1	0	4
CS8401	Design and Analysis of Algorithms	3	0	2	4
CS8402	Java and Internet Programming	4	0	0	4
CS8451	Operating Systems	3	0	0	3
CS8452	Software Engineering	3	0	0	3
EE8407	Electrical Engineering and Control Systems	3	0	0	3
PRACTICAL					
CS8411	Java and Internet Programming Laboratory	0	0	3	2
CS8461	Operating Systems Laboratory	0	0	3	2
	TOTAL CREDITS	19	1	8	25

SEMESTER V

Course Code	Course Title	L	T	P	C
THEORY					
CS8501	Data Communication and Computer Networks	3	1	0	4
CS8502	Microprocessors and Micro Controllers	3	0	0	3
CS8503	System Software Internals	3	0	0	3
CS8504	Theory of Computation	3	0	0	3
CS8551	Object Oriented Analysis and Design	3	0	0	3
PRACTICAL					
HS8561	Employability Skills	0	0	2	1
CS8511	Case Tools Laboratory	0	0	3	2
CS8512	Communications and Networks Laboratory	0	0	3	2
CS8513	Microprocessors Laboratory	0	0	3	2
	TOTAL CREDITS	15	1	11	23

SEMESTER VI

Course Code	Course Title	L	T	P	C
THEORY					
CS8601	Artificial Intelligence	3	0	0	3
CS8602	Compiler Design	3	0	2	4
CS8603	Computer Graphics and Multimedia	3	0	0	3
CS8604	Programming Paradigms	3	0	0	3
CS8651	Digital Signal Processing – Algorithms and Applications	3	0	0	3
E1	Elective I	3	0	0	3
PRACTICAL					
CS8611	Computer Graphics and Multimedia Laboratory	0	0	3	2
CS8612	Creative and Innovative Project	0	0	3	2
	TOTAL CREDITS	18	0	8	23

SEMESTER VII

Course Code	Course Title	L	T	P	C
THEORY					
MG8653	Principles of Management	3	0	0	3
CS8701	Mobile and Pervasive Computing	3	0	0	3
CS8702	Parallel Programming	3	0	0	3
CS8703	Security in Computing	3	0	0	3
E2	Elective II	3	0	0	3
E3	Elective III	3	0	0	3
PRACTICAL					
CS8711	Mobile Application Development Laboratory	0	0	3	2
CS8712	Software Development Laboratory	0	0	3	2
	TOTAL CREDITS	**18**	**0**	**6**	22

SEMESTER VIII

Course Code	Course Title	L	T	P	C
THEORY					
E4	Elective IV	3	0	0	3
E5	Elective V	3	0	0	3
PRACTICAL					
CS8811	Project Work	0	0	12	6
	TOTAL CREDITS	**6**	**0**	**12**	12

TOTAL NO OF CREDITS: 180

ELECTIVES

Course Code	Course Title	L	T	P	C
CS8001	.Net & C# Programming	3	0	0	3
CS8002	Adhoc & Sensor Networks	3	0	0	3
CS8003	Advanced Topics on Databases	3	0	0	3
CS8004	Bio Informatics Technologies	3	0	0	3
CS8005	Cloud Computing and Services	3	0	0	3
CS8006	Computational Intelligence	3	0	0	3
CS8007	Data Warehousing & Data Mining	3	0	0	3
CS8008	Database Tuning	3	0	0	3
CS8009	E-Learning Techniques	3	0	0	3
CS8010	Graph Theory & Combinatorics	3	0	0	3
CS8011	Green Computing	3	0	0	3
CS8012	Human Computer Interaction	3	0	0	3
CS8013	Information Retrieval & Management	3	0	0	3
CS8014	Middleware Technologies	3	0	0	3
CS8015	Nano Computing	3	0	0	3
CS8016	Natural Language Processing	3	0	0	3
CS8017	Network Analysis & Management	3	0	0	3
CS8018	Principles of Cryptography & Network Security	3	0	0	3
CS8019	Principles of Distributed Systems	3	0	0	3
CS8020	Principles of Embedded & Real Time Systems	3	0	0	3
CS8021	Service Oriented Architecture	3	0	0	3
CS8022	Software Agents	3	0	0	3
CS8023	Software Quality & Testing	3	0	0	3
CS8024	System Modeling & Simulation	3	0	0	3
CS8071	Cyber Forensics	3	0	0	3
CS8072	Game Programming	3	0	0	3

CS8073	Semantic Web	3	0	0	3
CS8074	UNIX Internals	3	0	0	3
GE8751	Engineering Ethics and Human Values	3	0	0	3
MG8654	Total Quality Management	3	0	0	3
IT8071	Digital Image Processing	3	0	0	3
IT8072	Free & Open Source Software	3	0	0	3
IT8073	TCP/IP Design & Implementation	3	0	0	3
CS8075	Foundation Skills in Integrated Product Development	3	0	0	3
GE8072	Disaster Management	3	0	0	3
GE8073	Human Rights	3	0	0	3

HS8151 **TECHNICAL ENGLISH I** **L T P C**

(For all branches of B.E / B.Tech programmes) **3 1 0 4**

OBJECTIVES:

- To enable all students of engineering and technology develop their basic communication skills in English.
- To give special emphasis to the development of speaking skills amongst the students of engineering and technology.
- To ensure that students use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading for Pleasure.

UNIT I

Listening - Introducing learners to GIE - Types of listening - Listening to audio (verbal & sounds); **Speaking -** Speaking about one's place, important festivals etc. – Introducing oneself, one's family / friend; **Reading -** Skimming a reading passage – Scanning for specific information - Note-making; **Writing -** Free writing on any given topic (My favourite place / Hobbies / School life, etc.) - Sentence completion - Autobiographical writing (writing about one's leisure time activities, hometown, etc.); **Grammar -** Prepositions - Reference words
- Wh-questions - Tenses (Simple); **Vocabulary -** Word formation - Word expansion (root words / etymology); **E-materials -** Interactive exercises for Grammar & Vocabulary - Reading comprehension exercises - Listening to audio files and answering questions.

UNIT II

Listening - Listening and responding to video lectures / talks**; Speaking -** Describing a simple process (filling a form, etc.) - Asking & answering questions - Telephone skills – Telephone etiquette; **Reading –** Critical reading - Finding key information in a given text - Sifting facts from opinions**; Writing -** Biographical writing (place, people) - Lab descriptions (general/specific description of laboratory experiments) - Definitions - Recommendations; **Grammar -** Use of imperatives - Subject-verb agreement**; Vocabulary -** Compound words - Word Association**; E-materials -** Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures – Picture-based activities.

UNIT III

Listening - Listening to specific task - focused audio tracks; **Speaking -** Role-play – Simulation
- Group interaction - Speaking in formal situations (teachers, officials, foreigners);

Reading

- Reading and interpreting visual material**; Writing -** Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause& effect / compare & contrast / narrative / analytical) - Informal writing (letter/e-mail/blogs) - Paraphrasing**; Grammar -** Tenses (Past) - Use of sequence words - Adjectives**; Vocabulary-** Different forms and uses of words, Cause and effect words**; E-materials -** Interactive exercises for Grammar and Vocabulary - Excerpts from films related to the theme and follow up exercises - Pictures of flow charts and tables for interpretations.

UNIT IV

Listening - Watching videos / documentaries and responding to questions based on them**; Speaking -** Responding to questions - Different forms of interviews - Speaking at different types of interviews; **Reading -** Making inference from the reading passage - Predicting the content of a reading passage; **Writing -** Interpreting visual materials (line graphs, pie charts etc.) - Essay writing – Different types of essays**; Grammar -** Adverbs **–** Tenses – future time reference; **Vocabulary -** Single word substitutes - Use of abbreviations & acronyms**; E-materials -** Interactive exercises for Grammar and Vocabulary - Sample interviews - film scenes - dialogue writing.

UNIT V

Listening - Listening to different accents, Listening to Speeches / Presentations, Listening to broadcast & telecast from Radio & TV**; Speaking -** Giving impromptu talks, Making presentations on given topics**; Reading -** Email communication - Reading the attachment files having a poem/joke/proverb - Sending their responses through email **Writing -** Creative writing, Poster making**; Grammar -** Direct and indirect speech**; Vocabulary -** Lexical items (fixed / semi fixed expressions); **E-materials -** Interactive exercises for Grammar & Vocabulary

- Sending emails with attachment – Audio / video excerpts of different accents, - Interpreting posters

TOTAL : 60 PERIODS

OUTCOMES:

Learners should be able to:

- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Read different genres of texts adopting various reading strategies.
- Listen/view and comprehend different spoken discourses/excerpts in different accents.

TEXT BOOKS:

1. Mindscapes: English for Technologists and Engineers, Orient Black Swan, 2012
2. S.P. Dhanavel, English and Communication Skills for students of Science and Engineering. Oriented Black Swan, Chennai, 2011

REFERENCES:

1. Pickett, Nell Ann, Ann A.Laster and Katherine E.Staples. **Technical English: Writing, Reading and Speaking.** New York: Longman, 2001.
2. Bailey, Stephen. **Academic Writing: A practical guide for students.** New York: Rutledge, 2011.
3. Morgan, David and Nicholas Regan**. Take-Off: Technical English for Engineering.** Reading: Garnet Publishing Limited, 2008.
4. Thorn, Michael and Alan Badrick. **An Introduction to Technical English.** Harlow**:**Prentice Hall Europe, 1993.
5. Rizvi, M.Ashraf. **Effective Technical Communication.** New Delhi: Tata McGraw-Hill Publishing Company, 2007.

Extensive Readers:

1. Murthy, Sudha. **Wise & Otherwise**. Penguin Books India, New Delhi : 2006.
2. Gates, Bill and Collins Hemingway, **Business @ the Speed of Thought: Succeeding in the Digital Economy.** Warner Business Books, New York: 2000.

Website Resources:

1. www.uefap.com
2. www.eslcafe.com
3. www.listen-to-english.com
4. www.owl.english.purdue.edu
5. www.chompchomp.com

MA815 MATHEMATICS – I L T P C

(Common to all branches of B.E. / B.Tech. Programmes in I Semester) 3 1 0 4

OBJECTIVES:

- To develop the use of matrix algebra techniques. This is needed by engineers for practical applications.
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I MATRICES 9+3

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of eigenvalues and eigenvectors – Cayley-Hamilton Theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II INFINITE SERIES 9+3

Sequences – Convergence of series – General properties – Series of positive terms – Tests of convergence (Comparison test, Integral test, Comparison of ratios and D'Alembert's ratio test) – Alternating series – Series of positive and negative terms – Absolute and conditional convergence – Power Series – Convergence of exponential, logarithmic and Binomial Series.

UNIT III FUNCTIONS OF SEVERAL VARIABLES 9+3

Limits and Continuity – Partial derivatives – Homogeneous functions and Euler's theorem– Total derivative – Differentiation of implicit functions – Change of variables – Jacobians– Partial differentiation of implicit functions – Taylor's series for functions of two variables – Errors and approximations – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT IV IMPROPER INTEGRALS 9+3

Improper integrals of the first and second kind and their convergence – Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions – Properties – Evaluation of integrals using Beta and Gamma functions – Error functions.

UNIT V MULTIPLE INTEGRALS 9+3

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of Solids – Change of variables in double and triple integrals – Area of a curved surface.

TOTAL : 60 PERIODS

OUTCOMES:

- This course equips students to have basic knowledge and understanding in one fields of materials, integral and differential calculus.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40th Edition, 2007.
2. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.

REFERENCES:

1. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.
2. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
3. Greenberg M.D., "Advanced Engineering Mathematics", Pearson Education, New Delhi, 2nd Edition, 5th Reprint, 2009.
4. Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2007.

PH8151 ENGINEERING PHYSICS L T P C

(Common to ALL Branches of B.E./B.Tech. Programmes) 3 0 0 3

OBJECTIVE:

To introduce the basic physics concepts relevant to different branches of Engineering and Technology.

UNIT I PROPERTIES OF MATTER 9

Elasticity - Poisson's ratio and relationship between moduli (qualitative) - Stress-strain diagram- factors affecting elasticity - bending of beams - cantilever - bending moment - theory and experiment of Young's modulus determination - Uniform and non-uniform bending - I shaped girders - twisting couple - hollow cylinder - shaft - torsion pendulum - determination of rigidity modulus- moment of inertia of a body (regular and irregular).

UNIT II ACOUSTICS AND ULTRASONICS 9

Classification of sound - loudness and intensity - Weber-Fechner Law - standard intensity and intensity level - decibel - reverberation - reverberation time - rate of growth and decay of sound intensity - derivation of Sabine's formula - absorption coefficient and its determination - factors affecting acoustics of buildings : focussing, interference, echo, Echelon effect, resonance - noise and their remedies. Ultrasonics - production - magnetostriction and piezoelectric methods - detection of ultrasound - acoustic grating - industrial applications - NDT - Ultrasonic method: scan modes and practice.

UNIT III THERMAL PHYSICS 9

Thermal expansion - thermal stress - expansion joints - bimetallic strips - thermal conductivity - conductions in solids - Forbe's and Lees' disc methods - Rectilinear flow of heat through a rod - flow of heat through a compound materials - radical flow of heat through a spherical shell - thermal insulation of buildings – Laws of blackbody radiation: Kirchoffs law, Stephens law, Wiens law, Raleigh-Jean law and Planks law (derivation). Laws of thermodynamics - Otto and diesel engines and their efficiency - entropy - entropy of Carnot's cycle - reverse Carnot's cycle - refrigerator.

UNIT IV APPLIED OPTICS 9

Interference - Michelson interferometer: construction, working, determination of wave length and thickness - anti-reflection coating - air wedge and its application - Lasers - Einstein's coefficients - CO_2 , Nd:YAG and semiconductor lasers - homo junction and hetro junction - construction and working - applications - Optical fibres - classification (index & mode based) - principle and propagation of light in optical fibres - acceptance angle and numerical aperture - fibre optic communication system - active and passive sensors.

UNIT V SOLID STATE PHYSICS 9

Nature of bonding - growth of single crystals (qualitative) - crystal systems - crystal planes and directions - expressions for interplanar distance - coordination number and packing factor for simple structures: SC, BCC, FCC and HCP - structure and significance of NaCl, ZnS, diamond and graphite - crystal imperfections: point defects, dislocations and stacking faults - unit cell, Bravais space lattices - miller indices.

TOTAL : 45 PERIODS

OUTCOMES:

The students will have knowledge on the basics of physics related to properties of matter, Optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications

TEXT BOOKS:

1. Gaur R.K., and Gupta, S.L., Engineering Physics, Dhanpat Raj Publications, 2003
2. Palanisamy, P.K., Engineering Physics, Scitech Publications (P) Ltd, 2006.
3. Arumugam, M., Engineering Physics, Anuradha Publications, 2000.

REFERENCES:

1. Sankar, B.N., Pillai.S.O., Engineering Physics, New Age International (P) Ltd., 2007.
2. Rajendran.V Engineering Physics, Tata McGraw-Hill, 2009.

CY8151 ENGINEERING CHEMISTRY L T P C

(Common to all branches of Engineering and Technology) 3 0 0 3

OBJECTIVES:

- To make the students acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines.
- To make the students conversant with basics of polymer chemistry.
- To make the students understand the concepts of **Kinetics and Catalysis**
- To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
- To acquaint the students with the basics of nano materials, their properties and applications.

UNIT I CHEMICAL THERMODYNAMICS 9

Second law: Entropy - entropy change for an ideal gas, reversible and irreversible processes;entropy of phase transitions; Clausius inequality. Free energy and work function: Helmholtzand Gibbs free energy functions; Criteria of spontaneity; Gibbs-Helmholtz equation; Clausius- Clapeyron equation; Maxwell relations – Van't Hoff isotherm and isochore. Chemical potential; Gibbs-Duhem equation – variation of chemical potential with temperature and pressure.

UNIT II POLYMER CHEMISTRY 9

Introduction: Classification of polymers – Natural and Synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerisation. Types and mechanism of polymerisation: Addition (Free Radical, cationic, anionic and living); condensation and copolymerisation. Properties of polymers: Tg, Tacticity, Molecular weight – weight average, number average and polydispersity index. Techniques of polymerisation: Bulk, emulsion, solution and suspension.

UNIT III KINETICS AND CATALYSIS 9

Introduction – reaction velocity, factors affecting reaction velocity, rate constant, order of reaction, molecularity, pseudo molecular reactions, zero, first, second and third order reactions, reactions of fractional orders, determination of order of reactions. Catalysis: Auto catalysis - Enzyme Catalysis: Michaelis-Menton equation; factors affecting enzyme catalysis. Heterogeneous Catalysis: Types of adsorption isotherms: Langmuir–Hinselwood and Rideal– Eley Mechanism.

UNIT IV PHOTOCHEMISTRY AND SPECTROSCOPY 9

Photochemistry: Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert-Beer Law. Photoprocesses - Internal Conversion, Inter-system crossing, Fluorescence, Phosphorescence, Chemiluminescence and Photo-sensitisation. Spectroscopy: Electromagnetic spectrum - Absorption of radiation – Electronic, Vibrational and rotational transitions. Width and intensities of spectral lines. Spectrophotometric estimation of iron. UV- visible and IR spectroscopy – principles, instrumentation (Block diagram) and applications.

UNIT V NANOCHEMISTRY 9

Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nanoparticles: Nanocluster, nanorod, nanotube and nanowire. Synthesis: Precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation; Properties and Applications. Risk discussion and Future perspectives.

TOTAL : 45 PERIODS

OUTCOMES:

The students will have knowledge on the basics of physics related to properties of matter, optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications

TEXT BOOKS:

1. P. Kannan and A. Ravikrishnan, “Engineering Chemistry”, Sri Krishna Hitech Publishing Company Pvt. Ltd. Chennai, 2009.
2. S. Vairam, P. Kalyani and Suba Ramesh, “Engineering Chemistry”, Wiley India, 2011

REFERENCE BOOKS:

1. P.W. Atkins and de Paula Julio, “Physical Chemistry”, Oxford University Press, 8th Ed., (Indian Student Edition) (2009).
2. K. K. Rohatgi-Mukherjee, “Fundamental of Photochemistry” New Age International (P) Ltd., New Delhi, 1986.
3. G.A. Ozin and A.C. Arsenault, “Nanochemistry: A Chemical Approach to Nanomaterials”, RSC Publishing, 2005.
4. V.R.Gowariker, N.V.Viswanathan and Jayadev Sreedhar, “Polymer Science”, New Age International P (Ltd.,), Chennai, 2006

GE8151 COMPUTING TECHNIQUES L T P C
3 0 0 3

OBJECTIVES:

The students should be made to:

- Learn the organization of a digital computer.
- Be exposed to the number systems.
- Learn to think logically and write pseudo code or draw flow charts for problems.
- Be exposed to the syntax of C.
- Be familiar with programming in C.
- Learn to use arrays, strings, functions, pointers, structures and unions in C.

UNIT I INTRODUCTION 8

Generation and Classification of Computers- Basic Organization of a Computer – Number System – Binary – Decimal – Conversion – Problems. Need for logical analysis and thinking– Algorithm – Pseudo code – Flow Chart.

UNIT II C PROGRAMMING BASICS 10

Problem formulation – Problem Solving - Introduction to ‘ C’ programming – fundamentals – structure of a ‘C’ program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in ‘C’ – Managing Input and Output operations – Decision Making and Branching – Looping statements – solving simple scientific and statistical problems.

UNIT III ARRAYS AND STRINGS 9

Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String- String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

UNIT IV FUNCTIONS AND POINTERS 9

Function – definition of function – Declaration of function – Pass by value – Pass by reference– Recursion – Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays-Example Problems.

UNIT V STRUCTURES AND UNIONS 9

Introduction – Need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage class- es, Pre-processor directives.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Design C Programs for problems.
- Write and execute C programs for simple applications

TEXTBOOKS:

1. Pradip Dey, Manas Ghosh, “Fundamentals of Computing and Programming in C”, FirstEdition, Oxford University Press, 2009
2. Ashok N. Kamthane, “Computer programming”, Pearson Education, 2007.
3. Yashavant P. Kanetkar. “ Let Us C”, BPB Publications, 2011.

REFERENCES:

1. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006
2. Byron S Gottfried, “ Programming with C”, Schaum’s Outlines, Second Edition, Tata McGraw-Hill, 2006.
3. R.G. Dromey, “How to Solve it by Computer”, Pearson Education, Fourth Reprint, 2007

GE8152 ENGINEERING GRAPHICS L T P C

2 0 3 4

OBJECTIVES:

To develop in students, graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.

Concepts and conventions (Not for Examination) 1

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I PLANE CURVES AND FREE HAND SKETCHING 14

Basic Geometrical constructions, Curves used in engineering practices

Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves, **Scales:** Construction of Diagonal and Vernier scales.

Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES 14

Orthographic projection- principles-Principal planes-First angle projection-Projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS 14

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 14

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 15

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method and vanishing point method.

COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY) 3

Introduction to drafting packages and demonstration of their use.

TOTAL: 75 PERIODS

OUTCOMES:

On Completion of the course the student will be able to:

- Perform free hand sketching of basic geometrical constructions and multiple views of objects.
- Do orthographic projection of lines and plane surfaces.
- Draw projections and solids and development of surfaces.
- Prepare isometric and perspective sections of simple solids.
- Demonstrate computer aided drafting.

TEXT BOOK:

1. N.D.Bhatt and V.M.Panchal, “Engineering Drawing”, Charotar Publishing House, 50th, 2010

REFERENCES:

1. K.R.Gopalakrishna., “Engineering Drawing” (Vol I&II combined) Subhas Stores, Bangalore, 2007
2. Luzzader, Warren.J., and Duff,John M.,,” Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production”, Eastern Economy Edition, Prentice Hall of India Pvt Ltd, New Delhi, 2005
3. M.B.Shah and B.C.Rana, “Engineering Drawing”, Pearson, 2nd Edition, 2009
4. K.Venugopal and V.Prabhu Raja, “Engineering Graphics”, New Age International (P) Limited ,2008.
5. K. V.Natrajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2009.
6. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi,2008.

Publication of Bureau of Indian Standards:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

PH8161	PHYSICS LABORATORY (common to all branches of B.E./B.Tech. Programmes)	L T P C 0 0 2 1

OBJECTIVES:

To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter.

1.	Torsional pendulum	–	Determination of rigidity modulus of wire and moment of inertia of disc
2.	Non – uniform bending	–	Determination of young's modulus
3.	Lee's disc	–	Determination of thermal conductivity of a bad
4.	Potentiometer	–	Determination of thermo e.m.f. of thermocouple
5.	Air wedge	–	Determination of thickness of a thin sheet of paper
6.	i. Optical fibre	–	Determination of Numerical Aperture and acceptance
	ii. Compact disc	–	Determination of width of the groove using laser
7.	Acoustic grating	–	Determination of velocity of ultrasonic waves in
8.	Post office box	–	Determination of Band gap of a semiconductor
9.	Spectrometer	–	Determination of wavelength using grating

10. Viscosity of liquids – Determination of co-efficient of viscosity of a liquid by Poiseuille's flow

TOTAL: 30 PERIODS

OUTCOMES:

The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.

CY8161	**CHEMISTRY LABORATORY**	**L T P C**
	(Common to all branches of Engineering and Technology)	**0 0 2 1**

OBJECTIVES:

- To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
- To acquaint the students with the determination of molecular weight of a polymer by vacometry.

1. Estimation of HCl using Na_2CO_3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1,10- phenanthroline / thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
11. Determination of molecular weight of poly vinyl alcohol using Ostwald viscometer.
12. Pseudo first order kinetics – ester hydrolysis.
13. Corrosion experiment – weight loss method.
14. Determination of CMC.
15. Phase change in a solid.

TOTAL: 30 PERIODS

OUTCOMES:

The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters

REFERENCES:

1. A text of quantitative inorganic analysis, A. L. Vogel , ELBS, London. 1995.
2. Experiments in physical chemistry, D.P. Shoemarker and C.W. Gardad, McGraw Hill, London, 2001.
3. American Public Health Association.

GE8161 COMPUTER PRACTICES LABORATORY L T P C

0 0 3 2

OBJECTIVES:

The student should be made to:

- Be familiar with the use of Office software.
- Be exposed to presentation and visualization tools.
- Be exposed to problem solving techniques and flow charts.
- Be familiar with programming in C.
- Learn to use Arrays, strings, functions, structures and unions.

LIST OF EXPERIMENTS:

1. Search, generate, manipulate data using MS office/ Open Office
2. Presentation and Visualization – graphs, charts, 2D, 3D
3. Problem formulation, Problem Solving and Flowcharts
4. C Programming using Simple statements and expressions
5. Scientific problem solving using decision making and looping.
6. Simple programming for one dimensional and two dimensional arrays.
7. Solving problems using String functions
8. Programs with user defined functions
9. Program using Recursive Function and conversion from given program to flow chart.
10. Program using structures and unions.

TOTAL : 45 PERIODS

OUTCOMES:

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

- Apply good programming design methods for program development.
- Design and implement C programs for simple applications.
- Develop recursive programs.

GE8162 ENGINEERING PRACTICES LABORATORY L T P C
(Common to all Branches of B.E. / B.Tech. Programmes) 0 0 3 2

OBJECTIVES:

To provide exposure to the students with hands-on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICE 12

Plumbing

- Basic pipe connections involving the fittings like valves, taps, coupling, unions, reduc- ers, elbows and other components used in household fittings. Preparation of plumbing line sketches.
- Laying pipe connection to the suction side of a pump – inlet.
- Laying pipe connection to the delivery side of a pump – out let.
- Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances.

Wood Work

- Sawing, planning and making common joints: T-Joint, Mortise and Tennon joint, Dovetail joint.

STUDY

- Study of joints in door panels, wooden furniture
- Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICE 9

- Basic household wiring using switches, fuse, indicator – lamp etc.,
- Preparation of wiring diagrams
- Stair case light wiring
- Tube – light wiring
- Study of iron-box, fan with regulator, emergency lamp

GROUP – B (MECHANICAL AND ELECTRONICS)
15

3. MECHANICAL ENGINEERING

PRACTICE Welding

- Arc welding of butt joints, lap joints, tee joints
- Gas welding Practice.
- Basic Machining
- Simple turning, drilling and tapping operations.
- Machine assembly Practice.
- Study and assembling the following:
- Centrifugal pump, mixies and air conditioners.
- Demonstration on
  (a) Smithy operations like the production of hexagonal bolt.
  (b) Foundry operation like mould preparation for grooved pulley.

4. ELECTRONIC ENGINEERING PRACTICE 9

- Soldering simple electronic circuits and checking continuity.
- Assembling electronic components on a small PCB and testing.
- Study of Telephone, FM radio, low-voltage power supplies.

TOTAL: 45 PERIODS

OUTCOMES:

- Ability to fabricate carpentry components and pipe connections including plumbing works.
- Ability to use welding equipments to join the structures.
- Ability to fabricate electrical and electronics circuits.

HS8251	**TECHNICAL ENGLISH II**	**L T P C**
	(For all branches of B.E / B.Tech programmes)	**3 1 0 4**

OBJECTIVES

- To make the students acquire listening and speaking skills meant for both formal and informal contexts
- To help them develop their reading skills by exposing them to different types of reading strategies
- To equip them with writing skills needed for academic as well as workplace situations
- To make them acquire language skills at their own pace by using e-materials and language lab component

UNIT I

Listening - Listening to informal conversations and participating**; Speaking -** Opening a conversation (greetings, comments on something, weather) - Turn taking - Closing a conversation (excuses, general wish, positive comment, thanks); **Reading -** Developing analytical skills, Deductive and inductive reasoning - Extensive reading**; Writing -** Effective use of SMS for sending short notes and messages - Using 'emoticons' as symbols in email messages; **Grammar -** Regular & irregular verbs - Active and passive voice**; Vocabulary -** Homonyms (e.g. 'can') - Homophones (e.g. 'some', 'sum'); **E-materials -** Interactive exercise on Grammar and vocabulary – blogging; **Language Lab -** Listening to different types of conversation and answering questions.

UNIT II

Listening - Listening to situation based dialogues**; Speaking -** Conversation practice in real life situations, asking for directions (using polite expressions), giving directions (using imperative sentences), Purchasing goods from a shop, Discussing various aspects of a film (they have already seen) or a book (they have already read); **Reading -** Reading a short story or an article from newspaper, Critical reading, Comprehension skills**; Writing -** Writing a review / summary of a story / article, Personal letter (Inviting your friend to a function, congratulating someone for his success, thanking one's friend / relatives); **Grammar -** modal verbs, Purpose expressions**; Vocabulary -** Phrasal verbs and their meanings, Using phrasal verbs in sentences**; E-materials -** Interactive exercise on Grammar and vocabulary, Extensive reading activity (reading stories / novels from links), Posting reviews in blogs - **Language Lab -** Dialogues (Fill up exercises), Recording students' dialogues.

UNIT III

Listening - Listening to the conversation - Understanding the structure of conversations**; Speaking -** Conversation skills with a sense of stress, intonation, pronunciation and meaning
- Seeking information – expressing feelings (affection, anger, regret etc.); **Reading -** Speed reading – reading passages with the time limit - Skimming**; Writing -** Minutes of meeting – format and practice in the preparation of minutes - Writing summary after reading the articles from the journals - Format for the journal articles – elements of technical articles (abstract, introduction, methodology, results, discussion, conclusion, appendices, references) - Writing strategies; **Grammar -** Conditional clauses - Cause and effect expressions; **Vocabulary -** Words used as nouns and verbs without any change in the spelling (e.g. 'rock', 'train', 'ring'); **E-materials -** Interactive exercise on Grammar & vocabulary - Speed Reading practice exercises; **Language Lab -** Intonation practice using EFLU materials – Attending a meeting and writing minutes.

UNIT IV

Listening - Listening to a telephone conversation, Viewing a model interview (face-to-face, telephonic and video conferencing) and observing the practices**; Speaking -** Role play practice in telephone skills - listening and responding, -asking questions, -note taking – passing on messages, Role play and mock interview for grasping the interview skills; **Reading -** Reading the job advertisements and the profile of the company concerned – scanning**; Writing -** Applying for a job – cover letter - résumé preparation – vision, mission and goals of the candidate**; Grammar -** Numerical expressions - Connectives (discourse markers); **Vocabulary**
- Idioms and their meanings – using idioms in sentences**; E-materials -** Interactive exercises on Grammar & Vocabulary - Different forms of résumés- Filling up a résumé / cover letter; **Language Lab -** Telephonic interview – recording the responses - e-résumé writing.

UNIT V

Listening - Viewing a model group discussion and reviewing the performance of each participant - Identifying the characteristics of a good listener**; Speaking -** Group discussion skills – initiating the discussion – exchanging suggestions and proposals – expressing dissent/ agreement – assertiveness in expressing opinions – mind mapping technique**; Reading -** Note making skills – making notes from books, or any form of written materials - Intensive reading **Writing -** Types of reports – Feasibility / Project report – report format – recommendations / suggestions – interpretation of data (using charts for effective presentation); **Grammar -** Use of clauses**; Vocabulary –** Collocation**; E-materials -** Interactive grammar and vocabulary exercises - Sample GD - Pictures for discussion, Interactive grammar and vocabulary exercises - Pictures for discussion; **Language Lab -** Different models of group discussion

TOTAL : 60PERIODS

OUTCOMES:
Learners should be able to:

- Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
- Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
- Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
- Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.

TEXT BOOKS:

1. Mindscapes: English for Technologists and Engineers, Orient Black Swan, 2012.
2. S.P. Dhanavel, English and Communication Skills for students of Science and Engineering. Oriented Black Swan, Chennai, 2011

REFERENCES:

1. Laws, Anne. **Presentations.** Hyderabad: Orient BlackSwan, 2000.
2. Lewis, Hedwig. **Body Language: A Guide for Professionals.** Sage Publications, New Delhi : 1998.
3. Naterop, Jean B. and Rod Revell. **Telephoning in English.** Cambridge University Press, Cambridge : 1987.
4. Rutherford, Andrea J. **Basic Communication Skills for Technology**. Pearson Education, New Delhi : 2001.
5. Ur, Penny. **Teaching Listening Comprehension**. Cambridge University Press, Cambridge : 1984.

EXTENSIVE READERS

1. Abdul Kalam, A P J. **Ignited Minds: Unleashing the Power within India.** Penguin Books India, New Delhi : 2002.
2. Parameswaran, Uma. **C.V.Raman: A Biography.** Penguin Books India, New Delhi : 2011.

WEB RESOURCES

1. www.esl-lab.com
2. www.englishgrammar.org
3. www.englishclub.com
4. www.mindtools.com
5. www.esl.about.com

MA8251 **MATHEMATICS II** **L T P C**

(Common to all branches of B.E. / B.Tech. Programmes in II Semester) **3 1 0 4**

OBJECTIVES:

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated

UNIT I DIFFERENTIAL EQUATIONS 9+3

Method of variation of parameters – Method of undetermined coefficients–Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients.

UNIT II VECTOR CALCULUS 9+3

Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral and volume integral - Green's, Gauss divergence and Stoke's theorems – Verification and application in evaluating line, surface and volume integrals.

UNIT III ANALYTIC FUNCTION 9+3

Analytic functions – Necessary and sufficient conditions for analyticity - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping –Mapping by functions w= z+ c, az, 1/Z, Z^2 + - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION 9+3

Line integral - Cauchy's integral theorem – Cauchy's integral formula – Taylor's andLaurent's series – Singularities – Residues – Residue theorem – Application of residuetheorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

UNIT V LAPLACE TRANSFORMS 9+3

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems –Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem —– Transform of periodic functions – Application to solution of linear ordinary differential equations with constant coefficients.

TOTAL : 60 PERIODS

OUTCOMES:

The subject helps the students to develop the fundamentals and basic concepts in vector calculus, ODE, Laplace transform and complex functions. Students will be able to solve problems related to engineering applications by using these techniques.

TEXT BOOKS:

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 40th Edition, 2007.
2. Ramana, B.V. “Higher Engineering Mathematics”, Tata McGraw Hill, New Delhi, 2010.

REFERENCES:

1. Glyn James, “Advanced Modern Engineering Mathematics”, Pearson Education, New Delhi, 2007.
2. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, Delhi, 3rd Edition, 2007.
3. ali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”,
4. Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
5. Peter V.O’Neil, Advanced Engineering Mathematics, Cengage Learning India Pvt., Ltd, New Delhi, 2007.

PH8253 PHYSICS FOR INFORMATION SCIENCE (Common to Computer Science and Information Technology Branches) **L T P C 3 0 0 3**

OBJECTIVE:

To understand the essential principles of Physics of semiconductor device and Electron transport properties. Become proficient in magnetic and optical properties of materials and Nano electronic devices.

UNIT I ELECTRICAL PROPERTIES OF MATERIALS 9

Electrical conduction – Classification of conducting materials – Free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Wiedemann-Franz law – Ohm's law – Classical free electron theory (advantages and drawbacks) - Quantum free electron theory – Schrodinger wave equation – Applications of Schrodinger wave equation (Particle in infinite potential well, Particle in a box, Reflection and transmission of electron waves) – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids – Electron effective mass.

UNIT II SEMICONDUCTORS AND TRANSPORT PHYSICS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion – Hall effect and devices – Ohmic contacts – Schottky diode.

UNIT III MAGNETIC PROPERTIES OF MATERIALS 9

Classification of magnetic materials – Quantum numbers – Magnetic moment – Classical theory of diamagnetism (Langevin theory) – Theory of paramagnetism – Ferromagnetism (Weiss theory) – Anti ferromagnetic materials – Ferrites – Hard soft magnetic materials – Magnetic recording materials – Bubble memory – Magnetic principle in computer data storage – Magnetic tape – Floppy disc – Magnetic hard disc.

UNIT IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – Absorption in metals, insulators & Semiconductors - LED's – Organic LED's – Polymer light emitting materials – Plasma light emitting devices – LCD's – Laser diodes – Optical data storage techniques (including DVD, Blue -ray disc, Holographic data storage).

UNIT V NANO DEVICES 9

The density of state for solids – Electron density in a conductor – Significance between Fermi energy and Volume of the material – Quantum confinement – Quantum structures – Metal-to-insulator transition – Confining excitons – Band gap of nanomaterials –Tunneling – Resonant Tunneling Diodes (RTD's) – Single electron phenomena – Single electron Transistor – Quantum cellular automata (QCA) – Carbon nanotubes – Molecular electronic structures – Spintronics.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students will be able to

- Understand the electrical, magnetic and optical properties of semiconductor materials
- Understand the concepts and applications of semiconductor devices

TEXT BOOKS:

1. P.K. Palanisamy, “Materials Science”, Scitech, 2003.
2. S.O. Kasap, “Principles of Electronic Materials and Devices”, Tata McGraw-Hill, 2007.
3. R.F. Pierret, “Semiconductor Device Fundamentals”, Pearson, 1996.

REFERENCES:

1. N. Garcia and A. Damask, “Physics for Computer Science Students”, Springer-Verlag, 1991.
2. S. Datta, “Quantum Transport: Atom to Transistor”, Cambridge University Press, 2005.

CS8201 DIGITAL PRINCIPLES AND SYSTEM DESIGN L T P C

3 0 0 3

OBJECTIVES:

- To familiarize basic and advanced operations of boolean algebra
- To learn the designing of combinational and sequential circuits from Boolean functions
- To analyse the logic design using hardware description languages
- To know the application of logic design in advanced digital circuits like RAM and ROM

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods – Logic Gates – NAND and NOR Implementations.

UNIT II COMBINATIONAL LOGIC 9

Combinational Circuits – Analysis and Design Procedures – Circuits for Arithmetic Operations, Code Conversion – Decoders and Encoders – Multiplexers and Demultiplexers – Introduction to HDL – HDL Models of Combinational Circuits.

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 9

Sequential Circuits – Latches and Flip Flops – Analysis and Design Procedures – State Reduction and State Assignment – Shift Registers – Counters – HDL for Sequential Logic Circuits.

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 9

Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards.

UNIT V MEMORY AND PROGRAMMABLE LOGIC 9

RAM and ROM – Memory Decoding – Error Detection and Correction – Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices – Application Specific Integrated Circuits.

TOTAL: 45 PERIODS

OUTCOMES:

- To reduce simple Boolean functions using K-Maps
- To reduce complex Boolean functions using Tabulation method
- To transform logic circuits using universal logic gates
- To convert between digital codes using encoder/decoder
- To compile batch of digital operations using multiplexer/demultiplexer
- To design counting logic circuits using shift registers/digital counters
- To reduce state tables and state transition tables in asynchronous logic design
- To demonstrate error detection and error correction using digital circuits

TEXT BOOK:

1. M. Morris Mano and Michael D. Ciletti, “Digital Design”, IV Edition, Pearson Education, 2008.

REFERENCES:

1. John F. Wakerly, “Digital Design Principles and Practices”, Fourth Edition, Pearson Education, 2007.
2. Charles H. Roth Jr, “Fundamentals of Logic Design”, Fifth Edition – Jaico Publishing House, Mumbai, 2003.
3. Donald D. Givone, “Digital Principles and Design”, Tata MCGraw Hill, 2003.
4. G. K. Kharate, “Digital Electronics”, Oxford University Press, 2010.

CS8202 PRINCIPLES OF COMPUTER ENGINEERING L T P C

3 0 0 3

OBJECTIVE:

- To know the evolution of computers
- To understand the basics of computer operations
- To differentiate between various streams of programming
- To understand the functions of operating systems
- To learn the basics of database management systems
- To learn the basics of computer networks

UNIT I INTRODUCTION 9

Characteristics of computers – Evolution of Computers – Evaluation of computers – Computer generations – Units of Data storage – Coding data in storage – Program planning – Algorithms– Evaluation of Algorithms - Flow charts – Pseudocodes.

UNIT II SOFTWARE & HARDWARE 9

Basic computer operations – Classification of computers – Hardware components – Bus Architecture and instruction sets – Computer Ethics - Generation of Languages – Compiler& Interpreters – Virtual Machines – Procedural programming – Object oriented programming – Scripting languages – Functional languages – Language design – Language syntax and semantics.

UNIT III OPERATING SYSTEMS 9

Role of OS – Types of OS – Functions of OS – Process Management – Memory Management – File Management – Device Management – Security – MS-DOS – UNIX – Windows – Current trends of OS.

UNIT IV DATABASE MANAGEMENT 9

File based approach and Database approach – Evolutions of data models – Three level architecture for DBMS – Data independence – Data dictionary – Database administrator – Database languages.

UNIT V NETWORKS 9

Definition and purpose of computer Networks – Open systems interconnections – Types of networks – Topologies in Network Design – Switching Technologies – TCP/IP Network model – Networking Devices – Internet – www and network security.

TOTAL: 45 PERIODS

OUTCOMES:

- To exercise the algorithmic /pseudocode approach to program design
- To appreciate the use of compiler and interpreter
- To identify the difference between the operations of MS-DOS, WINDOWS and UNIX
- To be able to write queries in database languages
- To explain the network topology within department / institute laboratories

TEXT BOOKS:

1. Pradeep K. Sinha and Priti Sinha, Computer Fundamentals, Third Edition, BPB Publications, New Delhi, 2003.
2. Carl Reynolds and Paul Tymann, Principles of Computer Science, Schaum's Outline Series, McGraw Hill, New Delhi, 2008.
3. Sanjay Silakari and Rajesh K. Shukla, Basic Computer Engineering, Wiley- India, 2011.

REFERENCE:

1. Bhanu Pratap, Computer Fundamentals, Cyber Tech Publications, New Delhi, 2011.

CS8203 PROGRAMMING USING C++ L T P C

3 0 0 3

OBJECTIVES:

- To develop programming skills from OO perspective
- To get introduced to handling pointer operations in combination with Object-orientation
- To learn to handle exceptions in OO operations
- To learn advanced file handling and stream operations

UNIT I POINTERS AND FILE HANDLING IN C 9

Introduction to Pointers – Pointers and arrays – Pointers and structures –Pointers to functions – Applications of pointers – File Handling – Case study.

UNIT II INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING 9

Introduction – Procedure vs. object oriented programming – Data types – control structures – Arrays and Strings – User defined types – Functions and Pointers – Case study

UNIT III OBJECT ORIENTED PROGRAMMING CONCEPTS 9

Classes and Objects – Operator Overloading – Inheritance – Polymorphism and Virtual Functions – Case study

UNIT IV TEMPLATES AND EXCEPTION HANDLING 9

Function templates and class templates – Name spaces – Casting – Exception Handling – Case study.

UNIT V FILES AND ADVANCED FEATURES 9

C++ Stream classes – Formatted IO – File classes and File operations – Dynamic memory allocation – Standard Template Library – Case Study.

TOTAL: 45 PERIODS

OUTCOMES:

- To write programs using pointers in combination with arrays, structures and functions
- To be able to convert a procedure-oriented program into object-oriented program
- To write OO programs using overloading
- To write programs that handle exceptions
- To write programs using dynamic memory allocation

TEXT BOOKS:

1. Yashavant Kanetkar, “Understanding Pointers In C”, 4th Revised & Updated Edition, 2008, Bpb Publications.
2. HM Deitel and PJ Deitel “C++ How to Program”, Seventh Edition, 2010, Prentice Hall.

REFERENCES:

1. Brian W. Kernighan and Dennis M. Ritchie, “The C programming Language”, 2006, Prentice-Hall.
2. E Balagurusamy, “Object oriented Programming with C++”, Third edition, 2006, Tata McGraw Hill.
3. Bjarne Stroustrup, “The C++ Programming language”, Third edition, Pearson Education.
4. Horstmann “Computing Concepts with C++ Essentials”,Third Edition,2003, John Wiley.
5. Herbert Schildt, “The Complete Reference in C++”, Fourth Edition, 2003, Tata McGraw Hill.
6. Robert Lafore, “Object Oriented Programming in C++”, 2002, Pearson education.

CS8211 **DIGITAL LABORATORY** **L T P C**
0 0 3 2

OBJECTIVES:

The student should be made to:

- Understand the various logic gates.
- Be familiar with various combinational circuits.
- Understand the various components used in the design of digital computers.
- Be exposed to sequential circuits
- Learn to use HDL

LIST OF EXPERIMENTS:

1. Verification of Boolean Theorems using basic gates.
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters.
3. Design and implementation of combinational circuits using MSI devices:
   - 4 – bit binary adder / subtractor
   - Parity generator / checker
   - Magnitude Comparator
   - Application using multiplexers
4. Design and implementation of sequential circuits:
   - Shift –registers
   - Synchronous and asynchronous counters
5. Coding combinational / sequential circuits using HDL.
6. Design and implementation of a simple digital system (Mini Project).

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS HARDWARE

1. Digital trainer kits 30
2. Digital ICs required for the experiments in sufficient numbers

SOFTWARE

1. HDL simulator.

OUTCOMES:

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

- Use boolean simplification techniques to design a combinational hardware circuit.
- Design and Implement combinational and sequential circuits.
- Analyze a given digital circuit – combinational and sequential.
- Design the different functional units in a digital computer system.
- Design and Implement a simple digital system

CS8212 PROGRAMMING LABORATORY L T P C
0 0 3 2

OBJECTIVES:

The student should be made to:

- Understand the use of Functions, Pointers and Files in C.
- Understand the Object Oriented Programming concepts of C++
- Analyze the use of advanced Object Oriented features in an application.

LIST OF EXPERIMENTS:

1. Programs using Functions and Pointers in C
2. Programs using Files in C
3. Programs using Classes and Objects
4. Programs us.ing Operator Overloading
5. Programs using Inheritance, Polymorphism and its types
6. Programs using Arrays and Pointers
7. Programs using Dynamic memory allocation
8. Programs using Templates and Exceptions
9. Programs using Sequential and Random access files

ABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

- 30 Terminals with C and C++ Compiler

TOTAL: 45 PERIODS

OUTCOMES:

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

- Write programs using Functions and Pointers in C.
- Design applications using Object Oriented Concepts
- Design Programs that use advanced concepts of C++
- Write Programs using Templates and Files using C++
- Critically analyze the use of C and C++ programming languages for different types of applications

MA8351 ALGEBRA AND NUMBER THEORY L T P C
(BRANCH SPECIFIC COURSE) 3 1 0 4

OBJECTIVES :

- To introduce the basic notions of groups, rings, fields which will then be used to solve related problems.
- To examine the key questions in the Theory of Numbers.
- To give an integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

UNIT I FIELDS 9+3

Group Theory - Rings and Polynomials – Fields.

UNIT II FINITE FIELDS AND POLYNOMIALS 9+3

Finite Fields – Irreducible Polynomials over Finite fields – Factorization of Polynomials over Finite Fields.

UNIT III DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS 9+3

Division algorithm- Base-b representations – number patterns – Prime and composite numbers –Fibonacci and Lucas numbers – Fermat numbers – GCD – Euclidean Algorithm – Fundamental theorem of Arithmetic – LCM.

UNIT IV DIOPHANTINE EQUATIONS AND CONGRUENCES 7+3

Linear Diophantine equations – Congruence's – Linear Congruence's - Applications: Divisibility tests – Modular Designs – Chinese remainder theorem – 2x2 linear systems.

UNIT V CLASSICAL THEOREMS AND MULTIPLICATIVE FUNCTIONS 10+4

Wilson's theorem – Fermat's Little theorem – Euler's theorem – Euler's Phi functions – Tau and Sigma functions – Perfect numbers – Mersenne Primes – Mobius Function.

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course the student is able to:

- Solve problems related to finite fields and Polynomials
- Understand the applications of division and Euclidean Algorithm
- Understand the classical theorems and multiplicative functions

TEXT BOOKS:

1. Lidl.R., and Pilz. G., "Applied Abstract Algebra", Springer-Verlag, New Delhi, 2nd Edition, 2006.
2. Thomas Koshy, "Elementary Number Theory with Applications", Elsevier Publications, New Delhi, 2002.

REFERENCES:

1. San Ling and Chaoping Xing, "Coding Theory – A first Course", Cambridge Publications, Cambridge, 2004.
2. Niven.I, Zuckerman.H.S., and Montgomery, H.L., "An Introduction to Theory of Numbers" , John Wiley and Sons, Singapore, 2004.

GE8351 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C

3 0 0 3

OBJECTIVES:

To the study of nature and the facts about environment.

- To find and implement scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14

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 – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – 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 of biodiversity.

Field study of common plants, insects, birds

Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c)Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards– soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.
Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over- utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – 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 IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act– Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT-V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

OUTCOMES:

Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.

- Public awareness of environment at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions.
- Development and improvement in standard of living has lead to serious environmental disasters.

TEXT BOOKS:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, (2006).

REFERENCE BOOKS:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia',Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD,New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press 2005.

CS8301 COMPUTER ARCHITECTURE L T P C

3 1 0 4

OBJECTIVES:

- To learn the fundamentals of computer architecture
- To know the concepts behind parallelism and pipelining
- To learn advanced concepts in Instruction level parallelism
- To get introduced to binary arithmetic
- To learn about virtual memory, associative memory and memory management

UNIT I FUNDAMENTALS OF A COMPUTER SYSTEM 9+3

Functional Units of a Digital Computer – Hardware – Software Interface –Translation from a High Level Language to the Hardware Language – Instruction Set Architecture – Styles and features – RISC and CISC Architectures – Performance Metrics – Amdahl's Law – Case Studies of ISA.

UNIT II BASIC PROCESSING UNIT 9+3

Components of the Processor – Datapath and Control – Execution of a Complete Instruction – Hardwired and Micro programmed Control – Instruction Level Parallelism – Basic Concepts of Pipelining – Pipelined Implementation of Datapath and Control – Hazards – Structural, Data and Control Hazards –Exception handling.

UNIT III ADVANCED CONCEPTS IN ILP AND CURRENT TRENDS 9+3

Exploitation of more ILP – Hardware and Software Approaches – Dynamic Scheduling – Speculation – Compiler Approaches – Multiple Issue Processors. – ILP and Thread Level Parallelism – Current Trends – Multicore Processors – Graphics and Computing GPUs.

UNIT IV ARITHMETIC FOR COMPUTERS 9+3

Addition and Subtraction – Fast Adders – Binary Multiplication – Binary Division – Floating Point Numbers – Representation, Arithmetic Operations.

UNIT V MEMORY AND I/O 9+3

Need for a hierarchical memory system – Types and characteristics of memories – Cache memories – Improving cache performance – Virtual memory – Memory management techniques – Associative memories.

Accessing I/O devices – Programmed Input/Output – Interrupts – Direct Memory Access – Interface circuits – Need for Standard I/O Interfaces like PCI, SCSI, USB.

TOTAL: 45 +15:60 PERIODS

OUTCOMES:

- To identify the functional units in a digital computer system
- To distinguish between the various ISA styles
- To trace the execution sequence of an instruction through the processor
- To compare different approaches used for implementing a functional unit
- To write programs involving interrupt handling

TEXT BOOK:

1. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software Interface”, Fourth Edition, Morgan Kaufmann / Elsevier, 2009.

REFERENCES:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, "ComputerOrganization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2012.
2. William Stallings, "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.
3. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.
4. John L. Hennessey and David A. Patterson, "Computer Architecture – A Quantitative Approach", Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.
5. V.P. Heuring, H.F. Jordan, "Computer Systems Design and Architecture", Second Edition, Pearson Education, 2004.
6. Behrooz Parhami, "Computer Architecture", Oxford University Press, 2007.

CS8302 DATA STRUCTURES L T P C

3 0 0 3

OBJECTIVES:

- To learn program independent view of data structures
- To know the data structure representation and various operations performed on them
- To learn algorithms for sorting, searching and indexing

UNIT I LINEAR DATA STRUCTURES 11

Abstract Data Types - Asymptotic Notations: Big-Oh, Omega and Theta – Best, Worst and Average case Analysis: Definition and an example – Arrays and its representations – Stacks and Queues – Linked lists – Linked list based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.

UNIT II NON-LINEAR DATA STRUCTURES 9

Trees – Binary Trees – Binary tree representation and traversals – Threaded binary trees – Binary tree representation of trees – Application of trees: Set representation and Union-Find operations – Graph and its representations – Graph Traversals – Connected components.

UNIT III SEARCH STRUCTURES AND PRIORITY QUEUES 9

AVL Trees – Red-Black Trees – Splay Trees – Binary Heap – Leftist Heap

UNIT IV SORTING 8

Insertion sort – Merge sort – Quick sort – Heap sort – Sorting with disks – k-way merging – Sorting with tapes – Polyphase merge.

UNIT V SEARCHING AND INDEXING 8

Linear Search – Binary Search - Hash tables – Overflow handling – Cylinder Surface Indexing – Hash Index – B-Tree Indexing.

TOTAL : 45 PERIODS

OUTCOMES:

- To analyse the programs and express their time complexity
- To write programs using linear and non-linear data structures
- To write programs for sorting, searching and indexing

TEXT BOOKS:

1. Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures, Galgotia Book Sorce, Gurgaon, 1976.
2. Gregory L. Heilman, Data Structures, Algorithms and Object Oriented Programming, Tata Mcgraw-Hill, New Delhi, 2002.

REFERENCES:

1. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, Second Edition, Tata McGraw-Hill, New Delhi, 1991.
2. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, Data Structures and Algorithms, Pearson Education, New Delhi, 2006.

CS8303 DATABASE MANAGEMENT SYSTEMS L T P C

3 0 0 3

OBJECTIVES:

- To learn the fundamentals and issues in database systems
- To appreciate the design of databases using relational models
- To learn data definition and query languages
- To understand the importance of transaction management in databases
- To emphasize the need for sorting and indexing in databases
- To learn advanced representations of databases suited for real-time applications

UNIT I INTRODUCTION TO DATABASE SYSTEMS 9

Data - Database Applications - Evolution of DB & DBMS - Need for data management – Data models & Database Architecture - Professions in DBMS - Key issues and challenges in Database Systems

UNIT II ER AND RELATIONAL MODELS 9

ER Diagrams - Relational Model - ER to Relational Mapping - Constraints - Keys - Dependencies - Relational Algebra - Normalisation - First, Second, Third & Fourth Normal Forms - BCNF – Join Dependencies

UNIT III DATA DEFINITION AND QUERYING 8

Basic DDL - Introduction to SQL - Data Constraints - Triggers - Database Security – Advanced SQL - Embedded & Dynamic SQL - Views

UNIT IV TRANSACTIONS AND CONCURRENCY 10

Introduction to Transactions - Transaction Systems - ACID Properties - System & Media Recovery - Two Phase Commit Protocol - Recovery with SQL - Need for Concurrency - Locking Protocols - Deadlocks & Managing Deadlocks - SQL Support for Concurrency

UNIT V ADVANCED TOPICS IN DATABASES 9

Indexing & Hashing Techniques - Query Processing & Optimization - Sorting & Joins – Database tuning - Introduction to Special Topics - Spatial & Temporal Databases - Data Mining & Warehousing - Data Visualisation - Mobile Databases - OODB & XML Databases - Multimedia & Web Databases.

TOTAL : 45 PERIODS

OUTCOMES:

- To classify modern and futuristic database applications based on size and complexity
- To design a database from understanding an Universe of Discourse, using ER diagrams
- To be able to map ER model with Relational model
- To write queries using normalization criteria
- To create a physical database from a design using DDL
- To compare and contrast various indexing strategies in different database systems
- To critique how advanced databases differ from traditional databases.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata McGraw Hill, 2010.
2. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems” , Sixth Edition, Pearson / Addison - Wesley, 2010
3. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2002.

EC8303 ELECTRONIC DEVICES AND CIRCUITS FOR COMPUTER ENGINEERS L T P C 3 0 0 3

OBJECTIVE:

To know theorems and techniques to analyze electric circuits, electronic devices and their characteristics, important power supply designs, and design of amplifiers, oscillators and opamp circuits.

UNIT I VOLTAGE AND CURRENT LAWS 9

Nodes, Paths, Loops, and Branches; Kirchoff's Current Law, Kirchoff's Voltage Law, Single Loop Circuit, Single Node-Pair Circuit, Series and Parellel Connected Independent Sources, Resistors in Series and Parellel, Voltage and Current Division

UNIT II CIRCUIT ANALYSIS TECHNIQUES 9

Linearity and Superposition, Sources Transformation, Thevinin and Norton Equivalent Circuits, Maximum Power Transfer, Delta-Wye Conversion, Single Phase and 3 Phase Circuits-Power Factor-Power-Concept of Phasor Diagrams.

UNIT III SEMICONDUCTOR DEVICES 9

PN-Junction Diode- Drift and Diffusion Current-Zener Diode-Zener Regulator-BJT- VI Charecteristics-CE Configuration-Current Equation h-Parameter Model.JFET- V-I Charesteristics- Current Equation- Transconductance MOSFET-Types DMOS, EMOS – V-I Charesteristics-Moll Current Equation.

UNIT IV RECTIFIERS, AMPLIFIERS AND OSCILLATORS 9

FWR-Filter-Capacitance Input Filter-Choke Input Filter – CE Amplification with and without feedback – Analysis and Frequency Response – CS MOSFET Amplifier – Analysis

UNIT V OPERATION AMPLIFIER 9

Introduction of an Inverting Amplifier, Non Inverting Amplifier, Basic Application of Operation Amplifier: Subractor, Summing Amplifier, Analog to Digital Converter, Digital to Analog Convertor, Low Pass Filter, First Order Low Pass Filter, First Order High Pass Filter, Integrator, Differentiator.

TOTAL: 45 PERIODS

OUTCOMES:

- The students are familiarized in electric circuits, machines, transformers; know basic of mathematical models of electrical systems.
- The students can analyze transfer function and state variables and also perform sophisticated analysis on real time physical systems.

TEXT BOOKS:

1. David A.Bell 'Electronic Devices and Circuit/ -Oxford press-2008.
2. Robert T.Paynter Introductory Electronic Devices and Circuits – Pearson

REFERENCES:

1. Denal A.Neamar, Electronic Circuit Analysis and Design – Second Edition – Tata MC Graw Hill, 2002.
2. Adel S.Sedia Keanath Cswith Micro Electronic Circuit-Fourth Edition- Oxford University Press-1998.

CS8311 DATA STRUCTURES LABORATORY L T P C

0 0 3 2

OBJECTIVES:

The student should be made to:

- Understand array based and link list based implementations of stack and queue
- Learn the use of list, stacks and queues for different types of applications
- Understand different operations of trees and graphs
- Be exposed to searching and sorting algorithms

1. Array based implementation of stack and queue.
2. Linked list implementations and problems related to linked list such as inverting list, concatenation, etc.
3. Linked list based implementation of stack and queue
4. Evaluation of expressions
5. Binary tree traversals
6. Graph traversals
7. Merge sort
8. Quick sort
9. Binary search
10. Binary Heap
11. AVL tree implementation
12. Hash Tables

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

30 Systems with C++ Compiler.

OUTCOMES:

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

- Compare and contrast Array based and Link based applications of typical data structures such as Stacks and Queues
- Design applications and justify use of specific linear data structures for these applications
- Implement binary tree and graph operations
- Compare and contrast different search algorithms

CS8312 DATABASE MANAGEMENT SYSTEMS LABORATORY L T P C

0 0 3 2

OBJECTIVES:

The student should be made to:

- Understand data definitions and data manipulation commands
- Learn about the use of nested and joint queries
- Understand functions, procedures and procedural extensions of data bases
- Be familiar with the use of a front end tool
- Understand design and implementation of typical data base applications

LIST OF EXPERIMENTS:

1. Data Definition Commands.
2. Data Manipulation Commands.
3. DML Command to perform Nested and Join Queries.
4. Views – Creation and Manipulation.
5. Cursors and Triggers.
6. Procedural Extension Language.
7. Functions and Procedures.
8. Forms and Menu design using a Front End Tool.
9. Simple application development.
10. Report Generation.
11. Data base connectivity techniques.
12. Design and implementation of a Database Application.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Use typical data definitions and manipulation commands.
- Design applications to test Nested and Joint Queries
- Implement simple applications that uses Views
- Implement applications that require a Front End Tool and Report Generations
- Critically analyze the use of Tables, Views, functions and Procedures for a realistic database application.

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS:

Softwares:

Oracle

Server

Visual Basic

MA8354 PROBABILITY AND QUEUEING THEORY L T P C
(Branch specific course) 3 1 0 4

OBJECTIVES:

- To provide the required fundamental concepts in probability and queueing models and apply these techniques in networks, image processing etc.
- Acquire skills in analyzing queueing models.

UNIT I RANDOM VARIABLES 9+3

Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 9+3

Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III RANDOM PROCESSES 9+3

Classification – Stationary process – Markov process - Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations – Limiting distributions.

UNIT IV QUEUEING THEORY 9+3

Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little's formula - Queues with finite waiting rooms – Finite source models.

UNIT V NON-MARKOVIAN QUEUES AND QUEUEING NETWORKS 9+3

M/G/1 queue – Pollaczek Khinchin formula - M/D/1 and $M/E_k/1$ as special cases – Series queues – Open and closed Jackson networks.

TOTAL: 60 PERIODS

OUTCOMES:

- The students will have a fundamental knowledge of the probability concepts.
- Acquire skills in analyzing queueing models.
- It also helps to understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.

TEXT BOOKS:

1. Ibe, O.C. "Fundamentals of Applied Probability and Random Processes", Elsevier, U.P.,1st Indian Reprint, 2007.
2. Gross, D. and Harris, C.M., "Fundamentals of Queueing Theory", Wiley Student, 3rd Edition, New Jersy, 2004.

REFERENCES:

1. Allen, A.O., "Probability, Statistics and Queueing Theory with Computer Applications", Elsevier, California, 2nd Edition, 2005.
2. Taha, H.A., "Operations Research", Pearson Education, Asia, 8th Edition, 2007.
3. Trivedi, K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", PHI, New Delhi, 2nd Edition, 2009.
4. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill, New Delhi, 9th Reprint, 2010.

CS8401 DESIGN AND ANALYSIS OF ALGORITHMS L T P C

3 0 2 4

OBJECTIVES:

- To understand various algorithm design techniques, and to know how to apply those techniques to real-time problems
- To learn to design parallel algorithms
- To learn concepts of dynamic programming
- To get introduced to NP-class of problems and their approximate solutions.

UNIT I ANALYSIS & DIVIDE-AND-CONQUER 9

Introduction to Algorithms – Growth of functions – Solving recurrence equations: Substitution method, Iteration method and Master method – Finding Maximum and Minimum – Selection– Strassen's Matrix Multiplication – Convex Hull.

Lab Component: 6

Implementing some recursive algorithms and study its theoretical time vs empirical time – Implement and analyze selection problem.

UNIT II GREEDY & DYNAMIC PROGRAMMING 9

Greedy Approach: General Method – Knapsack problem – Minimum cost spanning trees – Single source shortest path problem. Dynamic Programming: Principle of optimality – All pairs shortest path problem – Longest common subsequence – Traveling salesperson problem.

Lab Component: 6

Implement and analyze: Minimum spanning tree problem and Traveling salesperson problem.

UNIT III BACKTRACKING & BRANCH-AND-BOUND 9

Backtracking: General method – 8 Queens Problem – Graph coloring – Sum of subset problem – Hamiltonian cycle. Branch and Bound – Knapsack problem – Traveling salesman problem.

Lab Component: **6**

Implement and analyze: Sum of subsets – Implement Branch and Bound based traveling salesperson problem and compare with dynamic programming.

UNIT IV STRING MATCHING & PARALLEL ALGORITHMS **9**

Simple string matching – KMP String matching algorithm – Boyer Moore String matching algorithm. Parallel algorithms: PRAM models – Prefix computation – List ranking – Finding the maximum – Odd-Even merge sort – Sorting on a mesh – Bitonic sort.

Lab Component: **6**

Implement and compare simple string matching and KMP algorithms. Implement prefix computation algorithm by using multiple threads or processes.

UNIT V NP PROBLEMS & APPROXIMATION ALGORITHMS **9**

NP-completeness – Polynomial time verification – Theory of reducibility – Circuit satisfiability - NP-completeness proofs – NP-complete problems: Vertex cover, Hamiltonian cycle and Traveling Salesman problems – Approximation Algorithms – Approximation algorithms to vertex-cover and traveling salesman problems.

Lab Component: **6**

Implement vertex cover and traveling salesman problems using approximation algorithm.

TOTAL: 45 + 30 : 75 PERIODS

OUTCOMES:

- To implement recursive algorithms and study the time complexity
- To implement and analyse: Minimum spanning tree problem and Traveling salesperson problem.
- To implement programs using Branch and Bound technique
- To implement and compare simple string matching and KMP algorithms.
- To write programs for prefix computation using multiple threads or processes.
- To implement vertex cover and traveling salesman problems using approximation algorithm

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Second Edition, Universities Press, Hyderabad, 2008.
2. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Introduction to Algorithms, Second Edition, Prentice Hall of India, New Delhi, 2007

REFERENCES:

1. Kenneth A. Berman and Jerome L. Paul, Algorithms, Cengage learning India Edition, New Delhi, 2002.
2. Sara Baase and Allen Van Gelder, Computer Algorithms – Introduction to Design & Analysis, Third Edition, Pearson Education, New Delhi, 2000.

CS8402 JAVA AND INTERNET PROGRAMMING L T P C

4 0 0 4

OBJECTIVES:

- To comprehend the concepts of core java and working principles of Internet
- To learn client-server programming and web development
- To learn concepts related to web application development

UNIT I JAVA FUNDAMENTALS 12

Overview of Java, Fundamental Programming Structures, Strings – Objects Classes and Methods - Inheritance - Packages and Interfaces - Exception handling, Collections - Multithreading – Java I/O Streams, File Handling.

UNIT II INTERNET BASICS AND JAVA NETWORK PROGRAMMING 12

Internet Addressing, Browsers, Servers, Protocols – Web Application Architectures, Development – Scripting Languages – Databases – Search Engines – Web Services – Collective Intelligence – Mobile Web – Features of Web 3.0

Overview of Java Networking - TCP - UDP - InetAddress and Ports - Socket Programming- Working with URLs - Internet Protocols simulation - HTTP - SMTP - POP - FTP - Remote Method Invocation.

UNIT III CLIENT-SIDE PROGRAMMING 12

Scripting for content structuring, form design, client side validation, dynamic page generation, adding interactivity, styles, using HTML, DHTML, XHTML, CSS, Java Script – XML - Document Type Definition - XML Schema - Document Object Model - Presenting XML - Using XML Parsers: DOM and SAX - Evolution of AJAX JQuery - Web applications with AJAX - AJAX JQuery Framework - AJAX with PHP - AJAX with Databases – Java Applets – JQuery - Swing

UNIT IV SERVER-SIDE PROGRAMMING 12

Types of servers - Configuring and Using Web servers, Setting up Databases, Java Database Connectivity -Handling form data, validation, querying databases, information retrieval, response generation, Session management - using PHP, Servlets, JSP.

UNIT V WEB APPLICATION DEVELOPMENT 12

Creating Interactive Websites - Search engines – cookies - Blogs - Social web applications - developing WIKI pages – Programming for the Mobile web.

TOTAL: 60 PERIODS

OUTCOMES:

- To write java programs using inheritance and exception handling
- To write programs using socket programming
- To write programs for client-side and server-side programming
- To create interactive web-sites and social web applications

TEXT BOOKS:

1. Herbert Schildt, "Java The Complete Reference", 8th Edition, McGraw-Hill Osborne Media, 2011.
2. Paul Deitel, "Internet & World Wide Web: How to Program", Prentice Hall, 4th Edition, 2007.

REFERENCES:

1. Cay S. Horstmann and Gary Cornell, "Core Java™, Volume I – Fundamentals" 8th Edition, Prentice Hall, 2007.
2. Cay S. Horstmann and Gary Cornell, "Core Java, Vol. 2: Advanced Features", 8th Edition, Prentice Hall, 2008.
3. Robert W. Sebesta, "Programming the World Wide Web", Addison-Wesley,Sixth Edition, 2010.
4. Elliotte Rusty Harold, "Java Network Programming", Third Edition, O'Reilly,2004.
5. Uttam K.Roy, "Web Technologies", Oxford University Press, 1st Edition, 2010. Leon Shklar and Rich Rosen, "Web Application Architecture: Principles,
6. Protocols and Practices", Wiley, 2nd Edition, 2009. http://www.w3schools.com/

CS8451 OPERATING SYSTEMS L T P C
3 0 0 3

OBJECTIVES:

- To learn the components and operations of operating systems
- To get an idea about process synchronization
- To learn concepts behind inter-process communication
- To learn disk scheduling and process scheduling
- To understand deadlock handling and memory management

UNIT I OPERATING SYSTEMS OVERVIEW 9

Introduction to operating systems – Computer system organization, architecture – Operating system structure, operations – Process, memory, storage management – Protection and security – Distributed systems – Computing Environments – Open-source operating systems – OS services – User operating-system interface – System calls – Types – System programs – OS structure – OS generation – System Boot – Process concept, scheduling – Operations on processes – Cooperating processes – Inter-process communication – Examples – Multithreading models – Thread Libraries – Threading issues – OS examples

UNIT II PROCESS MANAGEMENT 9

Basic concepts – Scheduling criteria – Scheduling algorithms – Thread scheduling – Multiple- processor scheduling – Operating system examples – Algorithm Evaluation – The critical- section problem – Peterson's solution – Synchronization hardware – Semaphores – Classic problems of synchronization – Critical regions – Monitors – Synchronization examples – Deadlocks – System model – Deadlock characterization – Methods for handling deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock detection – Recovery from deadlock

UNIT III STORAGE MANAGEMENT 9

Memory Management – Swapping – Contiguous memory allocation – Paging – Segmentation – Example: The Intel Pentium - Virtual Memory: Background – Demand paging – Copy on write – Page replacement – Allocation of frames – Thrashing**.**

UNIT IV I/O SYSTEMS 9

File concept – Access methods – Directory structure – File-system mounting – Protection – Directory implementation – Allocation methods – Free-space management – Disk scheduling– Disk management – Swap-space management – Protection

UNIT V CASE STUDY 9

The Linux System – History – Design Principles – Kernel Modules – Process Management – Scheduling – Memory management – File systems – Input and Output – Inter-process Communication – Network Structure – Security – Windows 7 – History – Design Principles – System Components – Terminal Services and Fast User – File system – Networking.

TOTAL: 45 PERIODS

OUTCOMES:

- To write programs using multi-threading
- To solve problems related to process scheduling and disk scheduling
- To use synchronization concepts in real-time programs
- To apply banker's algorithm for solving problems in deadlocks
- To solve problems related to paging and segmentation
- To implement OS concepts in Linux

TEXT BOOK:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts Essentials", John Wiley & Sons Inc., 2010.

REFERENCES:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.
2. Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Education", 1996.
3. D M Dhamdhere, "Operating Systems: A Concept-based Approach", Second Edition, Tata McGraw-Hill Education, 2007.
4. William Stallings, "Operating Systems: Internals and Design Principles", Seventh Edition, Prentice Hall, 2011.

CS8452 SOFTWARE ENGINEERING L T P C

3 0 0 3

OBJECTIVES:

- To provide an overview of software engineering
- To emphasize on following CMM
- To learn detailed concepts related to software engineering life cycle
- To understand the concepts of verification and validation
- To appreciate the necessity of assessing software quality and measurements

UNIT I SOFTWARE PROCESS MODELS 9

The Evolving role of Software – Software – The changing Nature of Software – Legacy software —– A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment – Personal and Team Process Models – Product and Process – Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – the Unified Process.

UNIT II REQUIREMENT ENGINEERING 9

Software Engineering Practice – communication Practice – Planning practice Modeling practice– Construction Practice –Deployment. Requirements Engineering - Requirements Engineering tasks – Initiating the requirements Engineering Process- Eliciting Requirements– Developing Use cases – Building the Analysis Models – Elements of the Analysis Model – Analysis pattern – Negotiating Requirements – Validating Requirements.

UNIT III ANALYSIS MODELLING 9

Requirements Analysis – Analysis Modeling approaches – data modeling concepts – Object oriented Analysis – Scenario based modeling – Flow oriented Modeling – Class based modeling – creating a behaviour model.

UNIT IV DESIGN & TESTING 9

Design Engineering – Design process -Design Quality-Design model-User interface Design – Testing strategies- Testing Tactics - strategies Issues for conventional and object oriented software-validation testing –system testing –Art of debugging – Project management

UNIT V QUALITY & MAINTENANCE 9

Software evolution - Verification and Validation -Critical Systems Validation – Metrics for Process, Project and Product-Quality Management -Process Improvement –Risk Management- Configuration Management – Software Cost Estimation

TOTAL: 45 PERIODS

OUTCOMES:

- To differentiate the perspective of various software process models
- To elicit the requirements for real-time problems
- To compile a SRS pertaining to industry standards
- To create a behavioral model from the set of requirements
- To develop a user-interface design for the given system
- To outline various software metrics and their context in measuring software programs
- To estimate the software cost

TEXT BOOKS:

1. Roger S.Pressman, Software Engineering: A Practitioner's Approach, McGraw Hill International edition, Seventh edition, 2009.
2. Ian Sommerville, Software Engineering, 8th Edition, Pearson Education, 2008.

REFERENCES:

1. Stephan Schach, Software Engineering, Tata McGraw Hill, 2007
2. Pfleeger and Lawrence Software Engineering: Theory and Practice, Pearson Education, second edition, 2001

EE8407 ELECTRICAL ENGINEERING AND CONTROL SYSTEMS L T P C

3 0 0 3

OBJECTIVE

To impart knowledge on Network analysis, principle of electrical machines, different system representation, block diagram reduction and Mason's rule, time response and frequency response analysis of LTI systems, and State variable analysis.

UNIT I ELECTRIC CIRCUITS 9

Dependent and independent sources - Kirchhoff's laws - mesh current and node voltage methods - theorems - Thevenin's - Norton's - superposition - maximum power transfer- (DC Analysis only) Phasors - sinusoidal steady state response of simple RLC circuits.

UNIT II DC MACHINES 9

Construction of DC machines - Theory of operation of DC generators – Characteristics of DC generators- Operating principle of DC motors - Types of DC motors and their characteristics - Speed control of DC motors- Applications.

UNIT III AC MACHINES 9

Principles of single phase transformers; EMF equation-Operation of three-phase induction motors-single-phase induction motor - double field revolving theory –starting methods. Principles of synchronous machines -Equation of induced EMF.

UNIT IV MATHEMATICAL MODELS OF PHYSICAL SYSTEMS 9

Definition & classification of system - terminology & structure of feedback control theory - Differential equation of physical systems - Block diagram algebra - Signal flow graphs.

UNIT V TRANSFER FUNCTION and STATE VARIABLE ANALYSIS 9

Time Response analysis of II order system -Frequency response - Bode plots – Concept of state variable - State models for linear & continuous time systems.

TOTAL: 45 PERIODS

OUTCOME:

- The students are familiarized in electric circuits, machines, transformers;
- know basic of mathematical models of electrical systems.
- The students can analyze transfer function and state variables and also
- perform sophisticated analysis on real time physical systems.

TEXT BOOKS:

1. Smarajit Ghosh, 'Fundamentals of Electrical and Electronics Engineering', 2nd Edition, Prentice-Hall, New Delhi, 2007.
2. Richard C Dorf and Robert H.Bishop, " Modern Control Systems", 8th Edition, Prentice- Hall, (pearson Education, Inc.), New Delhi, 2005.
3. V.K.Mehta, Rohit Mehta, 'Principles of Electrical Engineering' S.Chand.

REFERENCES:

1. Vincent Del Toro, 'Electrical Engineering Fundamentals', 2nd Edition, Prentice-Hall, (Pearson Education Inc.), 2007.
2. John Bird, 'Electrical and Electronics Principles and Technology', 3rd Edition, Elsevier, New Delhi.
3. B. S. Manke, 'Linear Control Systems', Khanna Publishers.

CS8411 JAVA AND INTERNET PROGRAMMING LABORATORY L T P C
0 0 3 2

OBJECTIVES:

The student should be made to:

- Understand Object Oriented features of Java.
- Learn about Socket programming and RMI in Java
- Understand Client side scripting and Server side programming
- Learn about Web application development in Java

LIST OF EXPERIMENTS:

1. Java classes and objects
2. Inheritance, Polymorphism
3. Interfaces and Exception Handling, Packages
4. Using InetAddress class
5. Socket Programming in Java
6. RMI
7. Client side scripting using
   - XHTML,
   - Javascript/DOM
   - CSS
8. XML DTD, Parsers, XSLT
9. Programming with AJAX, JQuery
10. Java Applets, AWT, Swings
11. Server Side programming (implement these modules using any of the server side scripting languages like PHP, Servlets, JSP etc.,
    - Gathering form data
    - Querying the database
    - Response generation
    - Session management
12. MySQL/JDBC/Oracle
13. Application development
14. Develop applications using Dreamweaver/Flex/Silver Light etc.,

TOTAL: 45 PERIODS

OUTCOMES:

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

- Implement programs using the Object Oriented features of Java
- Implement socket programming and Client side scripting in Java
- Design a Web application using Java Applets, AWT and Swings
- Develop application using Dreamweaver/Flex/Silver Light etc. including use of database connectivity

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS:

Software:

1. Browser
2. JDK version 6 update 27
3. TOMCAT 7.0
4. MySQL 5.5,
5. Oracle 11i
6. Dreamweaver CS5.5
7. NetBeans IDE 7
8. XAMPP / WAMP

CS8461	OPERATING SYSTEMS LABORATORY	L T P C
		0 0 3 2

OBJECTIVES:

The student should be made to:

- Learn shell programming and the use of filters in the UNIX environment.
- Be exposed to programming in C using system calls.
- Learn to use the file system related system calls.
- Be exposed to process creation and inter process communication.
- Be familiar with implementation of CPU Scheduling Algorithms, page replacement algorithms and Deadlock avoidance

LIST OF EXPERIMENTS:

1. Learn the use of basic UNIX commands.
2. Shell Programming.
3. Grep, sed, awk.
4. File system related system calls. (Learn to create, open, read, write, seek into, close files; open, read, write, search, close directories)
5. Process management – Fork, Exec (Learn to create a new process and to overlay an executable binary image on an existing process)
6. Inter-process communication between related processes using pipes.
7. Process synchronization using semaphores (Solutions to synchronization problems like producer consumer problem, dining philosophers' problem etc...)
8. Inter-process communication between unrelated processes using Shared memory
9. Inter-process communication between unrelated processes using Message Queues

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to

- Implement deadlock avoidance, and Detection Algorithms
- Compare the performance of various CPU Scheduling Algorithm
- Critically analyze the performance of the various page replacement algorithms
- Create processes and implement IPC

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

1. Linux server
2. Terminals for 30 students

Outcomes:

The students will be able to

- Write Shell programming in the UNIX environment.
- Create programs using System calls in C.
- Use the file system related system calls.
- Create process and their communication.
- Develop process synchronization using semaphores.

CS8501 DATA COMMUNICATION AND COMPUTER NETWORKS L T P C

3 1 0 4

OBJECTIVES:

- To appreciate the top-down and bottom-up view of computer network architecture
- To know the functionality of each layer in computer networks
- To get introduced to various protocols at every layer
- To learn concepts related to network addressing
- To learn the use of hardware in data communication

UNIT I APPLICATION LAYER 9+3

Network Architecture – Layers - HTTP – DNS – E-Mail (SMTP, MIME, POP3, IMAP, Web Mail), FTP, Telnet - SNMP.

UNIT II TRANSPORT LAYER 11+3

User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Flow Control – Congestion Control – Queuing - Discipline Introduction to Quality of services (QOS).

UNIT III NETWORK LAYER 11+3

Circuit Switching - Packet Switching Virtual Circuit Switching – IP – ARP – DHCP – ICMP– Routing – RIP – OSPF – Subnetting – CIDR – Interdomain Routing – BGP – IPV6 BasicFeatures – Inter Domain Multicast – Congestion Avoidance in Network Layer.

UNIT IV DATA LINK LAYER 7+3

Channel access on links – SDMA – TDMA – FDMA – CDMA – Hybrid Multiple Access Techniques – Issues in the Data Link Layer – Framing - Error correction and detection – Link Level Flow Control – Medium Access – Ethernet – Token Ring – FDDI – Wireless LAN – Bridges and Switches.

UNIT V DATA COMMUNICATIONS 7+3

Data Transmission – Transmission Media – Signal Encoding Techniques – Multiplexing – Spread Spectrum.

TOTAL: 45+15 PERIODS

OUTCOMES:

- To write programs for data communication in application layer
- To differentiate between the functional view of TCP and UDP
- To evaluate the protocols in network layer from QoS perspective
- To outline the protocols and topologies in data link layer
- To identify the use of various transmission media

TEXT BOOKS:

1. James F. Kurose, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Third Edition, Pearson Education, 2006.
2. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.
3. William Stallings, “Data and Computer Communications”, Eighth Edition, Pearson Education, 2011.

REFERENCES:

1. Nader F. Mir, “Computer and Communication Networks”, First Edition, Pearson Education, 2007.
2. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach “, McGraw Hill Publisher, 2011.
3. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2004.

CS8502 MICROPROCESSORS AND MICROCONTROLLERS L T P C

3 0 0 3

OBJECTIVES:

- To understand the functional blocks of a microprocessor
- To learn 8085 / 8086 programming
- To be able to build a microprocessor / microcontroller based system for a given application

UNIT I THE 8085 MICROPROCESSOR 9

Introduction to 8085 – Microprocessor architecture – Instruction set – Programming the 8085.

UNIT II 8086 SOFTWARE ASPECTS 9

Intel 8086 microprocessor – Architecture – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines.

UNIT III 8086 SYSTEM DESIGN 9

8086 signals – Basic configurations – System bus timing –System design using 8086 – Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

UNIT IV I/O INTERFACING 9

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications.

UNIT V MICROCONTROLLERS 9

Architecture of 8051 – Signals – Operational features – Memory and I/O addressing – Interrupts – Instruction set – Applications.

TOTAL: 45 PERIODS

OUTCOMES:

- To write programs for 8085 / 8086
- To write programs involving interrupt handling
- To explain the architecture and concepts behind 8051 and its operations

TEXT BOOKS:

1. Ramesh S.Gaonkar, “Microprocessor - Architecture, Programming and Applications with the 8085”, Fifth edition, Penram International Publishing Private Limited, 2002.
2. Yu-cheng Liu, Glenn A.Gibson, “Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design”, Second Edition, Prentice Hall of India, 2007.

3. A. K. Ray & K. M. Bhurchandi, “Advanced Microprocessors and Peripherals- Architectures, Programming and Interfacing”, Tata McGraw Hill, Second Edition, 2006.

REFERENCES:

1. Soumitra Kumar Mandal, “ Microprocessors and Microcontrollers: Architecture, Programming and Interfacing using 8085, 8086 and 8051”, Tata McGraw Hill, 2011.
2. Barry B. Brey, “The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386,80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, Pentium IV, Architecture, Programming & Interfacing”, Eighth Edition, Pearson Prentice Hall, 2009.
3. Peter Abel, “IBM PC Assembly language and programming”, Fifh Edition, Prentice Hall of India Pvt. Ltd., 2007.
4. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Second Edition, Pearson education,2011.

CS8503 SYSTEM SOFTWARE INTERNALS L T P C
3 0 0 3

OBJECTIVES:

- To understand the issues related to design and implementation of assemblers
- To learn the role of linkers and loaders
- To understand the working of macro processors
- To get introduced to virtual machines
- To learn about code optimization

UNIT I ASSEMBLERS 12

Review of Computer Architecture – Machine Instructions and Programs – Assemblers – Basic Assembler Functions – Assembler Features – Assembler Design Options.

UNIT II LOADERS AND LINKERS 8

Loaders and Linkers – Basic Loader Functions – Machine-Dependent Loader Features – Machine-Independent Loader Features– Loader Design Options-Dynamic Linking and Loading- Object files- Contents of an object file – designing an object format – Null object formats- Code sections- Relocation – Symbols and Relocation – Relocatable a.out- ELF.

UNIT III MACROPROCESSORS AND EMULATORS 7

Macroprocessors – Basic Macro Processor Functions – Machine-Independent Macro Processor Features – Macro Processor Design Options - Introduction to Virtual Machines (VM) - Emulation - basic Interpretation – Threaded Interpretation – Interpreting a complex instruction set – binary translation.

UNIT IV VIRTUAL MACHINES 9

Pascal P-Code VM – Object-Oriented VMs – Java VM Architecture – Common Language Infrastructure – Dynamic Class Loading.

UNIT V ADVANCED FEATURES 9

Instruction Set Issues – Profiling – Migration – Grids – Code optimizations- Garbage Collection - Examples of real world implementations of system software.

TOTAL : 45 PERIODS

OUTCOMES:

- To write assembly level programs
- To analyse loaders and linkers
- To explain macro processor design
- To describe the structure and architecture of virtual machines
- To outline the benefits and issues related to data and process migration in grids

TEXT BOOKS:

1. Leland L. Beck, “System Software”, 3rd ed., Pearson Education, 1997.
2. John R. Levine, “Linkers & Loaders”, Morgan Kauffman, 2003.
3. James E Smith and Ravi Nair, “Virtual Machines”, Elsevier, 2005.

REFERENCES:

1. Srimanta Pal, “ Systems Programming “ , Oxford University Press, 2011.
2. John J.Donovan, “ “Systems Programming”, Tata McGraw-Hill, 1991.

CS8504 THEORY OF COMPUTATION L T P C

3 0 0 3

OBJECTIVES:

- To learn about automata, grammar, language and their relationships
- To understand the power of Turing machine and the decidable nature of a problem

UNIT I REGULAR LANGUAGES 10

Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions - Regular Expression – FA and Regular Expressions – Pumping lemma for Regular languages - Equivalence and minimization of Finite Automata.

UNIT II CONTEXT FREE LANGUAGES 10

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Equivalence of Parse trees and derivation - Normal forms for CFG - Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG – Pumping lemma for CFL.

UNIT III CLOSURE PROPERTIES AND TURING MACHINES 8

Closure properties of Regular Sets: Complement and Intersection – Closure properties of CFL: Union, Concatenation, Kleene Closure, Intersection and Complement – Turing Machines– Language of a Turing machine – Turing machine as a computing device - Various techniques for construction of TMs – Equivalence of one tape and multi-tape Turing machines.

UNIT IV UNDECIDABILITY 8

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Rice theorem for Recursive and Recursively enumerable languages – Post's Correspondence Problem.

UNIT V RECENT TRENDS & APPLICATIONS 9

Matrix grammar – Programmed grammar – Random context grammar – Regular Control grammar – Lindenmayer systems – A glance on DNA computing and Membrane computing.

TOTAL : 45 PERIODS

OUTCOMES:

- To differentiate DFA and NFA
- To solve problems in DFA and NFA
- To solve problems in CFG
- To explain the undecidable nature of a given problem
- To apply TOC to real-world problems.

TEXT BOOKS:

1. John E. Hopcroft and Jeffery D. Ullman, Introduction to Automata Theory, Languages and Computations, Narosa Publishing House, Delhi, 1989.
2. Kamala Krithivasan and R. Rama, Introduction to Formal Languages, Automata Theory and Computation, Pearson Education, Delhi, 2009.

REFERENCES:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the theory of Computation, Second Edition, Prentice-Hall of India Pvt. Ltd, 2003.
2. J. Martin, Introduction to Languages and the Theory of Computation, Third Edition, Tata Mc Graw Hill, New Delhi, 2003.
3. Micheal Sipser, “Introduction of the Theory and Computation”, Thomson Learning, 1997.

CS8551 OBJECT ORIENTED ANALYSIS AND DESIGN L T P C

3 0 0 3

OBJECTIVES:

- To understand the fundamentals of objects and their modeling
- To differentiate unified process from other approaches
- To emphasize on modeling based software design
- To familiarize with the modeling languages
- To reinforce software design with design patterns

UNIT I OOAD BASICS 10

Introduction – Overview of object oriented system development – Object basics-The Unified Process – Modeling concepts – Modeling as a design technique – Analysis and modeling – UML diagrams – Use case Modeling – Class modeling – State modeling – Interaction Modeling

UNIT II REQUIREMENTS & MORE MODELING 7

Object Constraint Language - Inception – Evolutionary Requirements– Domain Models – System Sequence Diagrams – Operation Contracts

UNIT III DESIGN AND PRINCIPLES OF DESIGN 10

Requirements to Design –Design Patterns – Logical Architecture – Package diagram – Design patterns – Model, View, Control pattern – Detailed design – Object design with GRASP pattern – Detailed class diagram with Visibility.

UNIT IV MAPPING TO CODE 8

Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint.

UNIT V MORE PATTERNS 10

More Patterns – Analysis update – Objects with responsibilities – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design – Persistence framework with patterns.

TOTAL : 45 PERIODS

OUTCOMES:

- To express software design with UML diagrams
- To analyse the communication of software modules using interaction diagrams
- To identify and map basic software requirements in UML modeling
- To be capable of transforming UML based software design into pattern based design framework using design patterns
- To explain the purpose of applying particular design pattern to a specific module
- To outline and analyse the areas of design pattern correspondence with code

TEXT BOOKS:

1. Michael Blaha and James Rumbaugh, “Object-oriented modeling and design with UML”, Prentice-Hall of India, 2005.
2. Craig Larman. “Applying UML and Patterns – An introduction to Object-Oriented Analysis and Design and Iterative Development”, 3rd ed, Pearson Education, 2005.

REFERENCES:

1. Ali Bahrami, “Object Oriented Systems Development”, McGraw-Hill, 1999.
2. Booch, Grady. Object Oriented Analysis and Design. 2nd ed. Pearson Education 2000.
3. Fowler, Martin. UML Distilled. 3rd ed. Pearson Education. 2004.
4. Lunn, Ken. Software development with UML. Palgrave Macmillan. 2003.
5. O’Docherty, Mike. Object-Oriented Analysis & Design. Wiley. 2005.

HS8561	EMPLOYABILITY SKILLS	L T P C
	(Lab / Practical Course)	0 0 2 1

(Common to all branches of Fifth or Sixth Semester B.E / B.Tech programmes)

OBJECTIVES:

- To enhance the employability skills of students with a special focus on Presentation skills, Group discussion skills and Interview skills
- To help them improve their soft skills, including report writing, necessary for the workplace situations

1. Making presentations – introducing oneself – introducing a topic – answering questions – individual presentation practice
2. Creating effective PPTs – presenting the visuals effectively
3. Using appropriate body language in professional contexts – gestures, facial expressions, etc.
4. Preparing job applications - writing covering letter and résumé
5. Applying for jobs online - email etiquette
6. Participating in group discussions – understanding group dynamics - brainstorming the topic
7. Training in soft skills - persuasive skills – People skills - questioning and clarifying skills – mock GD
8. Writing Project proposals – collecting, analyzing and interpreting data / drafting the final report
9. Attending job interviews – answering questions confidently
10. Interview etiquette – dress code – body language – mock interview

TOTAL: 30 PERIODS

REQUIREMENTS FOR A CLASS OF 30 STUDENTS

1. A PC or a lap top with one or two speakers
2. A Collar mike and a speaker
3. An LCD projector and a screen
4. CD's and DVD's on relevant topics

OUTCOMES:

At the end of the course, learners should be able to

- Take international examination such as IELTS and TOEFL
- Make presentations and Participate in Group Discussions.
- Successfully answer questions in interviews**.**

REFERENCE BOOKS:

1. Dhanavel, S.P. 2010. English and Soft Skills. Hyderabad: Orient BlackSwan Ltd.
2. Corneilssen, Joep. How to Prepare for Group Discussion and Interview. New Delhi: Tata-McGraw-Hill, 2009.
3. D'Abreo, Desmond A. Group Discussion and Team Building. Mumbai: Better Yourself Books, 2004.
4. Ramesh, Gopalswamy, and Mahadevan Ramesh. The ACE of Soft Skills. New Delhi: Pearson, 2010.
5. Gulati, Sarvesh. Corporate Soft Skills. New Delhi: Rupa and Co. 2006.
6. Van Emden, Joan, and Lucinda Becker. Presentation Skills for Students. New York: Palgrave Macmillan, 2004.

EXTENSIVE READERS

1. Covey, Stephen R. The 7 Habits of Highly Effective People. New York: Free Press,1989.
2. Bagchi, Subroto. The Professional. New Delhi: Penguin Books India, 2009.

WEB RESOURCES

1. www.humanresources.about.com
2. www.careerride.com

CS8511 CASE TOOLS LABORATORY L T P C

0 0 3 2

OBJECTIVES:

The student should be made to:

- Learn the basics of OO analysis and design skills.
- Be exposed to the UML design diagrams.
- Learn to map design to code.
- Be familiar with the various testing techniques

LIST OF EXPERIMENTS:

1. Study of case tools such as rational rose or equivalent tools
2. Requirements
   - Implementation of requirements engineering activities such as elicitation, valida - tion, management using case tools
3. Analysis and design
   - Implementation of analysis and design using case tools.

4. Study and usage of software project management tools such cost estimates and scheduling
5. Documentation generators - Study and practice of Documentation generators.
6. Data modeling using automated tools.
7. Practice reverse engineering and re engineering using tools.
8. Exposure towards test plan generators, test case generators, test coverage and software metrics.
9. Meta modeling and software life cycle management.

TOTAL : 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to

- Design and implement projects using OO concepts.
- Use the UML analysis and design diagrams.
- Apply appropriate design patterns.
- Create code from design.
- Compare and contrast various testing techniques

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

1. Case tools such as rational rose or equivalent tools. (30 user license).
2. Any Project management tools such as JxProject (freeware).
3. 1 server + 32 PCs (P4 or higher version with atleast 2 GB RAM).

CS8512 COMMUNICATIONS AND NETWORKS LABORATORY L T P C

0 0 3 2

OBJECTIVES:

The student should be made to:

- Understand the use of TCP and UDP Sockets.
- Create about different Algorithms
- Be exposed to the use of simulation tool for perform Component of TCP / UDP Routing protocols.

LIST OF EXPERIMENTS:

1. Simple Chat Program using TCP Sockets
2. Simulation of HTTP Protocol using TCP Sockets
3. Simulation of DNS using UDP Sockets
4. Learn to use commands like TCP Dump, Netstat, Trace Route
5. Simulation of Ping using Raw Sockets
6. Simulation of Distance Vector/ Link State Routing algorithm

7. Study and configure functionalities of a router and switches (or by simulation)
8. Study of TCP/UDP performance using Simulation tool
9. Performance comparison of Routing protocols using Simulation tool
10. Simulation of error correction code (like CRC)

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

1. Linux Server - 1
2. Terminals for 30 students

OUTCOMES:

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

- **Implement** Chat Program and HTTP Protocol using TCP Sockets
- Compare and Contrast different routing algorithms
- Configure functionalities of router and switches
- Compare performance of routing protocols using simulation tools

CS8513 MICROPROCESSORS LABORATORY L T P C

0 0 3 2

OBJECTIVES:

The student should be made to:

- Introduce ALP concepts and features
- Write ALP for arithmetic and logical operations in 8086 and 8051
- Differentiate Serial and Parallel Interface
- Interface different I/Os with Microprocessors
- Be familiar with MASM

LIST OF EXPERIMENTS:

1. Simple programming exercises on 8085 (Like 8-bit multiplication, division).
2. Code conversion, decimal arithmetic and Matrix operations.
3. Floating point operations, string manipulations, sorting and searching.
4. Simple programming with 8086 with basic system calls for input/output (Arithmetic operations).
5. String manipulation - search, find and replace, copy operations, sorting and searching.
6. File manipulations with system calls.
7. Interfacing with 8085/8086 – 8255 and 8253.
8. Interfacing with 8085/8086 – 8279 and 8251.
9. Microprocessor based system development.
10. Application development using Micro controller.

OUTCOMES:

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

- Write ALP Programmes for fixed and Floating Point and Arithmetic
- Interface different I/Os with processor
- Generate waveforms using Microprocessors
- Execute Programs in 8051
- Explain the difference between simulator and Emulator

LABORATORY REQUIREMENTS FOR BATCH OF 30

STUDENTS HARDWARE

1. 8085 trainer kits 30
2. 8086 trainer kits 30
3. Interface cards like stepper motor interface, traffic light controller, ADC / DAC
4. 8051 trainer kits 30

SOFTWARE

1. 8086 assembler.
2. Simulator for HDL.
3. Simulator for 8051.

CS8601 ARTIFICIAL INTELLIGENCE L T P C
3 0 0 3

OBJECTIVES:

- To understand the role of intelligent agents
- To learn uninformed and informed search strategies
- To understand the concepts behind constraint satisfaction
- To learn to represent knowledge effectively using propositional logic and predicate logic
- To learn various reasoning paradigms
- To understand the role of reasoning in machine learning

UNIT I INTRODUCTION 9

Introduction – Definition - Future of Artificial Intelligence – Characteristics of Intelligent Agents – Typical Intelligent Agents – Problem Solving Approach to Typical AI problems

UNIT II PROBLEM SOLVING METHODS 9

Problem solving Methods - Search Strategies- Uninformed - Informed - Heuristics - Local Search Algorithms and Optimization Problems - Searching with Partial Observations - Constraint Satisfaction Problems – Constraint Propagation - Backtracking Search - Game Playing -Optimal Decisions in Games -Alpha--Beta Pruning -Stochastic Games

UNIT III KNOWLEDGE REPRESENTATION 9

First Order Predicate Logic – Prolog Programming - Unification -Forward Chaining - Backward Chaining - Resolution –Knowledge Representation - Ontological Engineering - Categories and Objects –Events - Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default Information

UNIT IV MACHINE LEARNING 9

Probability basics - Bayes Rule and its Applications - Bayesian Networks – Exact and Approximate Inference in Bayesian Networks - Hidden Markov Models - Forms of Learning - Supervised Learning - Learning Decision Trees - Regression and Classification with Linear Models - Artificial Neural Networks - Nonparametric Models - Support Vector Machines - Statistical Learning - Learning with Complete Data - Learning with Hidden Variables- The EM Algorithm – Reinforcement Learning

UNIT V APPLICATIONS 9

AI applications – Language Models - Information Retrieval - Information Extraction – Natural Language Processing - Machine Translation – Speech recognition – Robot – Hardware – Perception – Planning – Moving

TOTAL: 45 PERIODS

OUTCOMES:

- To differentiate between various intelligent agents
- To solve problems involving informed and uninformed search strategies
- To represent natural language sentences using predicate logic and propositional logic
- To differentiate supervised learning from unsupervised learning
- To identify real world applications of AI

TEXT BOOKS:

1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, 3rd Edition, 2009
2. Bratko, I., Prolog Programming for Artificial Intelligence (International Computer Science Series), Addison-Wesley Educational Publishers Inc; 4th edition, 2011.
3. David L. Poole, Alan K. Mackworth, Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.

REFERENCES:

1. M. Tim Jones, Artificial Intelligence: A Systems Approach (Computer Science), Jones and Bartlett Publishers, Inc; 1 edition, 2008
2. Ethem Alpaydin, Introduction to Machine Learning (Adaptive Computation and Machine Learning series), The MIT Press; second edition, 2009
3. Nils J. Nilsson, the Quest for Artificial Intelligence, Cambridge University Press,2009.
4. William F. Clocksin, and Christopher S. Mellish, "Programming in Prolog: Using the ISO Standard, Fifth Edition, Springer, 2003.

CS8602 COMPILER DESIGN L T P C

3 0 2 4

OBJECTIVES:

- To learn concepts of lexical analysis and parsing
- To understand the intermediate code and object code generation
- To know the importance of code optimization
- To learn about compiler parallelism

UNIT I FRONT END OF COMPILERS 9+6

The structure of Compiler – Lexical analysis: Role of Lexical analyzer, Specification and recognition of tokens, Syntax Analysis: Top down parsing, Bottom up parsing, LR Parsers: SLR, CLR, and LALR.

Lab Component: Lexical analyzer generators, Parser generators

UNIT II INTERMEDIATE CODE GENERATION 9+6

Syntax Directed Definitions, Evaluation orders for syntax directed definitions, Syntax Directed Translation schemes, Intermediate languages : Three address code, Syntax tree, Postfix code – Declarations – Type checking – Expression translation – Back patching

Lab Component: Intermediate code generation of Expressions, Assignment statements with arrays, Control flow statements, Switch statements.

UNIT III OBJECT CODE GENERATION 9+6

Storage organization, Stack allocation space, Access to non-local data on the stack, Heap management - Issues in code generation - Design of code generator - Register allocation and assignment – Instruction selection by tree rewriting – Optimal code generation for expressions – Dynamic programming code generation.

Lab Component: Code generation for any specific architecture supported by open source compilers

UNIT IV CODE OPTIMIZATION 9+6

Basic blocks and Flow graphs – Optimization of basic blocks – Principal sources of optimizations– Data flow analysis – Constant propagation – Partial redundancy elimination - Peephole optimizations.

Lab Component: Exploring and customizing different types of optimizations supported by any open source compiler

UNIT V PARALLELIZING COMPILER 9+6

Basic concepts and examples – Iteration spaces – Affine array indexes – Data reuse – Array data dependence - Finding synchronization free parallelism –Synchronization between parallel loops, Locality optimizations.

Case study: Open source parallelizing compilers.

TOTAL: 45 + 30 PERIODS

OUTCOMES:

- To design the front end of compiler
- To write programs for lexical analysis and parsing
- To explain concepts related to intermediate code generation related in open-source compilers
- To explore various types of code optimizations of open-source compilers
- To explain the concepts of compiler parallelization using open-source compilers

TEXT BOOK:

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D.Ullman, “Compilers : Principles, Techniques and Tools”, Second Edition, Pearson Education, 2008.

REFERENCES:

1. Randy Allen, Ken Kennedy, “Optimizing Compilers for Modern Architectures: A Dependence-based Approach”, Morgan Kaufmann Publishers, 2002.
2. Steven S. Muchnick, “Advanced Compiler Design and Implementation”, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.
3. Keith D Cooper and Linda Torczon, “Engineering a Compiler”, Morgan Kaufmann Publishers Elsevier Science, 2004.
4. V. Raghavan, “Principles of Compiler Design”, Tata Mc GrawHill Education Publishers, 2010.
5. Allen I. Holub, “Compiler Design in C”, Prentice-Hall software series,1993

CS8603 COMPUTER GRAPHICS AND MULTIMEDIA L T P C

3 0 0 3

OBJECTIVES:

- To learn the fundamentals of graphics and multimedia
- To know the concepts of 2D and 3D graphics programming
- To acquire skills related to multimedia compression and animation
- To learn to handle multimedia objects

UNIT I 2D PRIMITIVES 9

Elements of pictures created in computer graphics – Graphics input primitives and devices Drawing primitives in open GL and Basic open GL programming - open GL basic Graphics primitives – Output primitives – Line, Circle and Ellipse drawing algorithms – Attributes of output primitives.

UNIT II 2D GEOMETRIC TRANSFORMATIONS 9

2D Viewing – Window-Viewport Transformation - Two dimensional Geometric transformations– Line, Polygon, Curve and Text clipping algorithms.

UNIT III 3D CONCEPTS 9

Projections - Three dimensional object representation – Parallel and Perspective Polygons, Splines, Quadric Surfaces - Visualization of data sets - 3D affine transformations 3D Rotations using Quaternions – Viewing – Visible surface identification – Color Models, 3D Transformations in open GL

UNIT IV MULTIMEDIA BASICS 9

Introduction and definitions – applications – elements – Animations – Compression – Types of Compressions: Lossless – Lossy – Video compression – Image Compression – Audio compression– Data and file format standards – Multimedia data structures: KD Trees –R trees.

UNIT V MULTIMEDIA AUTHORING AND APPLICATIONS 9

Creating interactive multimedia – Multimedia Authoring Systems – Multimedia Authoring Software Applications – Video On demand – Virtual Reality – Augmented Reality – Content based retrieval in digital libraries.

TOTAL: 45 PERIODS

OUTCOMES:

- To develop, design and implement two and three dimensional graphical structures
- To differentiate lossy and lossless compressions
- To develop programming assignments related to animation
- To create interactive multimedia

TEXT BOOKS:

1. Donald D. Hearn, M. Pauline Baker and Warren Carithers, “Computer Graphics with OpenGL”, Fourth Edition, Pearson Education, 2010.
2. Ze-Nian Li and Mark S.Drew, “Fundamentals of Multimedia”, First Edition, Pearson Education, 2007.

REFERENCE BOOKS:

1. F.S.Hill, “Computer Graphics using OPENGL”, Second edition, Pearson Education, 2003.
2. Prabhat K Andleigh, Kiran Thakrar, “Multimedia systems design”, First Edition, PHI, 2007.

CS8604 PROGRAMMING PARADIGMS L T P C

3 0 0 3

OBJECTIVES:

- To explore modern programming languages and the techniques used for programming
- To get an idea on evaluation of programming languages
- To analyse a given program from good programming practice perspective

UNIT I INTRODUCTION 9

The art of Language design – Programming language spectrum - Compilation and Interpretation– Evaluation of Programming languages – Syntax and Semantics of language C-lite - Names – Types – Type Systems - Binding – Scope – Static – Dynamic – Abstract Data types

UNIT II SEMANTICS 9

Expression – Assignment - Control flow – Input/output – exception handling – state transformation – partial functions – semantics with dynamic typing – Formal treatment of semantics

UNIT III FUNCTIONS 9

Call and Return – Parameter passing – function declaration – semantics of call and return – formal treatment of types and semantics – memory management – dynamic arrays – garbage collection

UNIT IV PROGRAMMING TECHNIQUES 9

Imperative programming – C – ADA – Perl – Object Oriented Programming – Small Talk-Java– Python – Functional Programming – Scheme – Haskell

UNIT V MODERN PROGRAMMING TECHNIQUES 9

Logic programming – prolog – Event-Driven programming – Concurrent Programming – Concepts – Synchronization strategies – Language level mechanism - Interprocess communication – Scripting languages.

TOTAL: 45 PERIODS

OUTCOMES:

- To write programs related to syntax and semantics
- To compare programs between C, Ada, Perl and Small Talk
- To write programs using scripting languages
- To demonstrate event-driven and concurrent programming using prolog
- To apply prolog for developing distributed systems

TEXT BOOKS:

1. Allen B. Tucker and Robert E. Noonan, Programming Languages - Principles and Paradigms, Second Edition, Tata McGraw Hill, 2009

REFERENCES:

1. Robert W. Sebesta, Concepts of Programming Languages, Sixth Edition, Addison Wesley, July 24, 2003.
2. Michael L Scott, Programming Language Pragmatics, Third Edition, Morgan Kauffman, 2009.

CS8651 DIGITAL SIGNAL PROCESSING – ALGORITHMS AND APPLICATIONS **L T P C 3 0 0 3**

OBJECTIVES:

- To get an idea on designing analog and digital filters
- To acquire the knowledge related to error detection and correction
- To introduce discrete Fourier transform and its applications.
- To teach the design of infinite and finite impulse response filters for filtering undesired signals.
- To introduce signal processing concepts in systems having more than one sampling frequency.

UNIT I SIGNALS AND SYSTEMS **9**

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution – Correlation.

UNIT II FREQUENCY TRANSFORMATIONS **9**

Introduction to DFT – Properties of DFT – Circular Convolution - Filtering-methods based on DFT – FFT Algorithms – Decimation - in - time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT – Use and Application of DCT.

UNIT III IIR FILTER DESIGN **9**

Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (LPF, HPF, BPF, BRF) filter design using frequency translation

UNIT IV FIR FILTER DESIGN **9**

Structures of FIR – Linear phase FIR filter – Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques – Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.

UNIT V APPLICATIONS **9**

Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor – Adaptive Filters: Introduction, Applications of adaptive filtering to equalization, echo cancellation, interference cancellation – Speech Recognition Systems, Speech Synthesis Systems – Image Enhancement.

TOTAL: 45 PERIODS

OUTCOMES:

- To perform frequency transforms for signals
- To design IIR and FIR filters
- To write programs using analog and digital filters and to compare the respective output
- To identify finite word length errors in digital filters
- To develop applications related to image processing and speech processing

TEXT BOOKS:

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms and Applications", Pearson education / Prentice Hall, Fourth edition, 2007.
2. Emmanuel C..Ifeachor, & Barrie.W.Jervis, "Digital Signal Processing", Pearson Education / Prentice Hall, Second edition, 2002.

REFERENCES:

1. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Tata McGraw Hill, Third Edition, 2007.
2. Alan V. Oppenheim, Ronald W. Jchafer & Hohn. R.Back, "Discrete Time Signal Processing", Pearson Education, Second Edition, 2001.
3. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, 2006.

CS8611 COMPUTER GRAPHICS AND MULTIMEDIA LABORATORY L T P C
0 0 3 2

OBJECTIVES:

- To make the students understand graphics programming
- To create 3D graphical scenes using open graphics library suits
- To perform image manipulation, enhancement
- To create animations
- To create a multimedia presentation/Game/Project

IMPLEMENT THE EXERCISES FROM 1 TO 4 USING C / OPENGL / JAVA

1. Implementation of Algorithms for drawing 2D
   Primitives – Line (DDA, Bresenham) – all slopes
   Circle (Midpoint)
2. 2D Geometric transformations
   – Translation
   Rotation

Scaling

Reflectio

n Shear

Window-Viewport

3. Composite 2D Transformations
4. Liang - Barsky Line Clipping

Implement the exercises from 5 to 7 using OpenGL

5. 3D Transformations - Translation, Rotation, Scaling
6. 3D Projections – Parallel, Perspective
7. Creating 3D Scenes
8. Compression Algorithms - To implement text and image compression algorithms.
9. Image Editing and Manipulation - Basic Operations on image using any image editing software, Creating gif animated images, Image optimization
10. 2D Animation – To create Interactive animation using any authoring tool

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to

- Create 3D graphical scenes using open graphics library suits
- Implement image manipulation and enhancement
- Create 2D animations using tools

CS8612 CREATIVE AND INNOVATIVE PROJECT L T P C

0 0 3 2

The goal of this course is to encourage the students to identify innovative projects that help in exploring variables that promote creativity and innovation. Each student is expected to choose a real life or socially relevant problem At the end of the project, students should be familiar with the state of art in their respective fields. They would be able to apply the concepts learnt to relevant research problems or practical applications.

The goal of this course is to motivate them to learn concepts, models, frameworks, and tools that engineering graduates' need in a world where creativity and innovation is fast becoming a pre-condition for competitive advantage**.**

TOTAL: 45 PERIODS

MG8653 PRINCIPLES OF MANAGEMENT L T P C
3 0 0 3

AIM:

To learn the different principles and techniques of management in planning, organizing, directing and controlling.

OBJECTIVES

- To study the Evolution of Management
- To study the functions and principles of management
- To learn the application of the principles in an organization

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS 9

Definition of Management –Science or Art – Manager Vs Entrepreneur- types of managers- managerial roles and skills – Evolution of Management –Scientific, human relations , system and contingency approaches– Types of Business organization- Sole proprietorship, partnership, company-public and private sector enterprises- Organization culture and Environment – Current trends and issues in Management.

UNIT II PLANNING 9

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

UNIT III ORGANISING 9

Nature and purpose – Formal and informal organization – organization chart– organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization –Job Design - Human Resource Management –HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.

UNIT IV DIRECTING 9

Foundations of individual and group behaviour– motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership –communication – process of communication – barrier in communication – effective communication –communication and IT.

UNIT V CONTROLLING 9

System and process of controlling –budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

TOTAL: 45 PERIODS

OUTCOMES:

- Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

TEXT BOOKS:

1. Stephen P. Robbins & Mary Coulter, " Management", Prentice Hall (India)Pvt. Ltd., 10th Edition, 2009.
2. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", Pearson Education, 6th Edition, 2004.

REFERENCES:

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" Pearson Education, 7th Edition, 2011.
2. Robert Kreitner & Mamata Mohapatra, " Management", Biztantra, 2008.
3. Harold Koontz & Heinz Weihrich "Essentials of management" Tata Mc Graw Hill,1998.
4. Tripathy PC & Reddy PN, "Principles of Management", Tata Mcgraw Hill, 1999

CS8701 MOBILE AND PERVASIVE COMPUTING L T P C

3 0 0 3

OBJECTIVES:

- To study the details of lower layers of mobile architectures
- To learn to develop applications for various mobile OS
- To learn the concepts and protocols behind wireless networks

UNIT I PERVASIVE COMPUTING 9

Basics and vision – Architecture and Applications requirements – Smart devices and operating systems , secure services – Smart mobiles, cards and device networks.

UNIT II MOBILE APPLICATIONS 9

History – Mobile Ecosystem – Designing for context – Mobile strategy – Mobile applications– Information Architecture – Design – Mobile Web apps vs Native Apps – Adapting to devices– Supporting devices – Application development on Android and i Phone.

UNIT III MEDIUM ACCESS AND TELECOMMUNICATIONS 9

Frequencies – Signals – Antennas – Signal propagation – Media Access Control: Motivation, SDMA, FDMA, TDMA, CDMA – GSM: Mobile services, System architecture, Protocols, Localization and calling, Handover – GPRS.

UNIT IV WIRELESS NETWORKS **9**

Infrared vs radio transmission – Infrastructure and ad hoc networks – WLAN, IEEE 802.11 standards protocols. Piconet- Bluetooth-architecture and services. Wireless Broadband networks and satellites networks.

UNIT V MOBILE NETWORK AND TRANSPORT LAYERS **9**

Mobile IP – DHCP – Routing in Mobile ad hoc networks – TCP improvements – TCP over 2.5/3G.

TOTAL: 45 PERIODS

OUTCOMES:

- To explain the features of smart mobiles and other smart devices
- To develop applications for Android and iOS
- To explain protocols related to routing in mobile networks

TEXT BOOKS:

1. Stefan Poslad, “Ubiquitous Computing: Smart Devices, Environments and Interactions”, Wiley, 2009.
2. Brian Fling, “Mobile Design and Development”, O’Reily, 2009.
3. Jochen Schiller, “Mobile Communications”, 2nd ed., Pearson Education, 2003.

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. Alasdair Allan, “iPhone Programming”, O’Reilly, 2010.
4. Wei-Meng Lee, “Beginning iPhone SDK Progrmming with Objective-C”, Wrox Wiley, 2010.
5. Asoke K Talukder, Hasan Ahmed, Roop R Yavagal, “Mobile Computing”, 2nd ed, Tata McGraw Hill, 2010.
6. Pei Zheng, Lionel M. Ni, “Smart Phone & Next Generation Mobile Computing”, Morgan Kaufmann, 2006.
7. Frank Adelstein, Sandeep KS Gupta, Golden Richard, “Fundamentals of Mobile and Pervasive Computing”, Tata McGraw-Hill, 2005.
8. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.
9. Jochen Burkhardt et al, Pervasive Computing: Technology and Architecture of Mobile Internet Applications, Pearson Education, 2002.

CS8702 PARALLEL PROGRAMMING L T P C
3 0 0 3

OBJECTIVES:

- To understand various parallel programming models and challenges involved
- To learn the basics of OpenMP and MPI programming

UNIT I FUNDAMENTALS OF PARALLEL COMPUTING 9

Need for Parallel Computing – Parallel Computer Models – ILP, TLP and Data Parallelism– Parallel Programming Overview – Processes, Tasks and Threads – Parallel Programming Models – Shared Memory Programming – Message Passing Paradigm – Interaction and Communication – Interconnection Networks.

UNIT II CHALLENGES OF PARALLEL PROGRAMMING 9

Identifying Potential Parallelism – Techniques for Parallelizing Programs – Issues – Cache Coherence issues – Memory Consistency Models – Maintaining Memory Consistency – Synchronization Issues – Performance Considerations.

UNIT III SHARED MEMORY MODELS AND OPENMP PROGRAMMING 9

OpenMP Execution Model – Memory Model and Consistency – Open MP Directives – Run Time Library Routines – Handling Data and Functional Parallelism – Performance Considerations.

UNIT IV MPI PROGRAMMING 9

The MPI Programming Model – MPI Basics – Circuit Satisfiability – Global Operations – Asynchronous Communication – Collective Communication – Other MPI Features – Performance Issues – Combining OpenMP and MPI.

UNIT V PROGRAMMING HETEROGENEOUS PROCESSORS 9

GPU Architecture – Basics of CUDA – CUDA Threads – CUDA Memories – Synchronization Handling – Performance Issues – Application Development. Introduction to OpenCL.

TOTAL: 45 PERIODS

OUTCOMES:

- To identify the scope for parallelism in programs
- To explain the concepts behind parallel programming
- To write programs in Open MP
- To compare OpenMP and MPI

TEXT BOOKS:

1. John L. Hennessey and David A. Patterson, “Computer Architecture – A quantitative approach”, Morgan Kaufmann / Elsevier Publishers, 5th. Edition, 2012.
2. Peter S. Pacheco, “An Introduction to Parallel Programming”, Morgan Kaufmann, 2011.
3. Michael J Quinn, “Parallel programming in C with MPI and OpenMP”, Tata McGraw Hill, 2003.
4. David B. Kirk and Wen-mei W. Hwu, “Programming Massively Parallel Processors”, Morgan Kaufmann, 2010.

REFERENCES:

1. Ananth Grama, George Karypis, Vipin Kumar and Anshul Gupta, “Introduction to Parallel Computing”, Second Edition, Pearson Education Limited, 2003.
2. Shameem Akhter and Jason Roberts, “Multi-core Programming”, Intel Press, 2006.
3. Ian Foster, “Designing and Building Parallel Programs: Concepts and Tools for Parallel Software Engineering”, Addison Wesley Longman Publishing Co., USA, 1995.
4. David E. Culler, Jaswinder Pal Singh, “Parallel Computing Architecture: A hardware/ Software approach” , Morgan Kaufmann / Elsevier Publishers, 1999.
5. OpenMP Programmer’s Manual.
6. MPI Programmer’s Manual

CS8703 SECURITY IN COMPUTING L T P C

3 0 0 3

OBJECTIVES:

- To understand the basics of cryptography
- To learn to find the vulnerabilities in programs
- To know the different kinds of security threats in networks, databases and their solutions
- To learn about models and standards of security

UNIT I ELEMENTARY CRYPTOGRAPHY 9

Terminology and Background – Substitution Ciphers – Transpositions – Making Good Encryption Algorithms- Data Encryption Standard- AES Encryption Algorithm – Public Key Encryption – Cryptographic Hash Functions – Key Exchange – Digital Signatures – Certificates

UNIT II PROGRAM SECURITY 9

Secure programs – Non-malicious Program Errors – Viruses – Targeted Malicious code – Controls Against Program Threat – Control of Access to General Objects – User Authentication – Good Coding Practices – Open Web Application Security Project Top 10 Flaws – Common Weakness Enumeration Top 25 Most Dangerous Software Errors

UNIT III SECURITY IN NETWORKS 9

Threats in networks – Encryption – Virtual Private Networks – PKI – SSH – SSL – IPSec –Content Integrity – Access Controls – Wireless Security – Honeypots – Traffic Flow Security – Firewalls – Intrusion Detection Systems – Secure e-mail.

UNIT IV SECURITY IN DATABASES 9

Security requirements of database systems – Reliability and Integrity in databases – Two Phase Update – Redundancy/Internal Consistency – Recovery – Concurrency/Consistency – Monitors – Sensitive Data – Types of disclosures – Inference.

UNIT V SECURITY MODELS AND STANDARDS 9

Secure SDLC – Secure Application Testing – Security architecture models – Trusted Computing Base – Bell-LaPadula Confidentiality Model – Biba Integrity Model – Graham-Denning Access Control Model – Harrison-Ruzzo-Ulman Model – Secure Frameworks – COSO – CobiT – Compliances – PCI DSS – Security Standards - ISO 27000 family of standards – NIST.

TOTAL: 45 PERIODS

OUTCOMES:

- To write programs on public key encryption
- To differentiate malicious and non-malicious code
- To list and explain various type of threats in networks
- To write secured transactions in databases
- To explain various standards related to security models

TEXT BOOKS:

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Fourth Edition, Pearson Education, 2007.
2. Matt Bishop, “Introduction to Computer Security”, Addison-Wesley, 2004.
3. Michael Whitman, Herbert J. Mattord, “Management of Information Security”, Third Edition, Course Technology, 2010.

REFERENCES:

1. William Stallings, “Cryptography and Network Security : Principles and Practices”, Fifth Edition, Prentice Hall, 2010.
2. Michael Howard, David LeBlanc, John Viega, “24 Deadly Sins of Software Security: Programming Flaws and How to Fix Them”, First Edition, Mc Graw Hill Osborne Media,2009.
3. Matt Bishop, “Computer Security: Art and Science”, First Edition, Addison-Wesley, 2002.
4. https://www.owasp.org/index.php/Top_10_2010
5. https://www.pcisecuritystandards.org/security_standards/pci_dss.shtml
6. http://cwe.mitre.org/top25/index.html

CS8711 MOBILE APPLICATION DEVELOPMENT LABORATORY L T P C

0 0 3 2

OBJECTIVES:

The student should be made to:

- Understand the basics of Mobile application development
- Be exposed to launching services in a mobile phone and launching Web Portal
- Familiar with application using android and iPhone SDK frame work

LIST OF EXPERIMENTS:

1. General Form Design
2. Mobile browser based interactive applications
3. Applications using controls
4. Mobile networking applications (SMS/Email)
5. Applications involving data retrieval
6. Launching services in a mobile phone
7. Web portal development
8. Applications using Android SDK framework (like interactive applications, applications that make use of accelerometer sensor, video applications)
9. Applications that use the iPhone SDK framework
10. Testing the applications using emulators

TOTAL: 45 PERIODS

OUTCOMES:

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

- Design Mobile Networking application using basic facilities
- Launch services on Mobile Phone that involves data retrieval
- Design and development a Web Portal
- Compare and Contrast Android SDK and i Phone Frame Works for different types of application and testing these applications using Emulators

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

1. JDK environment
2. J2ME
3. Sun Java Wireless Toolkit
4. Android SDK
5. iPhone SDK

CS8712 SOFTWARE DEVELOPMENT LABORATORY L T P C

0 0 3 2

OBJECTIVES:

The student should be made to:

- Understand and apply software Engineering practices that are followed in Software Industries
- Develop a software package in any application.

Develop a software package in any application relevant to any area of study of your curriculum by applying the Software Engineering Practices generally done by software industries, which are

1. Identification of Use cases for each application system and SRS preparation.
2. Identification of reusable Components/Frameworks from open source and customizing them for each application.
3. Coding/Customizing/Wrapping for components/subsystems.
4. Testing – Scenario testing and test case preparation for each components/subsystems
5. Integration of subsystems and Testing
6. Simulation of datasets and load testing to analyze performance of the system.

TOTAL : 45 PERIODS

OUTCOMES:

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

- Develop a software package in any application by following the procedural steps namely Identification, Coding, Testing, Integration and Simulation .

CS8001 .NET AND C# PROGRAMMING L T P C

3 0 0 3

OBJECTIVES:

- To understand the concept of .NET framework
- To study the different techniques of security
- To get introduced to web services with ASP.NET
- To explore window based applications

UNIT I C# LANGUAGE BASICS 9

C# and the .NET framework - C# basics - Objects and types - Inheritance - Arrays - Operators and casts – Indexes

UNIT II C# ADVANCED FEATURES 9

Delegates and events - Strings and regular expressions - Generics - Collections - Memory management and pointers - Errors and exceptions

UNIT III BASE CLASS LIBRARIES AND DATA MANIPULATION 9

Tracing and events - Threading and synchronization - .Net security - Localization - Manipulating XML - Managing the file system - Basic network programming

UNIT IV DATABASE AND WEB SERVICES 9

Window based applications - Data access with .NET - basics of ASP .NET - Introduction to web services

UNIT V .NET FRAMEWORK 9

Architecture - Assemblies - Shared assemblies - CLR hosting - Appdomains - Reflection

TOTAL: 45 PERIODS

OUTCOMES:

- To write programs using basic and advanced features of C#
- To write programs for threading and synchronization
- To develop web based applications on .NET
- To explain the concepts related to reflection

TEXT BOOK:

1. Christian Nagel et al. “Professional C# 2005 with .NET 3.0”, Wiley India, 2007.

REFERENCES:

1. Ian Gariffiths, Mathew Adams, Jesse Liberty, “Programming C# 4.0”, O’Reilly,Fourth Edition, 2010.
2. Andrew Troelson, “Pro C# with .NET 3.0”, Apress, 2007.
3. Kevin Hoffman, “Microsoft Visual C# 2005”, Pearson Education, 2006.
4. S.Thamarai Selvi, R. Murugesan, “A Text Book on C#”, Pearson Education, 2003.

CS8002 AD HOC AND SENSOR NETWORKS L T P C

3 0 0 3

OBJECTIVES:

- To study the protocols and the functionalities of ad hoc networks
- To understand the various applications developed based on ad hoc networking
- To know about the sensor networks
- To appreciate the challenges in establishing infrastructure for sensor networks and managing databases

UNIT I INTRODUCTION AND MAC PROTOCOLS 9

Cellular and Ad hoc Networks - Issues in Ad hoc Networks - Design Issues and Design Goals of MAC protocol for Ad hoc Networks - Classification of MAC protocols - Contention Based Protocols - Reservation and Scheduling Mechanisms - Other Protocols.

UNIT II ROUTING PROTOCOLS 9

Design Issues and Classifications of unicast and multicast Routing Protocols - Proactive, Reactive and Hybrid routing protocol – Tree based and Mesh based multicast protocols, Energy Efficient and QoS guaranteed multicast protocols.

UNIT III TRANSPORT LAYER AND SECURITY ISSUES 9

Design Issues, Design Goals and Classifications of Transport layer protocols - TCP over Ad Hoc – Security in Ad hoc Networks - Network Security Requirements - Network Security Attacks - Key Management - Secure Routing in Ad hoc Networks.

UNIT IV SENSOR NETWORKS AND NETWORKING SENSORS 9

Unique Constraints and Challenges – Advantages and Applications – Collaborative Processing – Key Definitions – Localization and Tracking – Networking Sensors – MAC – Geographic, Energy Aware and Attribute based Routing.

UNIT V INFRASTRUCTURE ESTABLISHMENT AND NETWORK DATABASE 9

Topology Control – Clustering – Time Synchronization – Localization and Localization Services – Task Driven Sensing – Roles of Sensor Nodes and Utilities – Network Database

TOTAL: 45 PERIODS

OUTCOMES:

- To list the design issues in Ad-hoc networks
- To differentiate the working of various routing protocols
- To identify the challenges in sensor networks
- To outline issues related to synchronization and localization
- To evaluate the performance of protocols from QoS perspective

TEXT BOOKS:

1. C. Siva Ram Murthy and B.S. Manoj, “Ad Hoc Wireless Networks – Architectures and Protocols”, Pearson Education, 2nd Edition, 2005.
2. Feng Zhao and Leonidas Guibas, “Wireless Sensor Networks – An Information Processing Approach”, Elsevier Publications, 2004.

REFERENCES:

1. C.K.Toh, “Ad hoc Mobile Wireless Networks – Protocols and Systems”, Pearson Education, 1st Edition, 2007.
2. George Aggelou, “Mobile Ad hoc Networks – From Wireless LANs to 4G Networks”, Tata McGraw Hill, 2009.
3. Holger Karl and Andreas Willing, “Protocols and Architectures for Wireless Sensor Networks” Wiley Publications, 2005.

CS8003 ADVANCED TOPICS ON DATABASES L T P C

3 0 0 3

OBJECTIVES:

- To know advanced concepts in databases in large scale analytics
- to learn concepts behind parallel, distributed, active, spatial, temporal and object databases
- to learn reasoning and query processing
- to understand the challenges in designing multimedia databases

UNIT I PARALLEL AND DISTRIBUTED DATABASES 9

Inter and Intra Query Parallelism – Architecture – Query evaluation – Optimization – Distributed Architecture – Storage – Catalog Management – Query Processing - Transactions – Recovery- Large-scale Data Analytics in the Internet Context - Map Reduce Paradigm - run-time system for supporting scalable and fault-tolerant execution - paradigms: PigLatin and H ive and parallel databases versus Map Reduce

UNIT II ACTIVE DATABASES 9

Syntax and Sematics (Starburst, Oracle, DB2) – Taxonomy – Applications – Integrity Management – Workflow Management – Busines Rules – Design Principles – Properties – Rule Modularization – Rule Debugging – IDEA methodology – Open Problems.

UNIT III TEMPORAL AND OBJECT DATABASES 9

Overview – Data types – Associating Facts – Temporal Query Language – TSQL2 – Time Ontology – Language Constructs – Architecture – Temporal Support – Object Database and Change Management – Change of Schema – Implementing Database Updates in O_2 – Benchmark Database Updates – Performance Evaluation.

UNIT IV COMPLEX QUERIES AND REASONING 9

Logic of Query Languages – Relational Calculi – Recursive rules – Syntax and semantics of Datalog – Fixpoint semantics – Implementation Rules and Recursion – Rule rewriting methods – Compilation and Optimization – Recursive Queries in SQL – Open issues.

UNIT V SPATIAL, TEXT AND MULTIMEDIA DATABASES 9

Traditional Indexing Methods (Secondary Keys, Spatial Access Methods) – Text Retrieval – Multimedia Indexing – 1D Time Series – 2d Color images – Subpattern Matching – Open Issues – Uncertainties

TOTAL: 45 PERIODS

OUTCOMES:

- to write programs involving query optimization
- to write programs related to large scale data processing
- to use MapReduce in data analytics
- to evaluate the performance of temporal and spatial databases
- to write suitable indexing programs for multimedia databases

REFERENCES:

1. Ramakrishnan, Gehrke, “Database Management System”, Tata Mc Graw Hill Publications, Third Edition.
2. Carlo Zaniolo, Stefano Ceri “Advanced Database Systems”, Morgan Kauffmann Publishers.
3. VLDB Journal.

FURTHER READING:

- http://video.google.com
- http://www.blinkvid.com/video
- http://www.learnerstv.com/course.php?cat=Computers
- http://www.crazyengineers.com/forum

CS8004 BIO INFORMATICS TECHNOLOGIES L T P C

3 0 0 3

OBJECTIVES:

- To understand basic concepts of molecular biology and genetics
- To learn the concepts of computer science that relate to problems in biological sciences
- To learn to use computer as a tool for biomedical research
- To get introduced to important functional relationships from gene data.

UNIT I INTRODUCTION 9

Need for Bioinformatics technologies – Overview of Bioinformatics technologies Structural bioinformatics – Data format and processing – Secondary resources and applications – Role of Structural bioinformatics - Biological Data Integration System.

UNIT II DATAWAREHOUSING AND DATAMINING IN BIOINFORMATICS 9

Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics

UNIT III MODELING FOR BIOINFORMATICS 9

Hidden markov modeling for biological data analysis – Sequence identification – Sequence classification – multiple alignment generation – Comparative modeling – Protein modeling– genomic modeling – Probabilistic modeling – Bayesian networks – Boolean networks - Molecular modeling – Computer programs for molecular modeling.

UNIT IV PATTERN MATCHING AND VISUALIZATION 9

Gene regulation – motif recognition – motif detection – strategies for motif detection – Visualization – Fractal analysis – DNA walk models – one dimension – two dimension – higher dimension – Game representation of Biological sequences – DNA, Protein, Amino acid sequences.

UNIT V MICROARRAY ANALYSIS 9

Microarray technology for genome expression study – image analysis for data extraction – preprocessing – segmentation – gridding – spot extraction – normalization, filtering – cluster analysis – gene network analysis – Compared Evaluation of Scientific Data Management Systems – Cost Matrix – Evaluation model - Benchmark - Tradeoffs

TOTAL: 45 PERIODS

OUTCOMES:

- To apply data warehousing and data mining concepts in bioinformatics
- To develop models for biological data
- To write programs using HMM for bioinformatics
- To write programs using pattern matching and visualization
- To apply microarray technology for genomic expression study

TEXT BOOKS:

1. Yi-Ping Phoebe Chen (Ed), “BioInformatics Technologies”, First Indian Reprint, Springer Verlag, 2007.
2. Zoe lacroix and Terence Critchlow, “BioInformatics – Managing Scientific data”, First Indian Reprint, Elsevier, 2004

REFERENCES:

1. Zoe Lacroix and Terence Critchlow, “Bioinformatics – Managing Scientific Data”, First Edition, Elsevier, 2004
2. Bryan Bergeron, “Bio Informatics Computing”, Second Edition, Pearson Education, 2003.
3. Arthur M Lesk, “Introduction to Bioinformatics”, Second Edition, Oxford University Press, 2005

CS8005 CLOUD COMPUTING AND SERVICES L T P C

3 0 0 3

OBJECTIVES

- To understand the current trend and basics of cloud computing.
- To differentiate between various service types: software, platform and infrastructure
- To understand the collaboration of cloud services.
- To expose various ways to collaborate the cloud service online.
- To familiarize with technologies for cloud virtualization
- To learn the standards behind cloud services

UNIT I INTRODUCTION 9

Cloud-definition, benefits, usage scenarios, History of Cloud Computing - Cloud Architecture - Types of Clouds - Business models around Clouds – Major Players in Cloud Computing - issues in Clouds - Eucalyptus - Nimbus - Open Nebula, Cloud Sim.

UNIT II CLOUD SERVICES 9

Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services. Service providers- Google, Amazon, Microsoft Azure, IBM, Sales force.

UNIT III COLLABORATING USING CLOUD SERVICES 9

Email Communication over the Cloud - CRM Management - Project Management- Event Management - Task Management – Calendar - Schedules - Word Processing – Presentation – Spreadsheet - Databases – Desktop - Social Networks and Groupware.

UNIT IV VIRTUALIZATION FOR CLOUD 9

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT V SECURITY, STANDARDS AND APPLICATIONS 9

Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

TOTAL: 45 PERIODS

OUTCOMES

- To be able to collaborate the cloud services to any device.
- To explore the online applications of cloud services.
- To implement cloud computing for the corporation.
- To design various applications by integrating the cloud services

TEXT BOOKS:

1. John Rittinghouse & James Ransome, Cloud Computing, Implementation, Management and Strategy, CRC Press, 2010.
2. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Que Publishing, August 2008.
3. James E Smith, Ravi Nair, Virtual Machines, Morgan Kaufmann Publishers, 2006.

REFERENCES:

1. David E.Y. Sarna Implementing and Developing Cloud Application, CRC press 2011.
2. Lee Badger, Tim Grance, Robert Patt-Corner, Jeff Voas, NIST, Draft cloud computing synopsis and recommendation, May 2011.
3. Anthony T Velte, Toby J Velte, Robert Elsenpeter, Cloud Computing : A Practical Approach, Tata McGraw-Hill 2010.
4. Haley Beard, Best Practices for Managing and Measuring Processes for On demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
5. G.J.Popek, R.P. Goldberg, Formal requirements for virtualizable third generation Architectures, Communications of the ACM, No.7 Vol.17, July 1974.

CS8006 COMPUTATIONAL INTELLIGENCE L T P C

3 0 0 3

OBJECTIVES:

- To examine work at the frontiers of research in computing where ideas from biology are inspirations to build truly intelligent computer systems
- To analyse the dependencies among biology, complexity, computer science, informatics, cognitive science, robotics, and cybernetics
- To introduce concepts, models, algorithms, and tools for development of intelligent systems
- To create an understanding of the fundamental Computational Intelligence models
- To explore the theory and applications of two classes of system inspired by biology: neural networks and evolutionary computation
- To learn to apply Computational Intelligence techniques to classification, pattern recognition, prediction, rule extraction, and optimization problems.

UNIT I THEORETICAL FOUNDATIONS 9

Data mining: fundamentals – data reduction - Decision tree algorithms - Association rules, Clustering: K-means, fuzzy c-means, hierarchical, probabilistic clustering methods - Rough set theory: definition – rule induction – feature selection - rough sets in data mining

UNIT II LEARNING 9

Bayes Optimal Classifiers – Gibbs Algorithms –Supervised Learning – Unsupervised Learning – Reinforcement Learning – Adaptive Learning EM Algorithm – Probability Learning - K- Nearest Neighbour Learning – Regression – Case Based Learning – collaborative learning - cognitive approach to learning and prediction

UNIT III EVOLUTIONARY COMPUTING 9

Neural Networks – Back propagation Networks – Hopfield Neural Networks – Radial Basis Function Networks – Learning Vector Quantisation - Artificial Neural Networks

Fuzzy Classifiers – Fuzzy Cognitive Maps – Collective Intelligence - Swarm Intelligence – Ant routing – Adaptivity and self-organisation – quantitative emergence and control - Self- Organising Feature Maps

UNIT IV ARTIFICIAL IMMUNE SYSTEMS 9

Scope – Framework – Algorithms – Network Models – Cognition and Immune Systems – Survey of Immune Systems, AI Hybrid systems: Case based reasoning – Classifier systems – Fuzzy systems – DNA computing – Case studies: Autonomous Navigation – Network Security– Job-shop scheduling

UNIT V ADVANCED TOPICS **9**

Ant Colony Optimization – Particle Swarm optimization – Artificial Life Systems - Swarms in business intelligence - Human-swarm interaction - Behavioral Intelligence – flock based collaboration – fusion, Robotic Swarms – population diversity - Self-organising robots – self- reconfigurable robots – Robot Coordination - Quantum computing – quantum algorithms – firefly, glow worm - applications

TOTAL: 45 PERIODS

OUTCOMES:

- To write programs involving decision trees and clustering
- To write programs using machine learning
- To differentiate the operation of various type of neural networks
- To develop applications involving ACO and PSO

TEXT BOOKS:

1. S. Sumathi, Surekha Paneerselvam, Computational Intelligence Paradigms: Theory & Applications Using MATLAB, CRC Press, 2009.
2. Russell C. Eberhart and Yuhui Shi,Computational intelligence: concepts to implementations, Morgan Kauffman, 2007.
3. John Fulcher, L. C. Jain, Computational intelligence: a compendium, Studies in computational intelligence, Vol. 115, Springer, 2008.
4. Leandro N. De Castro, Jonathan Timmis, Artificial immune systems: a new computational intelligence approach, Illustrated edition, Springer, 2002.

REFERENCES:

1. Andries P. Engelbrecht, Computational intelligence: an introduction, editon 2, John Wiley and Sons, 2007.
2. Christine L. Mumford, Lakhmi C. Jain, Computational Intelligence: Collaboration, Fusion and Emergence, Intelligence Systems reference library series, Volume 1, Springer, 2009.
3. Cordon, O.; Herrera, F.; Gomide, F.; Hoffmann, F.; Magdalena, L.; , “Ten years of genetic fuzzy systems: current framework and new trends,” 9th Joint IFSA World Congress and 20th NAFIPS International Conference , vol.3, pp.1241-1246, 25-28 July 2001

CS8007 DATA WAREHOUSING AND DATA MINING L T P C

3 0 0 3

OBJECTIVES:

- To evolve multidimensional intelligent model from a typical system
- To examine ways for representing multi dimensional data for a data warehouse
- To discover the knowledge imbibed in the high dimensional system
- To study algorithms for finding the hidden interesting patterns in data
- To study the performance of various mining techniques on complex data objects.

UNIT I INTRODUCTION TO DATA WAREHOUSING 8

Evolution of Decision Support Systems- Data warehousing Components –Building a Data warehouse, Data Warehouse and DBMS, Data marts, Metadata, Multidimensional data model, OLAP vs OLTP, OLAP operations, Data cubes, Schemas for Multidimensional Database: Stars, Snowflakes and Fact constellations.

UNIT II DATA WAREHOUSE PROCESS AND ARCHITECTURE 9

Types of OLAP servers, 3–Tier data warehouse architecture, distributed and virtual data warehouses.Data warehouse implementation , tuning and testing of data warehouse. Data Staging (ETL) Design and Development, data warehouse visualization, Data Warehouse Deployment, Maintenance, Growth, Business Intelligence Overview- Data Warehousing and Business Intelligence Trends - Business Applications- tools-SAS

UNIT III INTRODUCTION TO DATA MINING 9

Data mining-KDD versus datamining, Stages of the Data Mining Process-task premitives, Data Mining Techniques -Data mining knowledge representation – Data mining query languages, Integration of a Data Mining System with a Data Warehouse – Issues, Data preprocessing –Data cleaning, Data transformation, Feature selection, Dimensionality reduction, Discretization and generating concept hierarchies-Mining frequent patterns-association-correlation

UNIT IV CLASSIFICATION AND CLUSTERING 10

Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Clustering techniques – , Partitioning methods- k-means- Hierarchical Methods - distance-based agglomerative and divisible clustering, Density-Based Methods – expectation maximization -Grid Based Methods – Model-Based Clustering Methods – Constraint – Based Cluster Analysis – Outlier Analysis

UNIT V DATA WAREHOUSING AND DATA MINING SOFTWARE'S AND APPLICATIONS **9**

Mining complex data objects, Spatial databases, temporal databases, Multimedia databases, Time series and Sequence data; Text Mining –Graph mining-web mining-Application and trends in data mining

TOTAL: 45 PERIODS

OUTCOMES:

- To build a data warehouse for a real-world system
- To identify the necessity for database tuning in data warehouses
- To develop programs demonstrating dimensionality reduction
- To write programs for classification and clustering
- To develop applications related to web data mining

TEXT BOOKS:

1. Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers, third edition2011, ISBN: 1558604898.
2. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", Tata Mc Graw Hill Edition, Tenth Reprint 2007.
3. G. K. Gupta, "Introduction to Data Min Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.

REFERENCES:

1. Mehmed kantardzic,"Datamining concepts,models,methods, and lgorithms", Wiley Interscience, 2003.
2. Ian Witten, Eibe Frank, Data Mining; Practical Machine Learning Tools and Techniques, third edition, Morgan Kaufmann, 2011.
3. George M Marakas, Modern Data Warehousing, Mining and Visualization, Prentice Hall, 2003.

CS8008 **DATABASE TUNING** **L T P C**

3 0 0 3

OBJECTIVES:

- To get the feel of basics of database tuning
- To learn concepts behind database design optimization
- To write procedures involving query planning

UNIT I SQL TUNING **9**

SQL tuning – Execution Plan – Inspection – Optimization – Locking – Joining – Locks – Tuning Recovery subsystem – Operating system consideration – Hardware Tuning.

UNIT II DESIGN OPTIMIZATION **9**

Techniques – Tuning Relational Systems – Normalization – Tuning Denormalization – Clustering two tables – Aggregate Maintenance – Record Layout – Query Tuning – Triggers – Client server mechanism – Bulk Loading data – Accessing Multiple Databases.

UNIT III PERFORMANCE TUNING **9**

Approach – Performance Tuning Vs Relational database Applications – Performance Monitoring – Reasons – Types – Strategy – Performance monitoring Tools and strategies.

UNIT IV TROUBLESHOOTING **9**

Query plan explainers – Performance Monitors – Event Monitors – Finding Suspicious Queries – Analyzing Query Access Plan – Profiling a Query Execution – DBMS Subsystems.

UNIT V CASE STUDIES **9**

Monitoring and Tuning Activities – Benchmarking results of Oracle SQL* Forms – Oracle 11g – Informix.

TOTAL: 45 PERIODS

OUTCOMES:

- To design databases involving normalization
- To write optimized code for accessing multiple databases
- To use tuning tools for different database operations
- To troubleshoot databases
- To use benchmark databases for demonstrating concepts behind database tuning

TEXT BOOKS:

1. Dennis Shasha and Philippe Bonnet “Database Tuning, Principles, Experiments, and Troubleshooting Techniques”, Elsevier Reprint 2005.
2. Peter Gulutzan & Trudy Pelzer, “SQL Performance Tuning”, Addison-Wesley, 1st edition, 2002.

CS8009 E-LEARNING TECHNIQUES L T P C

3 0 0 3

OBJECTIVES:

- To learn the fundamentals of E-learning framework and lifecycle
- To know the potential uses of various learning management systems
- To familiarize the principles of E-learning
- To know the issues in designing interactive learning
- To appreciate the challenges and benefits of collaborative learning

UNIT I INTRODUCTION 9

E-Learning - E-Learning cycle - E-Learning types - challenges and opportunities – cognitive presence –Approaches to design E-Learning - E-Learning framework - 6C framework - E-Learning Tools

UNIT II E-LEARNING STRATEGY 9

Role of tutor - E-Learning strategy - Blended E-Learning – M-Learning- problem based learning- Enterprise learning- Corporate Learning- Web based Learning - Pod casting -Learning Management systems – Content development process – E-Learning standards- SCORM standard- managing e-learning quality - case studies

UNIT III PRINCIPLES OF E-LEARNING 9

Philosophy of E-Learning – theory of learning – Applying principles of multimedia - Applying principles of contiguity - Applying principles of modality - Applying principles of redundancy - Applying principles of coherency - Applying principles of personalization- web-based learning communities - knowledge sharing and Knowledge management in e-learning- social networks and social media in e-learning

UNIT IV DESIGN **9**

On line E-Learning technologies – visual communication techniques- Computer-based technologies - Computer-mediated communication (CMC) - Assessment and evaluation- Organizing and designing learning sequences, Characteristics of Interactive Online Learning Media

UNIT V IMPLEMENTATION **9**

Leverages example in E-Learning – collaborative E-Learning- Learner control in E-Learning- guidelines to solve issues in E-Learning – Implementation of an E-Learning Course Content for a complete online course, Research in content retrieval and generation for E-Learning, Role of cloud and semantic Grid in E-Learning

TOTAL: 45 PERIODS

OUTCOMES:

- To analyze and compare different on-line E-Learning tools
- To design course content for a specific subject from different perspectives
- To plan and design the instruction and support level needs of learners of various backgrounds based on different learning methodologies
- To outline the various tasks of a typical online course facilitator
- To design and implement an E-Learning Course Content for a complete online course

TEXT BOOKS:

1. D.Randy Garrison "E-Learning in the 21st century a framework for research and practice", 2nd edition, Taylor and Francis, 2011.
2. Robin Mason, "E-Learning : the key concepts", Routledge, 2007.
3. William Horton, "E-Learning by Design", Pfeiffer Wiley, 2006.
4. John Gardner, Bryn Holems, "E-Learning : Concepts and practice" SAGE Publications, 2006.

REFERENCES:

1. R.C.Clark and R.E.Mayer, "E-Learning and the science of instruction", Pfeiffer Wiley,2011.
2. Mark J Rosenberg, "E-Learning: strategies for delivering knowledge in the Digital Age", McGraw- Hill, 2001.
3. Kjell E. (Erik) Rudestam , Judith Schoenholtz-Read, "Handbook of Online Learning", Sage Publications Inc., Second Edition, 2009.
4. Topics (Wiley Series on Parallel and Distributed Computing)

CS8010 GRAPH THEORY AND COMBINATORICS L T P C

3 0 0 3

OBJECTIVES:

- To comprehend graphs as modeling and analysis tool
- To introduce various data structures with graph theory
- To learn fundamentals behind principle of counting and combinatorics

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 – Rooted and binary trees.

UNIT II TREES, CONNECTIVITY & PLANARITY 9

Spanning trees – Fundamental circuits – Spanning trees in a weighted graph – cut sets – Properties of cut set – All cut sets – Fundamental circuits and cut sets – Connectivity and separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational and geometric graphs – Planer graphs – Different 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 – Euler graphs.

UNIT IV PERMUTATIONS & COMBINATIONS 9

Fundamental principles of counting - Permutations and combinations - Binomial theorem - combinations with repetition - Combinatorial numbers - Principle of inclusion and exclusion - Derangements - Arrangements with forbidden positions.

UNIT V GENERATING FUNCTIONS 10

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

TOTAL: 45 PERIODS

OUTCOMES:

- To write programs involving basic graph algorithms
- To write programs for graph coloring
- To differentiate the potential use of directed and undirected graphs
- To outline the concepts of permutations and combinations

TEXT BOOKS:

1. Narsingh Deo, Graph Theory: With Application to Engineering and Computer Science, Prentice Hall of India, 2003.
2. Grimaldi R.P., Discrete and Combinatorial Mathematics: An Applied Introduction, Addison Wesley, 1994.

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 Hil, 2007.

CS8011 GREEN COMPUTING L T P C

3 0 0 3

OBJECTIVES:

- To acquire knowledge to adopt green computing practices to minimize negative impacts on the environment
- To learn about energy saving practices
- To understand the impact of e-waste and carbon waste

UNIT I FUNDAMENTALS 9

Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics.

UNIT II GREEN ASSETS AND MODELING 9

Green Assets: Buildings, Data Centers, Networks, and Devices – Green Business Process Management: Modeling, Optimization, and Collaboration – Green Enterprise Architecture – Environmental Intelligence – Green Supply Chains – Green Information Systems: Design and Development Models.

UNIT III GRID FRAMEWORK 9

Virtualizing of IT systems – Role of electric utilities, Telecommuting, teleconferencing and teleporting – Materials recycling – Best ways for Green PC – Green Data center – Green Grid framework.

UNIT IV GREEN COMPLIANCE 9

Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future.

UNIT V CASE STUDIES 9

The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.

TOTAL: 45 PERIODS

OUTCOMES:

- To explain the necessity of GreenIT
- To outline methodologies for creating Green Assets and their management
- To appreciate the use of Grid in GreenIT
- To develop case studies related to Environmentally Responsible Business Strategies

TEXT BOOKS:

1. Bhuvan Unhelkar**, "**Green IT Strategies and Applications-Using Environmental Intelligence", CRC Press, June 2011
2. Woody Leonhard, Katherrine Murray, "Green Home computing for dummies", August 2009.

REFERENCES:

1. Alin Gales, Michael Schaefer, Mike Ebbers, "Green Data Center: steps for the Journey", Shoff/IBM rebook, 2011.
2. John Lamb, "The Greening of IT", Pearson Education, 2009.
3. Jason Harris, "Green Computing and Green IT- Best Practices on regulations & industry", Lulu.com, 2008.
4. Carl speshocky, "Empowering Green Initiatives with IT", John Wiley & Sons, 2010.
5. Wu Chun Feng (editor), "Green computing: Large Scale energy efficiency", CRC Press, 2012.

CS8012 HUMAN COMPUTER INTERACTION L T P C

3 0 0 3

OBJECTIVES:

- To determine the necessity and use of computers
- To learn the methodologies for designing interactive systems
- To discover various models used for designing HCI systems

UNIT I DESIGN PROCESS 9

Humans – Information process – Computer – Information Process – Differences and Similarities between them – Need for Interaction – Models – Ergonomics – Style – Context – Paradigms – Designing of Interactive systems – Usability – Paradigm shift – Interaction design basics – Design Process – Scenarios – Users need – Complexity of design

UNIT II DESIGN AND EVALUATION OF INTERACTIVE SYSTEMS 9

Software Process – Usability engineering – Issue based Information systems – Iterative design practices – Design rules – maximum usability – Principles – Standards and guidelines – design patterns – Programming Tools – Windowing systems – Interaction tool kit – User Interface management system – Evaluation techniques – evaluation design – Evaluating implementations – Observational Methods

UNIT III MODELS 9

Universal design principles – Multimodal systems – User Support – Presentation and Implementation Issues – types – requirements – approaches – Cognitive model – Hierarchical model – Linguistic model – physical and device models – Socio-technical models – Communication and Collaboration models – Task models – Task analysis and design

UNIT IV EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS OF HCI 9

Basic Design structure – Single independent variable – multiple independent variable – factorial design – split-plot design – random errors – experimental procedure – Statistical analysis – T tests – Analysis of Variance test – Regression – Chi-Square test – Survey – Probabilistic sampling – Non-probabilistic sampling – developing survey questions

UNIT V THEORIES 9

Dialogue notations and design – Dialogue need – dialogue design notations – Graphical – Textual - representing dialogue – formal descriptions – Dialogue analysis – System models – Interaction models – relationship with dialogue – Formalisms – Formal notations – Interstitial behavior – Virtual reality – Modeling rich interaction – Status Event analysis – Properties – Rich contexts – Sensor-based systems – Groupware – Applications – Ubiquitous computing – Virtual reality

TOTAL: 45 PERIODS

OUTCOMES:

- To evaluate the use of interactive systems
- To map software engineering principles with HCI system design
- To outline the methodologies for statistical analysis of HCI
- To design effective HCI for individuals and persons with disabilities
- To develop meaningful user interface

TEXT BOOKS:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale Human Computer Interaction, 3rd Edition Prentice Hall, 2004.
2. Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, Research Methods in Human-Computer Interaction, Wiley, 2010.

REFERENCE:

1. Ben Shneiderman and Catherine Plaisant Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition, pp. 672, ISBN 0-321-53735-1, March 2009), Reading, MA: Addison-Wesley Publishing Co.

CS8013 INFORMATION RETRIEVAL AND MANAGEMENT L T P C

3 0 0 3

OBJECTIVES:

- To learn the concepts behind IR
- To understand the operation of web search engines
- To learn the algorithms related to classification and clustering in Text Mining

UNIT I INTRODUCTION 9

Introduction -History of IR- Components of IR - Issues –Open source Search engine Frameworks, The impact of the web on IR - The role of artificial intelligence (AI) in IR – IR Versus Web Search - Components of a Search engine- Characterizing the web

UNIT II INFORMATION RETRIEVAL 9

Boolean and vector-space retrieval models- Term weighting - TF-IDF weighting- cosine similarity – Preprocessing - Inverted indices - efficient processing with sparse vectors – Language Model based IR - Probabilistic IR –Latent Semantic Indexing - Relevance feedback and query expansion

UNIT III WEB SEARCH ENGINE – INTRODUCTION AND CRAWLING 9

Web search overview, web structure, the user, paid placement, search engine optimization/ spam. Web size measurement - search engine optimization/spam – Web Search Architectures - crawling - meta-crawlers- Focused Crawling - web indexes –- Near-duplicate detection - Index Compression - XML retrieval

UNIT IV WEB SEARCH – LINK ANALYSIS AND SPECIALIZED SEARCH 9

Link Analysis –hubs and authorities - PageRank and HITS algorithms -Searching and Ranking – Relevance Scoring and ranking for Web – Similarity - Hadoop & MapReduce - Evaluation - Personalized search - Collaborative filtering and content-based recommendation of documents and products – handling “invisible” Web - Snippet generation, Summarization, Question Answering, Cross-Lingual Retrieval

UNIT V DOCUMENT TEXT MINING 9

Information filtering; organization and relevance feedback – Text Mining -Text classificationand clustering - Categorization algorithms: naive Bayes; decision trees; and nearest neighbor - Clustering algorithms: agglomerative clustering; k-means; expectation maximization (EM)

TOTAL: 45 PERIODS

OUTCOMES:

- To use an open source search engine framework and explore its capabilities
- To represent documents in different ways and discuss its effect on similarity calculations and on search
- To modify Page Rank and HITS
- To design and implement an innovative feature in a search engine
- To explain the search components affected by the innovation, design a smart information management system with Information Retrieval components

TEXT BOOKS:

1. C. Manning, P. Raghavan, and H. Schütze, Introduction to Information Retrieval , Cambridge University Press, 2008.
2. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, Modern Information Retrieval: The Concepts and Technology behind Search (2nd Edition) (ACM Press Books) 2011.
3. Bruce Croft, Donald Metzler and Trevor Strohman, Search Engines: Information Retrieval in Practice, Addison Wesley; 1 edition 2009
4. Mark Levene, An Introduction to Search Engines and Web Navigation, Wiley; 2 edition, 2010.

REFERENCES:

1. Stefan Buettcher, Charles L. A. Clarke, Gordon V. Cormack, Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.
2. Ophir Frieder Information Retrieval: Algorithms and Heuristics (The Information Retrieval Series)(2nd Edition), Springer; 2nd edition, 2004
3. Manu Konchady, Building Search Applications: Lucene, LingPipe, and Gate Mustru Publishing; First edition,2008

CS8014 MIDDLEWARE TECHNOLOGIES L T P C

3 0 0 3

OBJECTIVES:

- To provide a sound knowledge in various middleware technologies
- To familiarize between various web service architectures and their standards

UNIT I INTRODUCTION 9

General Middleware, Service Specific Middleware, Client/Server Building blocks – RPC - Messaging – Peer – to – Peer, Java RMI - Computing standards – OMG - Overview of CORBA - Overview of COM/DCOM - Overview of EJB - Middleware types - Middleware in distributed Applications.

UNIT II EJB and CORBA 9

EJB architecture - Overview of EJB software architecture, EJB Conversation, Building and Deploying EJBs, Roles, applications - EJB Session Beans, EJB entity beans - Lifecycle of Beans - EJB clients - developing an application - Deployment. CORBA – components - architectural features - method invocations - static and dynamic: IDL - CORBA's self-describing data - interface repository - Building an application using CORBA - Overview of CORBA Services - Object location Services, Messaging Services - CORBA Component Model.

UNIT III COM and .NET 9

Evolution of DCOM - Introduction to COM - COM clients and servers - COM IDL - COM Interfaces COM Threading Models – Marshalling - Custom and standard marshalling - Comparison COM and CORBA - Introduction to **.**NET - Overview of **.**NET architecture - Remoting.

UNIT IV SOA and WEB SERVICES 9

Defining SOA - Business value of SOA - SOA characteristics - Concept of a service, Basic SOA - Enterprise Service Bus (ESB) - SOA enterprise Software Models -Services and SOA – WSDL - SOAP, UDDI, WS Standards -Web Services and Service Oriented Enterprise (SOE) - Coordination and Transaction - Business Process Execution Language for Web Services.

UNIT V OTHER TYPES OF MIDDLEWARE 9

Other types of Middleware, Real-Time Middleware, Embedded Systems Middleware, Mobile Middleware, Oracle Fusion Middleware

TOTAL: 45 PERIODS

OUTCOMES:

- To implement programs in EJB
- To map and differentiate the functions between COM and .NET
- To outline the functionalities of various types of middleware technologies
- To design web services

TEXT BOOKS:

1. G. Sudha Sadasivam, Radha Shankarmani, "Middleware and Enterprise Integration Technologies", Wiley, 2009.
2. Gustavo Alonso, Fabio Casati, Harumi Kuno, Vijay Machiraju, "Web Services: Concepts, Architectures and Applications", Springer, 2010.
3. Ian Gorton, "Essential Software Architecture", Springer, 2nd Edition, 2011.

REFERENCES:

1. Judith M. Myerson, “The Complete Book of Middleware” Auerbach Publications, 1 edition, 2002.
2. Sasu Tarkoma**,** “Mobile Middleware: Supporting Applications and Services” Wiley 1st edition, 2009.
3. Distributed Systems Architecture: A Middleware Approach”, Morgan Kaufmann, 2005.
4. Reza Shafii, Reza Shafii, Stephen Lee, and Gangadhar Konduri, “Oracle Fusion Middleware 11g Architecture and Management”, McGraw-Hill Osborne Media, 1 edition, 2011.

CS8015 NANO COMPUTING L T P C

3 0 0 3

OBJECTIVES:

- To understand the basics of nano computing
- To appreciate the necessity of quantum computing
- To familiarize with quantum computing softwares

UNIT I NANOCOMPUTING-PROSPECTS AND CHALLENGES 9

Introduction - History of Computing - Nanocomputing - Quantum Computers - Nanocomputing Technologies - Nano Information Processing - Prospects and Challenges - Physics of Nanocomputing : Digital Signals and Gates - Silicon Nanoelectronics - Carbon Nanotube Electronics - Carbon Nanotube Field-effect Transistors - Nanolithography

UNIT II NANOCOMPUTING WITH IMPERFECTIONS 9

Introduction - Nanocomputing in the Presence of Defects and Faults - Defect Tolerance - Towards Quadrillion Transistor Logic Systems

UNIT III RELIABILITY OF NANOCOMPUTING 9

Markov Random Fields - Reliability Evaluation Strategies - NANOLAB - NANOPRISM - Reliable Manufacturing and Behavior from Law of Large Numbers

UNIT IV NANOSCALE QUANTUM COMPUTING 9

Quantum Computers - Hardware Challenges to Large Quantum Computers - Fabrication, Test, and Architectural Challenges - Quantum-dot Cellular Automata (QCA) - Computing with QCA - QCA Clocking - QCA Design Rules

UNIT V QCADESIGNER SOFTWARE AND QCA IMPLEMENTATION 9

Basic QCA Circuits using QCADesigner - QCA Implementation - Molecular and Optical Computing: Molecular Computing - Optimal Computing - Ultrafast Pulse Shaping and Tb/sec Data Speeds

TOTAL: 45 PERIODS

OUTCOMES:

- To list the challenges and issues in nano-computing research
- To identify the challenges in quantum computing
- To develop programs for QCA

TEXT BOOK:

1. Sahni V. and Goswami D., Nano Computing, McGraw Hill Education Asia Ltd. (2008), ISBN (13): 978007024892.

REFERNCES:

1. Sandeep K. Shukla and R. Iris Bahar., Nano, Quantum and Molecular Computing, Kluwer Academic Publishers (2004), ISBN: 1402080670.
2. Sahni V, Quantum Computing, McGraw Hill Education Asia Ltd. (2007).
3. Jean-Baptiste Waldner, Nanocomputers and Swarm Intelligence, John Wiley & Sons, Inc. (2008), ISBN (13): 978-1848210097.

CS8016 NATURAL LANGUAGE PROCESSING L T P C

3 0 0 3

OBJECTIVES:

- To learn the fundamentals of natural language processing
- To appreciate the use of CFG and PCFG in NLP
- To understand the role of semantic analysis

UNIT I INTRODUCTION 9

Natural Language Processing tasks in syntax, semantics, and pragmatics – Issues - Applications- The role of machine learning - Probability Basics –Information theory – Collocations -N-gram Language Models - Estimating parameters and smoothing - Evaluating language models.

UNIT II MORPHOLOGY AND PART OF SPEECH TAGGING 9

Linguistic essentials - Lexical syntax- Morphology and Finite State Transducers - Part of speech Tagging - Rule-Based Part of Speech Tagging - Markov Models - Hidden Markov Models – Transformation based Models - Maximum Entropy Models. Conditional Random Fields

UNIT III SYNTAX PARSING 9

Syntax Parsing - Grammar formalisms and treebanks - Parsing with Context Free Grammars- Features and Unification -Statistical parsing and probabilistic CFGs (PCFGs)-Lexicalized PCFGs.

UNIT IV SEMANTIC ANALYSIS 9

Representing Meaning – Semantic Analysis - Lexical semantics –Word-sense disambiguation - Supervised – Dictionary based and Unsupervised Approaches - Compositional semantics- Semantic Role Labeling and Semantic Parsing – Discourse Analysis.

UNIT V APPLICATIONS 9

Named entity recognition and relation extraction- IE using sequence labeling-Machine Translation (MT) - Basic issues in MT-Statistical translation-word alignment- phrase-based translation – Question Answering

TOTAL: 45 PERIODS

OUTCOMES:

- To tag a given text with basic Language processing features
- To design an innovative application using NLP components
- To implement a rule based system to tackle morphology/syntax of a language
- To design a tag set to be used for statistical processing for real-time applications
- To compare and contrast use of different statistical approaches for different types of NLP applications.

TEXT BOOKS:

1. Daniel Jurafsky and James H. Martin Speech and Language Processing (2nd Edition), Prentice Hall; 2 edition, 2008
2. Foundations of Statistical Natural Language Processing by Christopher D. Manning and Hinrich Schuetze, MIT Press, 1999
3. Steven Bird, Ewan Klein and Edward Loper Natural Language Processing with Python, O'Reilly Media; 1 edition, 2009
4. Roland R. Hausser, Foundations of Computational Linguistics: Human-Computer Communication in Natural Language, Paperback, MIT Press, 2011

REFERENCES:

1. Pierre M. Nugues, An Introduction to Language Processing with Perl and Prolog: An Outline of Theories, Implementation, and Application with Special Consideration of English, French, and German (Cognitive Technologies) Softcover reprint, 2010
2. James Allen, Natural Language Understanding, Addison Wesley; 2 edition 1994
3. NLTK – Natural Language Tool Kit - http://www.nltk.org/

CS8017 NETWORK ANALYSIS AND MANAGEMENT L T P C

3 0 0 3

OBJECTIVES:

- To learn the network analysis and flow analysis with a network tool
- To understand the evaluation methodologies for Network analysis and Management

UNIT I INRODUCTION 9

Introduction – Requirement Analysis Concepts – Requirement Analysis Process – Flow Analysis

UNIT II ARCHITECTURE 9

Network Architecture – Addressing and Routing Architecture – Performance architecture – Security and Privacy Architecture – Network Analysis Tool

UNIT III NETWORK MANAGEMENT 9

Network Management Overview - Management Perspective: Dimensions of the Management: Management Interoperability, Management Life cycle, Management Layers – Management functions and reference models

UNIT IV NETWORK MANAGEMENT ORGANIZATION 9

Management Information – Management Communication Patterns: Rules of conversation. Common Management Protocols – Management organization

UNIT V MANAGEMENT INTEGERATION 9

Applied Network Management: Management Integration – Service Level Management – Management Metrics: Assessing Management Impact and Effectiveness – Case Study: NMS, Organization Network

TOTAL: 45 PERIODS

OUTCOMES:

- To use a network analysis tool to analyse a given network
- To use NMS for network management operations

TEXT BOOKS:

1. James D.McCabe, Network Analysis, Architecture and Design, 3rd Edition, Elsevier, 2007.
2. Alexander Clemm, Network Management Fundamentals, 1st Edition, Cisco Press, 2006.

REFERENCES:

1. Larry Walsh, SNMP MIB Handbook, 2008.
2. Laura Chappell and Gerals combs, Wireshark Network Analysis, 1st Edition, 2010.
3. William Stallings, SNMP, SNMPV2, SNMPV3, AND RMON 1&2, 3rd Edition, 1999.

CS8018 PRINCIPLES OF CRYPTOGRAPHY AND NETWORK SECURITY **L T P C 3 0 0 3**

OBJECTIVES:

- To appreciate the use of cryptography and digital signatures
- To learn the standards of encryption
- To learn various encryption algorithms
- To know the importance of network security
- To learn various types of network attacks

UNIT I CLASSICAL CRYPTOSYSTEM **9**

Security trends – Security Attacks and services – Symmetric cipher model- Classical Encryption Techniques –– LFSR sequences – Basic Number theory – Congruences – Chinese Remainder theorem – Modular exponentiation – Fermat and Euler's theorem – Legendre and Jacobi symbols – Finite Field – Galois Field.

UNIT II BLOCK CIPHER **9**

Simple DES – DES – Modes of operation – Triple DES – AES – RC4 – RSA – Attacks – Primality test – factoring.

UNIT III MESSAGE AUTHENTICATION **9**

Discrete Logarithms – Computing discrete logs – Diffie-Hellman key exchange – ElGamal Public key cryptosystems – Hash functions – Secure Hash – Birthday attacks - MD5 – Digital signatures – RSA – ElGamal – DSA.

UNIT IV NETWORK SECURITY **9**

Kerberos, X.509, PKI – Electronic Mail security – PGP – IP security – Web Security – SSL, TLS, SET.

UNIT V WIRELESS NETWORK SECURITY **9**

Wireless Network Security- IEEE 802.11 Wireless LANs - Protocol Overview and Security - Wireless Application Protocol (WAP) - Protocol Overview - Wireless Transport Layer Security (WTLS).

TOTAL: 45 PERIODS

OUTCOMES:

- To demonstrate the fundamentals of encryption using popular algorithms
- To compile security protocols and practices for wired and wireless networks
- To design a firewall

TEXT BOOKS:

1. William Stallings, “Crpyptography and Network security Principles and Practices”, Pearson/PHI, 5th ed, 2006. [Unit I, Unit II, Unit IV, Unit V]
2. Wade Trappe, Lawrence C Washington, “Introduction to Cryptography with coding theory”, 2nd ed, Pearson, 2007. [Unit III]

REFERENCES:

1. W. Mao, “Modern Cryptography – Theory and Practice”, Pearson Education, Second Edition, 2007.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger, “Security in computing”, Third Edition – Prentice Hall of India, 2006.
3. Douglas R. Stinson. “Cryptography, theory and practice” , Second edition, CRS Press.

CS8019 PRINCIPLES OF DISTRIBUTED SYSTEMS L T P C

3 0 0 3

OBJECTIVES:

- To explain the goals and types of distributed systems
- To describe operation of distributed OS
- To emphasize the benefits of using distributed transactions
- To learn issues related to developing fault-tolerant systems

UNIT I INTRODUCTION 9

Introduction to Distributed systems - challenges - architectural models - fundamental models - P2P systems - Introduction to interprocess communications - external data representation and marshalling- client server communication - group communication-multicast/pubsub - Energy Efficient Computing - Cloud computing

UNIT II DISTRIBUTED OBJECTS AND FILE SYSTEM 9

Introduction - Communication between distributed objects - Remote procedure call - Events and notifications - Java RMI case Study - Introduction to DFS - File service architecture – Google file system - Introduction to Name Services- Name services and DNS - Directory and directory services-ClusterComputing-mapreduce/bigtable.

UNIT III DISTRIBUTED OPERATING SYSTEM SUPPORT 9

The operating system layer – Protection - Process and threads - Communication and invocation - Operating system architecture - Introduction to time and global states - Clocks, Events and Process states - Synchronizing physical clocks - Logical time and logical clocks - Global states - Distributed mutual exclusion - Overlay Networks - DHT

UNIT IV TRANSACTION AND CONCURRENCY CONTROL-DISTRIBUTED TRANSACTIONS 9

Transactions – Nested transaction – Locks - Optimistic concurrency control - Timestamp ordering- Comparison of methods for concurrency control - Introduction to distributed transactions- Flat and nested distributed transactions - Atomic commit protocols - Concurrency control in distributed transactions - Distributed deadlocks - Transaction recovery - Data- Intensive Computing and Map Reduce

UNIT V FAULT TOLERANCE, SECURITY AND REPLICATION 9

Overview of security techniques - Cryptographic algorithms – Digital signatures - Cryptography pragmatics – Distributed Replication - CDNs and replication – Fault tolerant services - Byzantine Fault Tolerance - Detecting and Correcting Local Faults - Logging and Crash Recovery – Highly available services – Transactions with eplicated data. Case study: Multiplayer online games, Social networking services, Large object CDN's (video/ audio streaming systems)

TOTAL: 45 PERIODS

OUTCOMES:

- To implement distributed systems in the areas of system processes, communication applications, naming and synchronization
- To design distributed systems that take into account consistency, replication and/or fault tolerance
- To evaluate the security of distributed systems.

TEXT BOOKS:

1. Tanenbaum, A. and van Steen, M., Distributed Systems: Principles and Paradigms, 2nd ed, Prentice Hall, 2007. ISBN: 0132392275.
2. Coulouris, G, Dollimore, J., and Kindberg, Distributed Systems: Concepts and Design, 4rd ed T., Addison-Wesley, 2006. ISBN: 0321263545

REFERENCES:

1. Mukesh Singhal, Ohio State University, Columbus ,“Advanced Concepts In Operating Systems”, McGraw-Hill Series in Computer Science, 1994.
2. Kenneth P. Birman, “Reliable Distributed Systems: Technologies, Web Services, and Applications”, Springer.
3. Haggit Attiya, “Distributed Computing: Fundamentals, Simulations, 2nd Edition John wiley and sons, New York 2005.

CS8020 PRINCIPLES OF EMBEDDED AND REAL TIME SYSTEMS L T P C

3 0 0 3

OBJECTIVES:

- To obtain a broad understanding of the technologies and applications of embedded and real-time systems
- To understand the architecture of embedded systems and real-time systems
- To have a basic knowledge on the various issues involved in real-time databases
- To know how embedded systems can be made more fault tolerant
- To learn about embedded/real-time operating systems and the various issues associated with them

UNIT I INTRODUCTION TO EMBEDDED SYSTEM ARCHITECTURE 9

Embedded System - Introduction – Application Areas – Overview of Embedded System Architecture – Specialties – Recent Trends – Hardware Architecture – Software Architecture – Application Software – Communication Software – Process of Generating Executable Image – Programming for Embedded Systems – Memory Management – Device Drivers – Productivity Tools –Embedded System - Development Process - Embedded System Fiascos

UNIT II REAL-TIME SYSTEM AND TASKS 9

Issues in Real Time Computing, Structure of a Real Time System - Task Classes, Performance Measures for Real Time Systems, Estimating Program Run times. Task Assignment and Scheduling - Classical Uniprocessor scheduling algorithms, Uni-Processor scheduling of IRIS Tasks, Task Assignment, Mode Changes, and Fault Tolerant Scheduling.

UNIT III REAL-TIME DATABASES AND COMMUNICATION 9

Introduction – Main Memory Databases – Transaction Priorities – Concurrency Control Issues – Disk Scheduling Algorithms – Databases for Hard Real-Time Systems – Fault-Tolerant Routing

UNIT IV FAULT-TOLERANCE TECHNIQUES 9

Fault Types – Temporal Behavior Classification, Output Behavior Classification, Independence and Correlation - Fault Detection – Fault and Error Containment – Redundancy – Hardware, Software, Time, Information - Data Diversity – Reversal Checks – Integrated Failure Handling

UNIT V EMBEDDED/REAL-TIME OPERATING SYSTEMS 9

RS232/UART – RS422/RS485 – US – Infrared – IEEE 1394 Firewire – Ethernet – Bluetooth – Architecture of Kernel – ISR – Semaphores – Mutex – Mailboxes – Message Queues – Event Registers – Pipes – Signals – Timers – Memory Management – Priority Inversion Problem – Off-the-shelf Operating Systems – Embedded OS – Real-Time OS – Handheld OS – Target Image Creation – Representative Embedded Systems.

TOTAL: 45 PERIODS

OUTCOMES:

- To outline the ideas of real-time task scheduling
- To explain techniques of fault-tolerance
- To analyse the operations of real-time OS

TEXT BOOKS:

1. C.M. Krishna, Kang G. Shin, “Real-Time Systems”, McGraw Hill International Editions, 1997. (Unit 2,3,4)
2. Dr. K.V.K.K. Prasad, “Embedded/Real-Time Systems: Concepts, Design and Programming”, Dreamtech Press, 2008. (Unit 1,5)

REFERENCES:

1. Andrew N Sloss, D. Symes, C. Wright, ” Arm system developers guide”, Morgan Kauffman/ Elsevier, 2006.
2. Michael J. Pont, “Embedded C”, Pearson Education, 2007.
3. Stuart Bennett, “Real Time Computer Control-An Introduction”, Second edition, Prentice Hall PTR, 1994.
4. Peter D. Lawrence, “Real time Micro Computer System Design – An Introduction”, McGraw Hill, 1988.
5. S.T. Allworth and R.N. Zobel, “Introduction to real time software design”, Macmillan, II Edition, 1987.

CS8021 SERVICE ORIENTED ARCHITECTURE L T P C

3 0 0 3

OBJECTIVES:

- To gain understanding of the basic principles of service orientation, service oriented analysis techniques, technology underlying the service design
- To learn the advanced concepts such as service composition, orchestration and Choreography, and various WS-* specification standards

UNIT I FUNDAMENTALS OF SOA 9

Introduction-Defining SOA-Evolution of SOA-Service Oriented Enterprise-Comparing SOA to client-server and distributed internet architectures-Basic SOA Architecture-concepts-Key Service characteristics-Technical Benefits-Business Benefits.

UNIT II COMBINING SOA AND WEB SERVICES 9

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns- Web Service Platform-Service Contract-Service Level Data Model-Service Discovery-Service Level Security-Service Level Interaction Patterns-Atomic and Composite Services-Service Enabling Legacy System-Enterprise Service Bus Pattern.

UNIT III MULTI CHANNEL ACCESS AND WEB SERVICES COMPOSITION 9

SOA for Multi-Channel Access-Business Benefits-Tiers-Business Process Management-Web Service Composition-BPEL-RESTFUL Services-comparison of BPEL and RESTFUL Services.

UNIT IV JAVA WEB SERVICES 9

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-SOA support in .NET – ASP.NET web services – Case Studies- Web Services Enhancements (WSE)

UNIT V WEB SERVICES SECURITY AND TRANSACTION 9

Meta Data Management-Advanced Messaging- Addressing – Reliable Messaging– Policies- WS-Policy– Security- WS-Security–Notification and Eventing-Transaction Management

TOTAL: 45 PERIODS

OUTCOMES:

- To outline the concepts of SOA
- To develop a web service in Java
- To implement web security

TEXT BOOKS:

1. Eric Newcomer, Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005.
2. James Mc Govern,Sameer Tyagi,Michael E Stevens,Sunil Mathew,”Java Web Services Architecture”,Elsevier,2003.

REFERENCES:

1. Thomas Erl, “Service Oriented Architecture”,Pearson Education,2005
2. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services, An Architect’s Guide”, Pearson Education, 2005.
3. Dan Woods and Thomas Mattern, “Enterprise SOA Designing IT for Business Innovation” O’REILLY, First Edition, 2006.
4. Frank Cohen, “FastSOA”,Elsevier,2007.
5. Jeff Davies, “The Definitive Guide to OA”,Apress,2007.

CS8022 SOFTWARE AGENTS L T P C

3 0 0 3

OBJECTIVES:

- To understand how software agents reduce information overhead
- To gain knowledge in use of software agents for cooperative learning and personal assistance
- To know how agent can communicate and share knowledge using agent communication language
- To gain knowledge in design of an agent interpreter and intelligent agent
- To understand the concept of mobile technology and mobile agents and its security

UNIT I AGENT AND USER EXPERIENCE 9

Agent characteristics- object Vs agent. Agent types- Interacting with Agents - Agent From Direct Manipulation to Delegation - Interface Agent, Metaphor with Character – Designing Agents –problem solving agent, rational agent. Direct Manipulation versus Agent Path to Predictable

UNIT II AGENTS FOR LEARNING AND ASSISTANCE 9

Agents for Information Sharing and Coordination - Agents that Reduce Work Information Overhead - Agents without Programming Language - Life like Computer character - S/W Agents for cooperative Learning – Multiple Reasoning agents –M system. Learning agents: computational architectures for learning agents; evolution, adaptation; multi-agent learning.

UNIT III AGENT COMMUNICATION AND COLLABORATION 9

Overview of Agent Oriented Programming - Agent Communication Language – KQML-Per formatives. Agent Based Framework of Interoperability. Virtual agents: agents in games and virtual environments; companion and coaching agents; modeling personality, emotions; multimodal interaction; verbal and non-verbal expressiveness.

UNIT IV AGENT ARCHITECTURE 9

Strategies for agent design. Agent interpreter- BDI architecture. Architecture of Intelligent Agents. Agents for Information Gathering - Open Agent Architecture - Communicative Action for Artificial Agent. Agent societies and societal issues.

UNIT V MOBILE AGENTS 9

Mobile agent paradigm - Mobile agent concepts -Mobile agent technology – programming mobile agents –application of mobile agents- Teleshopping. Mobile agent security- trust, reliability and reputation.

TOTAL: 45 PERIODS

OUTCOME:

- To develop a software agent for real-time application

TEXT BOOK:

1. Jeffrey M.Bradshaw," Software Agents ", MIT Press 2000, Pearson Indian Reprint 2010.

REFERENCES:

1. Lin, Fuhua Oscar (Ed.), "Designing Distributed Learning Environments with Intelligent Software Agents", Information Science Publishing, 2004
2. Russel & Norvig, " Artificial Intelligence: A Modern Approach ", Prentice Hall, 2nd Edition,2002.
3. Murch Richard, Johnson Tony 'Intelligent Software Agents, 'Prentice Hall,1998.
4. Joseph P.Bigus & Jennifer Bigus, "Constructing Intelligent agents with Java: A Programmer's Guide to Smarter Applications ", Wiley, 1997.
5. Knapik, Michael and Jay Johnson 'Developing Intelligent Agents for Distributed Systems: Exploring Architecture, Technologies, and Applications' , McGraw-Hill.1998
6. William R. Cockayne, Michael Zyda, "Mobile Agents", Prentice Hall, 1998

CS8023 SOFTWARE QUALITY AND TESTING L T P C
3 0 0 3

OBJECTIVES:

- To understand the basics of software quality
- To learn various metrics of software quality
- To introduce concepts behind designing of test cases
- To learn the procedure of debugging a given software

UNIT I INTRODUCTION TO SOFTWARE QUALITY 8

Ethical Basis for Software Quality – Total Quality Management Principles – Software Processes and Methodologies – Quality Standards, Practices & Conventions – Improving Quality with Methodologies – Structured/Information Engineering – Measuring Customer Satisfaction– Software Quality Engineering – Defining Quality Requirements – Management Issues for Software Quality – Data Quality Control – Benchmarking and Certification.

UNIT II SOFTWARE QUALITY METRICS AND RELIABILITY 9

Writing Software Requirements and Design Specifications – Analyzing Software Documents using Inspections and Walkthroughs – Software Metrics – Lines of code, Cyclomatic Complexity, Function Points, Feature Points – Software Cost Estimation– Reliability Models – Reliability Growth Models – OO Metrics.

UNIT III TEST CASE DESIGN 11

Testing as an Engineering Activity – Testing Fundamentals – Defects – Strategies and Methods for Black Box Test Case Design – Strategies and Methods for White-Box Test Case design – Test Adequacy Criteria – Evaluating Test Adequacy Criteria – Levels of Testing and different types of testing – OO Testing.

UNIT IV TEST MANAGEMENT 9

Testing and Debugging Goals and Policies – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Process and the Engineering Disciplines – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

UNIT V CONTROLLING AND MONITORING 8

Measurement and Milestones for Controlling and Monitoring – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans – Reporting review results.

TOTAL: 45 PERIODS

OUTCOMES:

- To analyse software documentations using inspections and walkthrough
- To associate various software metrics to context
- To list the components of test plan
- To explain the principles behind SCM

TEXT BOOKS:

1. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, Chennai,2003.
2. Stephen Kan, “Metrics and Models in Software Quality”, Addison-Wesley, Second Edition, 2004.

REFERENCES:

1. Milind Limaye, “Software Quality Assurance”, McGraw Hill, 2011.
2. M G Limaye, “Software Testing – Principles, Techniques and Tools”, McGraw Hill, 2011.
3. Edward Kit, “Software Testing in the Real World – Improving the Process”, Pearson Education, New Delhi, 1995.
4. Elfriede Dustin, “Effective Software Testing”, Pearson Education, New Delhi, 2003.
5. Renu Rajani and Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, New Delhi, 2003.
6. Yogesh singh, “Software Testing”, Cambridge University Press India, 2012.

CS8024 SYSTEM MODELING AND SIMULATION L T P C

3 0 0 3

OBJECTIVES:

- To understand the concepts using natural models of computation
- To learn various mathematical models
- To learn to analyse simulation data
- To get introduced to various simulation tools

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 Example.

UNIT II MATHEMATICAL MODELS 9

Statistical Models - Concepts – Discrete Distribution- Continuous Distribution – Poisson Process- Empirical Distributions- Queueing Models – Characteristics- Notation Queueing Systems – Markovian Models- Properties of random numbers- Generation of Pseudo Random numbers- Techniques for generating random numbers-Testing random number generators- Generating Random-Variates- Inverse Transform technique Acceptance-Rejection technique – Composition & Convolution Method.

UNIT III ANALYSIS OF SIMULATION DATA 9

Input Modeling - Data collection - Assessing sample independence – Hypothesizing distribution family with data - Parameter Estimation - Goodness-of-fit tests – Selecting input models in absence of data- Output analysis for a Single system – Terminating Simulations – Steady state simulations.

UNIT IV VERIFICATION AND VALIDATION 9

Building – Verification of Simulation Models – Calibration and Validation of Models – Validation of Model Assumptions – Validating Input – Output Transformations.

UNIT V SIMULATION OF COMPUT ER SYSTEMS AND CASE STUDIES 9

Simulation Tools – Model Input – High level computer system simulation – CPU – Memory Simulation – Comparison of systems via simulation – Simulation Programming techniques - Development of Simulation models.

TOTAL: 45 PERIODS

OUTCOMES:

- To apply statistical models for simulation
- To compare various systems for simulation

TEXT BOOKS:

1. Jerry Banks and John Carson, “Discrete Event System Simulation”, Fourth Edition, PHI, 2005.
2. Geoffrey Gordon, “System Simulation”, Second Edition, PHI, 2006.

REFERENCES:

1. Frank L. Severance, “ System Modeling and Simulation”, Wiley, 2001.
2. Averill M. Law and W.David Kelton, “Simulation Modeling and Analysis, Third Edition, McGraw Hill, 2006.
3. Jerry Banks, “Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice”, Wiley-Interscience, 1 edition, 1998.

CS8071 CYBER FORENSICS L T P C

3 0 0 3

OBJECTIVES:

- To understand Computer Forensics, Computing Investigations, Enforcement Agency Investigations, Corporate Investigations, forensically sound principles and practices related to digital evidence collection, management, and handling.

UNIT I TYPES OF COMPUTER FORENSICS 9

Computer Forensics Fundamentals – Types of Computer Forensics Technology – Types of Vendor and Computer Forensics Services.

UNIT II DATA RECOVERY 9

Data Recovery – Evidence Collection and Data Seizure – Duplication and Preservation of Digital Evidence – Computer Image Verification and Authentication.

UNIT III ELECTRONIC EVIDENCE 9

Discover of Electronic Evidence – Identification of Data – Reconstructing Past Events – Networks.

UNIT IV THREATS 9

Fighting against Macro Threats – Information Warfare Arsenal – Tactics of the Military – Tactics of Terrorist and Rogues – Tactics of Private Companies.

UNIT V SURVEILLANCE 9

The Future – Arsenal – Surveillance Tools – Victims and Refugees – Advanced Computer Forensics.

TOTAL: 45 PERIODS

OUTCOMES:

- To demonstrate data recovery from hardware
- To list various software threats
- To identify and explain the working of surveillance tools

TEXT BOOK:

1. John R. Vacca, “Computer Forensics”, Firewall Media, 2004.

REFERENCES:

1. Chad Steel, “Windows Forensics”, Wiley India, 2006.
2. Majid Yar, “Cybercrime and Society”, Sage Publications, 2006.
3. Robert M Slade, “Software Forensics”, Tata McGraw Hill, 2004

CS8072 GAME PROGRAMMING L T P C

3 0 0 3

OBJECTIVES:

- To get subsequent understanding of game design and development
- To learn the processes, mechanics, issues in game design
- To get exposed to the architecture of game programming
- To know about game engine development, modeling, techniques and frameworks
- To learn about 3D graphics principles and animation techniques

UNIT I 3D GRAPHICS FOR GAME PROGRAMMING 9

Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Surfaces, Shader Models, Image Texturing, Bump Mapping, Advanced Texturing, Character Animation, Physics-based Simulation

UNIT II GAME DESIGN PRINCIPLES 9

Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding

UNIT III GAMING ENGINE DESIGN 9

Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics

UNIT IV GAMING PLATFORMS AND FRAMEWORKS 9

Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DXStudio, Unity

UNIT V GAME DEVELOPMENT 9

Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TOTAL : 45 PERIODS

OUTCOMES:

- To create interactive games

TEXT BOOKS:

1. David H. Eberly, “3D Game Engine Design, Second Edition: A Practical Approach to Real-Time Computer Graphics” Morgan Kaufmann, 2 Edition, 2006.
2. JungHyun Han, “3D Graphics for Game Programming”, Chapman and Hall/CRC, 1st edition, 2011.
3. Mike McShaffrfy, “Game Coding Complete”, Third Edition, Charles River Media, 2009.
4. Jonathan S. Harbour, “Beginning Game Programming”, Course Technology PTR, 3 edition, 2009.

REFERENCES:

1. Ernest Adams and Andrew Rollings, “Fundamentals of Game Design”, Prentice Hall 1st edition, 2006.
2. Roger E. Pedersen, “Game Design Foundations”, Edition 2, Jones & Bartlett Learning,2009.
3. Scott Rogers, “Level Up!: The Guide to Great Video Game Design”, Wiley, 1st edition,2010.
4. Jason Gregory, “Game Engine Architecture”, A K Peters, 2009.
5. Jeannie Novak, “Game Development Essentials”, 3rd Edition, Delmar Cengage Learning, 2011.
6. Andy Harris, “Beginning Flash Game Programming For Dummies”, For Dummies; Updated edition, 2005.
7. John Hattan, “Beginning Game Programming: A GameDev.net Collection”, Course Technology PTR, 1 edition, 2009.
8. Eric Lengyel, “Mathematics for 3D Game Programming and Computer Graphics”, Third Edition, Course Technology PTR, 3rd edition, 2011.
9. Dino Dini, **“**Essential 3D Game Programming”, Morgan Kaufmann, 1st edition 2012.
10. Jim Thompson, Barnaby Berbank-Green, and Nic Cusworth, “Game Design: Principles, Practice, and Techniques - The Ultimate Guide for the Aspiring Game Designer”, 1st edition, Wiley, 2007.

CS8073 SEMANTIC WEB L T P C

3 0 0 3

OBJECTIVES:

- To understand the semantic web architecture
- To learn about ontological engineering
- To learn web ontology language
- To discover the capabilities and limitations of semantic web technology for different applications

UNIT I INTRODUCTION 9

Introduction to the Syntactic web and Semantic Web – Evolution of the Web – The visual and syntactic web – Levels of Semantics – Metadata for web information - The semantic web architecture and technologies –Contrasting Semantic with Conventional Technologies –Semantic Modeling -Potential of semantic web solutions and challenges of adoption

UNIT II ONTOLOGICAL ENGINEERING 9

Ontologies – Taxonomies –Topic Maps – Classifying Ontologies - Terminological aspects: concepts, terms, relations between them – Complex Objects -Subclasses and Sub-properties definitions –Upper Ontologies – Quality – Uses - Types of terminological resources for ontology building – Methods and methodologies for building ontologies – Multilingual Ontologies -Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning

UNIT III STRUCTURING AND DESCRIBING WEB RESOURCES 9

Structured Web Documents - XML – Structuring – Namespaces – Addressing – Querying – Processing - RDF – RDF Data Model – Serialization Formats- RDF Vocabulary –Inferencing -RDFS – basic Idea – Classes – Properties- Utility Properties – RDFS Modelling for Combinations and Patterns- Transitivity

UNIT IV WEB ONTOLOGY LANGUAGE 9

OWL – Sub-Languages – Basic Notions -Classes- Defining and Using Properties – Domain and Range – Describing Properties - Data Types – Counting and Sets- Negative Property Assertions – Advanced Class Description – Equivalence – Owl Logic.

UNIT V SEMANTIC WEB TOOLS AND APPLICATIONS 9

Development Tools for Semantic Web – Jena Framework – SPARL –Querying semantic web - Semantic Desktop – Semantic Wikis -Semantic Web Services – Application in Science – Business

TOTAL: 45 PERIODS

OUTCOMES:

- To build and implement a small ontology that is semantically descriptive of the chosen problem domain
- To implement applications that can access, use and manipulate the ontology
- To represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology
- To depict the semantic relationships among the data elements using Resource Description Framework (RDF)
- To design and implement a web services application that “discovers” the data and/or other web services via the semantic web

TEXT BOOKS:

1. Liyang Yu, A Developer’s Guide to the Semantic Web, Springer; 1st Edition. Edition, 2011.
2. John Hebeler, Matthew Fisher, Ryan Blace and Andrew Perez-Lopez, Semantic Web Programming, Wiley; 1 edition, 2009.
3. Grigoris Antoniou, Frank van Harmelen, A Semantic Web Primer, Second Edition (Cooperative Information Systems) (Hardcover), MIT Press, 2008
4. Robert M. Colomb, Ontology and the Semantic Web: Volume 156 Frontiers in Artificial Intelligence and Applications (Frontier in Artificial Intelligence and Applications), IOS Press, 2007.
5. Dean Allemang and James Hendler, Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL, Morgan Kaufmann; 2 edition, 2011.

REFERENCES:

1. Michael C. Daconta, Leo J. Obrst and Kevin T. Smith, The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management, Wiley; 1 edition 2003
2. Karin Breitman, Marco Antonio Casanova and Walt Truszkowski, Semantic Web: Concepts, Technologies and Applications (NASA Monographs in Systems and Software Engineering), Springer; Softcover, 2010.
3. Vipul Kashyap, Christoph Bussler and Matthew Moran, The Semantic Web: Semantics for Data and Services on the Web (Data-Centric Systems and Applications), Springer, 2008.

CS8074 UNIX INTERNALS L T P C

3 0 0 3

OBJECTIVES:

- To provide knowledge about Unix operating system working principles, its file system and programming for interprocess communication
- To learn shell programming and filters
- To get an understanding on using various system calls

UNIT I OVERVIEW 9

General Overview of the System : History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel : Architecture of the UNIX operating system – Introduction to system concepts. The Buffer Cache: Buffer headers – Structure of the buffer pool – Scenarios for retrieval of a buffer – Reading and writing disk blocks – Advantages and disadvantages of the buffer cache.

UNIT II FILE SUBSYSTEM 9

Internal representation of files: Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Inode assignment to a new file – Allocation of disk blocks

UNIT III SYSTEM CALLS FOR THE FILE SYSTEM 9

Open – Read – Write – File and record locking – Adjusting the position of file I/O – Lseek – Close – File creation – Creation of special files – Changing directory, root, owner, mode – stat and fstat – Pipes – Dup – Mounting and unmounting file systems – link – unlink

UNIT IV PROCESSES 9

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process – Manipulation of the process address space - Sleep. Process Control : Process creation – Signals – Process termination – Awaiting process termination – Invoking other programs – user id of a process – Changing the size of a process - Shell – System boot and the INIT process– Process Scheduling

UNIT V MEMORY MANAGEMENT AND I/O 9

Memory Management Policies : Swapping – Demand paging. The I/O Subsystem: Driver Interface – Disk Drivers – Terminal Drivers– Streams – Inter process communication.

TOTAL: 45 PERIODS

OUTCOMES:

- To write UNIX programs using file system calls
- To write UNIX programs for process scheduling and page replacement
- To write UNIX programs on inter-process communication

TEXT BOOK:

1. Maurice J. Bach, “The Design of the Unix Operating System”, First Edition, Pearson Education, 1999.

REFERENCES:

1. B. Goodheart, J. Cox, “The Magic Garden Explained”, Prentice Hall of India, 1986.
2. S. J. Leffler, M. K. Mckusick, M. J. .Karels and J. S. Quarterman., “The Design and Implementation of the 4.3 BSD Unix Operating System”, Addison Wesley, 1998.
3. Uresh Vahalia, “Unix Internals: The New Frontiers”, Pearson Education, 1996.
4. Steve D Pate, “UNIX File systems: Evolution, Design and Implementation”, Wiley Publishing Inc., 2003.

GE8751 ENGINEERING ETHICS AND HUMAN VALUES L T P C

3 0 0 3

OBJECTIVES:

- The course explains various moral issues through predominant theories. It educates the code of ethics as well as the industry standards and how they can be used for ensuring safety and reducing the risk. The course enunciated the Rights and Responsibilities of individuals. Various other ethical global issues also have been explained along with case studies.

UNIT I HUMAN VALUES 10

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality.

UNIT II ENGINEERING ETHICS 9

Senses of 'Engineering Ethics' – Variety of moral issues – 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 andReligion – 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 8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development– Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses andAdvisors – Moral Leadership – Sample Code of Conduct

OUTCOMES:

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

TEXTBOOK:

1. Mike W. Martin and Roland Schinzinger, “Ethics in Engineering”, Tata McGraw Hill, New Delhi, 2nd Edition, 2009.

REFERENCES:

1. Charles B. Fleddermann, “Engineering Ethics”, Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, “Engineering Ethics – Concepts and Cases”, Thompson Wadsworth, A Division of Thomson Learning Inc., United States, 2000
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, “Fundametals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001

Web sources:

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

MG8654 TOTAL QUALITY MANAGEMENT L T P C

3 0 0 3

AIM

To provide comprehensive knowledge about the principles, practices, tools and techniques of Total quality management.

OBJECTIVES

- To understand the various principles, practices of TQM to achieve quality.
- To learn the various statistical approaches for Quality control.
- To understand the TQM tools for continuous process improvement.
- To learn the importance of ISO and Quality systems

UNIT I INTRODUCTION 9

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of product and service quality - Basic concepts of TQM – TQM Framework - Contributions of Quality Gurus – Barriers to TQM – Cost of Quality.

UNIT II TQM PRINCIPLES 9

Quality statements - Customer focus –Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Continuous process improvement – PDCA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I 9

The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types.

UNIT IV TQM TOOLS & TECHNIQUES II 9

Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Performance measures - BPR.

UNIT V QUALITY SYSTEMS 9

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- Q 9000 – ISO 14000 – Concepts, Requirements and Benefits – Quality Council – Leadership, Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward.

TOTAL : 45 PERIODS

OUTCOMES :

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXT BOOK:

1. Dale H.Besterfiled, et al., “Total Quality Management”, Pearson Education Asia, Third Edition, Indian Reprint , 2006.

REFERENCES:

1. James R. Evans and William M. Lindsay, “The Management and Control of Quality”, (6th Edition), South-Western (Thomson Learning), 2005.
2. Oakland, J.S. “TQM – Text with Cases”, Butterworth – Heinemann Ltd., Oxford, Third Edition , 2003.
3. Suganthi,L and Anand Samuel, “Total Quality Management”, Prentice Hall (India) Pvt. Ltd., 2006 .
4. Janakiraman,B and Gopal, R.K, “Total Quality Management – Text and Cases”,Prentice Hall (India) Pvt. Ltd., 2006.

IT8071 DIGITAL IMAGE PROCESSING L T P C

3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the techniques for processing images including the different File formats used
- Be exposed different image enhancement techniques
- Learn about image segmentation and feature analysis
- Understand the role of multi resolution analysis in image processing
- Study various applications of image processing

UNIT I FUNDAMENTALS OF IMAGE PROCESSING 9

Introduction - Steps in image processing systems - Image acquisition - Sampling and Quantization - Pixel relationships - Color fundamentals and models - File Formats, Image operations: Arithmetic, Geometric and Morphological.

UNIT II IMAGE ENHANCEMENT 9

Spatial Domain - Gray level transformations - Histogram processing - Spatial filtering - Smoothing and sharpening - Frequency domain: Filtering in frequency domain - DFT, FFT, DCT - Smoothing and sharpening filters - Homomorphic filtering

UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS 9

Detection of discontinuities - Edge operators - Edge linking and boundary Detection - Thresholding - Region based segmentation - Morphological Watersheds - Motion segmentation, Feature analysis and extraction

UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS 9

Multi Resolution analysis : Image pyramids - Multi resolution expansion - Wavelet transforms - Image compression : Fundamentals - Models - Elements of information theory - Error free compression - Lossy compression - Compression standards

UNIT V APPLICATIONS OF IMAGE PROCESSING 9

Image classification - Image recognition - Image understanding - Video motion analysis - Image fusion - Steganography - Digital compositing - Mosaics - Color image processing

TOTAL: 45 PERIODS

OUTCOMES:

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

- Explain the various steps in image processing
- Compare and Contrast different image enhancement techniques
- Critically analyze various image segmentation and feature analysis
- Apply Multi resolution analysis to image processing
- Design various applications using image processing

TEXT BOOKS:

1. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing”, Third Edition, Pearson Education, 2009.
2. S.Sridhar, “Digital Image Processing”, Oxford University Press, 2011.

REFERENCE BOOKS:

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision”, Second Edition, Thompson Learning, 2007.
2. Anil K.Jain, “Fundamentals of Digital Image Processing”, PHI, 2011.
3. Sanjit K. Mitra, & Giovanni L. Sicuranza, “Non Linear Image Processing”, Elsevier, 2007.

IT8072 FREE AND OPEN SOURCE SOFTWARE L T P C

3 0 0 3

OBJECTIVES:

The student should be made to:

- Be exposed to the context and operation of free and open source software (FOSS) communities and associated software projects.
- Be familiar with participating in a FOSS project
- Learn scripting language like Python
- Learn some important FOSS tools

UNIT I PHILOSOPHY 6

Linux,GNU and Freedom, Brief history of GNU, Licensing free software – GPL and copy Left, trends and potential – global and Indian, overview and usage of various Linux Distributions – userfriendliness perspective – scientific perspective

UNIT II SYSTEM ADMINISTRATION 10

GNU and linux installation – Boot process, Commands Using bash features, The man pages, files and file systems, File security, Partitions, Processes, Managing processes, I/O redirection, Graphical environment, Installing software, Backup techniques

UNIT III FOSS PROGRAMMING PRACTICES 10

GNU debugging tools, Using source code versioning and managing tools, Review of common programming practices and guidelines for GNU/Linux and FOSS, Documentation

UNIT IV PROGRAMMING TECHNIQUES 10

Application programming – Basics of X Windows server architecture – QT programming – GTK + Programming- Python programming – Open source equivalent of existing Commercial software

UNIT V PROJECTS AND CASE STUDIES 9

Linux for portable Devices, Creation of Bootable CD and USB from command line, Case Studies – Samba, Libre office, Assistive technology

OUTCOMES:

Upon completion of the course, the student should be able to:

- Install and run open-source operating systems.
- Gather information about Free and Open Source Software projects from software releases and from sites on the internet.
- Build and modify one or more Free and Open Source Software packages.
- Use a version control system.
- Contribute software to and interact with Free and Open Source Software development projects.

TEXT BOOK:

1. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, Linux in a nutshell, Sixth edition, OReilly media, September 2009.

REFERENCE BOOKS:

1. Philosophy of GNU URL: http://www.gnu.org/philosophy/
2. Overview of Linux Distributions URL: http://distrowatch.com/dwres.php?resource=major
3. Introduction to Linux – A Hands on Guide, URL: http://tldp.org/guides.html
4. **Linux:** Rute's User tutorial and exposition , URL: http://rute.2038bug.com/index.html.gz
5. Version control system , URL: http://git-scm.com/
6. SVN version control , URL: http://svnbook.red-bean.com/
7. GTK+/GNOME
8. Application
9. Development,
10. Havoc
11. Pennington.
12. URL:

13. http://developer.gnome.org/doc/GGAD
14. Python Tutorial, Guido van Rossum, Fred L. Drake, Jr., Editor. URL:
15. http://www.python.org/doc/current/tut/tut.html
16. Doug Abbot, Linux for Embedded and Embedded and Real time applications , Newnes
17. Case study SAMBA: URL : http://www.samba.org/
18. Case study., Libre office: http://www.libreoffice.org/
19. Case study, ORCA: http://live.gnome.org/Orca

IT8073 TCP/IP DESIGN AND IMPLEMENTATION L T P C
3 0 0 3

OBJECTIVES:

- To learn the basics of socket programming using TCP Sockets.
- To learn about Socket Options
- To learn to develop Macros for including Objects In MIB Structure
- To understand SNMPv1, v2 and v3 protocols & practical issues.

UNIT I FUNDAMENTALS 9

Internetworking concepts - IP and datagram forwarding - TCP services - Interactive data flow - Timeout and retransmission - Bulk data flow - Persist timer – Keep-alive timer

UNIT II ARP AND IP 9

Structure of TCP/IP in OS - Data structures for ARP - Cache design and management - IP software design and organization - Sending a datagram to IP

UNIT III IP ROUTING IMPLEMENTATION 9

Routing table - Routing algorithms - Fragmentation and reassembly - Error processing (ICMP) - Multicast Processing (IGMP)

UNIT IV TCP I/O PROCESSING AND FSM 9

Data structure and input processing - Transmission control blocks - Segment format - Comparison - Finite state machine implementation - Output processing - Mutual exclusion - Computing TCP data length

UNIT V TCP TIMER AND FLOW CONTROL 9

Timers - Events and messages - Timer process - Deleting and inserting timer event - Flow control and adaptive retransmission - Congestion avoidance and control - Urgent data processing and push function

TOTAL : 45 PERIODS

OUTCOMES:

At the end of this course the student should be able to

- Understand the internals of the TCP/IP protocols
- Understand how TCP/IP is actually implemented
- Understand the interaction among the protocols in a protocol stack

TEXT BOOKS

1. Douglas E. Comer, “Internetworking with TCP/IP Principles, Protocols and Architecture”, Vol. 1 Fifth edition, Pearson Education Asia, 2006.
2. Douglas E. Comer, “Internetworking with TCP/IP - Design, Implementation and Internals”, Vol. 2 Third edition, Pearson Education Asia, 1999.

REFERENCE:

1. W. Richard Stevens, “TCP/IP illustrated-The Protocols”, Volume 1, Pearson Education, 2003.

CS8075 FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT L T P C 3 0 0 3

OBJECTIVE:

This program can be offered with all Undergraduate programs/courses for all engineering streams. The FSIPD program aims to improve student‘s awareness and understanding of the basic concepts involved in Integrated product Development (IPD) by providing exposure to the key product development concepts. Students, who complete this program, will stand a better chance to be considered for jobs in the Engineering industry.

COURSE OBJECTIVES:

After completing this program, the student will be able to obtain the technical skills needed to effectively play the entry level design engineer role in an engineering organization.

The student will be able to:

- Understand the global trends and development methodologies of various types ofproducts and services
- Conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
- Understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them in to design specification
- Understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- Gain knowledge of the Innovation & Product Development process in the Business Context

UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT 9

Global Trends Analysis and Product decision - Social Trends - Technical Trends- Economical Trends - Environmental Trends - Political/Policy Trends - Introduction to Product Development Methodologies and Management - Overview of Products and Services - Types of Product Development - Overview of Product Development methodologies - Product Life Cycle - Product Development Planning and Management

UNIT II REQUIREMENTS AND SYSTEM DESIGN 9

Requirement Engineering - Types of Requirements - Requirement Engineering - Traceability Matrix and Analysis - Requirement Management - System Design & Modeling - Introduction to System Modeling - System Optimization - System Specification - Sub-System Design - Interface Design

UNIT III DESIGN AND TESTING 9

Conceptualization - Industrial Design and User Interface Design - Introduction to Concept generation Techniques – Challenges in Integration of Engineering Disciplines - Concept Screening & Evaluation - Detailed Design - Component Design and Verification – Mechanical, Electronics and Software Subsystems - High Level Design/Low Level Design of S/W Program - Types of Prototypes, S/W Testing- Hardware Schematic, Component design, Layout and Hardware Testing – Prototyping - Introduction to Rapid Prototyping and Rapid Manufacturing - System Integration, Testing, Certification and Documentation

UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT 9

Introduction to Product verification processes and stages - Introduction to Product validation processes and stages - Product Testing standards and Certification - Product Documentation - Sustenance - Maintenance and Repair – Enhancements - Product EoL - Obsolescence Management - Configuration Management - EoL Disposal

UNIT V BUSINESS DYNAMICS ENGINEERING SERVICES INDUSTRY 9

The Industry - Engineering Services Industry - Product development in Industry versus Academia - The IPD Essentials - Introduction to vertical specific product development processes - Manufacturing/Purchase and Assembly of Systems - Integration of Mechanical, Embedded and S/W systems – Product development Trade-offs - Intellectual Property Rights and Confidentiality - Security and configuration management.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

The students will be able to

- Define, formulate and analyze a problem
- Solve specific problems independently or as part of a team
- Develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer
- Work independently as well as in teams
- Manage a project from start to finish

COURSE MATERIAL AND PEDAGOGY:

- NASSCOM has agreed to prepare / revise the course materials [selected teachers Anna University from major disciplines will be included in the process] as PPT slides for all theUNITS. The PPTs can be printed and given to each student if necessary at a Nominal Fee. This is the best possible material for this special course.
- NASSCOM will train the teachers of Anna University to enable them to teach this course. Atraining programme for nearly 3500 teachers needs to be organized. The team
  is exploring use of technology including the EDUSAT facility at Anna University.
- The course is to be offered as an elective to all UG Students both in the Constituent Colleges and Affiliated colleges of Anna University.

TEXT BOOKS [INDIAN ECONOMY EDITIONS]:

1. Karl T Ulrich and Stephen D Eppinger, "Product Design and Development", TataMcGraw Hill, Fifth Edition, New Delhi, 2011
2. John W Newstorm and Keith Davis, "Organizational Behavior", Tata McGraw Hill,Eleventh Edition, New Delhi, 2005.

REFERENCES:

1. Hiriyappa B, “Corporate Strategy – Managing the Business”, Authorhouse, USA, 2013
2. Peter F Drucker, “People and Performance”, Butterworth – Heinemann [Elsevier],Oxford, UK, 2004.
3. Vinod Kumar Garg and Venkitakrishnan N K, “Enterprise Resource Planning – Conceptsand Practice”, Prentice Hall India, New Delhi, 2003
4. Mark S Sanders and Ernest J McCormick, "Human Factors in Engineering and Design",McGraw Hill Education, Seventh Edition, New Delhi, 2013.

GE8072 DISASTER MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS 9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processess and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS

OUTCOMES:

The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management

TEXTBOOK:

1. Singhal J.P. “Disaster Management”, Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, “Disaster Science and Management”, McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

REFERENCES

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

GE8073 **HUMAN RIGHTS** **L T P C**
3 0 0 3

OBJECTIVES :

- To sensitize the Engineering students to various aspects of Human Rights.

UNIT I **9**

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights. Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights.

UNIT II **9**

Evolution of the concept of Human Rights Magana carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights.

UNIT III **9**

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNIT IV **9**

Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V **9**

Human Rights of Disadvantaged People – Women, Children, Displaced persons andDisabled persons, including Aged and HIV Infected People. Implementation of Human Rights – National and State Human Rights Commission – Judiciary – Role of NGO's, Media, Educational Institutions, Social Movements.

TOTAL : 45 PERIODS

OUTCOMES:

- Engineering students will acquire the basic knowledge of human rights.

REFERENCES:

1. Kapoor S.K., "Human Rights under International law and Indian Laws", Central Law Agency, Allahabad, 2014.
2. Chandra U., "Human Rights", Allahabad Law Agency, Allahabad, 2014.
3. Upendra Baxi, The Future of Human Rights, Oxford University Press, New Delhi.