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

COURSE CODE	COURSE TITLE	L	T	P	C
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

			L	T	P	C
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

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

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

MA8151   **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

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

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

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: Helmholtz

and 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

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

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 classes, Pre-processor directives.

TOTAL: 45 PERIODS

TEXTBOOKS:

1. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, 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

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

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 conductor
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 angle
	ii. Compact disc	–	Determination of width of the groove using laser
7.	Acoustic grating	–	Determination of velocity of ultrasonic waves in liquids
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

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

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.

<div align="right">**TOTAL: 30 PERIODS**</div>

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

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.

<div align="right">**TOTAL : 45 PERIODS**</div>

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

OBJECTIVE
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, reducers, 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

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

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

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**   **L T P C**

(Common to Computer Science and Information Technology Branches) 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) – Antiferromagnetic 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

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

OBJECTIVE

Learn how to design digital circuits by simplifying the Boolean functions. Also, gives an idea about designs using PLDs, and writing HDL codes for designing larger digital systems.

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

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 provide a fundamental knowledge of Computer Engineering , which includes evolution of computers and its various components and applications.

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

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

OBJECTIVE

To develop programming skill and to solve engineering related problems using Object Oriented Programming Concepts.

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

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

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.

CS8212   **PROGRAMMING LABORATORY**   **L T P C**
                                                                          0 0 3 2

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 using 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

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
* 30 Terminals with C and C++ Compiler

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

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

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

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

OBJECTIVE

Identify the functional units in a digital computer system, distinguish between the various ISA styles, trace the execution sequence of an instruction through the processor, compare different approaches used for implementing a functional unit and evaluate different computer systems based on performance metrics.

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

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, "Computer Organization 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

OBJECTIVE

Learning program independent view of data structures, including its representation and operations performed on them, which are then linked to sorting, searching and indexing methods to increase the knowledge of usage of data structures in algorithmic perspective.

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

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

OBJECTIVE

Classify modern and futuristic database applications based on size and complexity; design a database from understanding an Universe of Discourse, using ER diagrams; map ER model into Relational model and to normalize the relations; create a physical database from a design using DDL statements with appropriate key, domain and referential integrity constraints; analyze different ways of writing a query and justify which is the effective and efficient way; and compare and contrast various indexing strategies in different database systems and list key challenges in advanced database systems and to critique how they differ from traditional database systems.

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

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   S y s t e m s", 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

TEXT BOOKS:

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

REFERENCES:

1.   Denal A.Neamar, Electronic Circuit Analysis and Design – Second Edition – Tata MCGraw 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

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.

CS8312   DATABASE MANAGEMENT SYSTEMS LABORATORY   L T P C
0 0 3 2

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

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

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

Objective

Understanding various algorithm design techniques, and to know how to apply those techniques to various problems. Also, gives an understanding of parallel algorithm design, and provides the idea of 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

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

OBJECTIVE

This course comprehends the concepts of core java and working principles of Internet, and the knowledge will be enhanced to the client and server side programming and web 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

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 |

OBJECTIVE

Gives an idea about process synchronization, inter-process communication, scheduling, 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

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

OBJECTIVE

This course is intended to provide the students with an overall view over Software Engineering discipline and with insight into the processes of software development.

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

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

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 LOBORATORY**   **L T P C**
                                                                                                        0 0 3 2

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/SilverLight etc.,

TOTAL: 45 PERIODS

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

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

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
1. Linux server
2. Terminals for 30 students

CS8501   **DATA COMMUNICATION AND COMPUTER NETWORKS**   **L T P C**
                                                                    3 1 0 4

OBJECTIVE
Gets the idea of choosing the required functionality at each layer for a given application and trace the flow of information from one node to another node in the network. Then gives the

understanding of division of network functionalities in to layers, the component required to build different types of networks and identify the solution for the functionalities in each layer.

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 Basic Features – 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

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

OBJECTIVE

Gives an understanding of functional blocks of a Microprocessor and programming in 8085 and 8086. It also explains the functions of common programmable peripheral controllers and interface a processor with another processor/co-processor and other peripheral devices. At the end, the students will be capable of building a Microprocessor/ Microcontroller based system for a given control 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

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

Issues related to the design and implementation of assemblers, role of linkers and loaders as well as their interactions with hardware, working nature of macro processors and design of virtual machines are the core of this course.

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

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

Learning about automata, grammar, language, and their relationships. Further, gives an understanding of the power of Turing machine, and the decidable nature of a problem. Also, gives the idea on some new trends and applications.

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

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

OBJECTIVE

Gives and understanding of OOAD basics, UML diagrams, system modeling, design based on requirements, converting design to code, and 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

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

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

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

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

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

CS8513   **MICROPROCESSORS LABORATORY**   **L T P C**
                                                                  0 0 3 2

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.

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

OBJECTIVE

To search and discover intelligent characteristics of existing AI projects, map a new problem – as search and create an animation – showing different search strategies for a problem, program a new game/ problem in Prolog, evaluate different Knowledge Representation schemes for typical AI problems, design and implement a typical AI problem to be solved Using Machine Learning Techniques, design and implement a futuristic AI application

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

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

OBJECTIVE

To design the front end of the compiler, scanner, parser, intermediate code generator, object code generator, and the parallel compilation strategies.

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

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 McGrawHill 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 develop, design and implement two and three dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of 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

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

It explores a range of modern programming languages and programming techniques and performs comparison of the same, and gives the idea of evaluating programming language features critically with respect to the way they support good software engineering practice. Also, it describes analyzing of solving a problem in terms of several programming paradigms, so that one can determine the advantages and disadvantages of each approach.

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

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**   **L T P C**
                              APPLICATIONS   **3 0 0 3**

OBJECTIVE

This course provides the idea on design of analog and digital filters, and their classifications. Also, it provides a good knowledge of error correction in signal processing systems, which is then enriched with the applications to image and speech processing.

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

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

OBJECTIVE:

*   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
    Reflection
    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

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

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 McGraw 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

OBJECTIVE:

To study the details of lower layers of mobile architectures in the context of pervasive computing and mobile applications.

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 iPhone.

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

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

OBJECTIVE

To identify the scope for parallelism in a program, understand the various parallel programming models and the challenges involved in parallel programming, learn the basics of OpenMP and

MPI and programming with them, and the programming of heterogeneous systems using CUDA and OpenCL

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

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

OBJECTIVE

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

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

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

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

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

CS8001   **.NET AND C# PROGRAMMING**   **L T P C**
                                                                  3 0 0 3

OBJECTIVE:

Understand the concept of .NET framework, study the different techniques of security, introduce web services with ASP.NET, and 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

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

OBJECTIVE

To study the protocols and the functionalities of ad hoc networks, understanding the various applications developed based on ad hoc networking, addressing issues and challenges created. To know about the sensor networks and addressing the challenges in establishing infrastructure for sensor networks and managing database.

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

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

OBJECTIVE

To know advanced concepts of database in large scale analytics, derive data maintenance, change schema, database update and Benchmark Object Databases, deals with uncertainties in advanced concepts of database, and open issues in database technologies.

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 - MapReduce Paradigm - run-time system for supporting scalable and fault-tolerant execution - paradigms: PigLatin and Hive and parallel databases versus MapReduce

UNIT II   ACTIVE DATABASES   9

Syntax and Sematics (Starburst, Oracle, DB2) – Taxonomy – Applications – Integrity Management – Workflow Management – Business 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

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

OBJECTIVE:

To understand basic concepts of molecular biology and genetics, the concepts of computer science that relate to problems in biological sciences, computer as a tool for biomedical research, and 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

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

OBJECTIVE

This course gives the idea of evolution of cloud computing and its services available today, which may led to the design and development of simple cloud service. It also focused on some key challenges and issues around cloud computing.

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

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

OBJECTIVE

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

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

OBJECTIVE

This course deals with evolving multidimensional intelligent model from a typical system, representation of multi dimensional data for a data warehouse, discovering the knowledge imbibed in the high dimensional system, finding the hidden interesting patterns in data, and gives the idea to evaluate 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 9
APPLICATIONS

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

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", TataMc Graw Hill Edition, Tenth Reprint 2007.

3. G. K. Gupta, "Introduction to Data Min Data Mining with Case Studies", Easter EconomyEdition, 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

OBJECTIVE

To use Tuning tools for different operations; optimization to different mechanism of Database; and change Schema, Database update and Benchmark Databases.

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

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

OBJECTIVE

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

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

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

OBJECTIVE

This course comprehends the graphs as a modeling and analysis tool in computer science & Engineering. It introduces the structures such as graphs & trees and techniques of counting and combinations, which are needed in number theory based computing and network security studies in Computer Science.

UNIT I   INTRODUCTION   9

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

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

OBJECTIVE

To acquire knowledge to adopt green computing practices to minimize negative impacts on the environment, skill in energy saving practices in their use of hardware, examine technology tools that can reduce paper waste and carbon footprint by user, and to understand how to minimize equipment disposal requirements

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

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

OBJECTIVE

Determine the need for computers and evaluate the use of computers, identify the stages in software engineering that need to be modified for effectiveness of interacting with computers, discover the various models that can be used for designing systems, evaluate the design techniques by applying the apt statistical approach, and design dialogue for representation to computers

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

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

OBJECTIVE

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

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 classification and clustering - Categorization algorithms: naive Bayes; decision trees; and nearest

neighbor - Clustering algorithms: agglomerative clustering; k-means; expectation maximization (EM)

TOTAL: 45 PERIODS

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

OBJECTIVE

This course provides a sound knowledge in various middleware technologies for distributed applications. Also, it gives familiarization 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

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

OBJECTIVE

This course is intended to provide the students with the prospects, challenges, imperfections, reliability and with insight into Nanoscale Quantum Computing and QCA implementation.

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

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

OBJECTIVE

To tag a given text with basic Language processing features, design an innovative application using NLP components, implement a rule based system to tackle morphology/syntax of a Language, design a tag set to be used for statistical processing keeping an application in mind, design a Statistical technique for a new application, Compare and contrast use of different statistical approaches for different types of applications.

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

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- C o m p u t e r 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

OBJECTIVE

To learn the network analysis and flow analysis with a network tool and to evaluate the performance of the design issues and architecture to meet the network communication requirements, and to understand hoe network management technology works to manage today's system

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

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

OBJECTIVE

To learn about wired and wireless network security with various cryptographic techniques, which include private and public keys algorithms along with attacks types.

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

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

OBJECTIVE:

Explain the goals and types of distributed systems, describe and implement distributed systems in the areas of system processes, communication applications, naming and synchronization, design distributed systems that take into account consistency, replication and/or fault tolerance, and to evaluate the security of distributed 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 replicated data.

Case study: Multiplayer online games, Social networking services, Large object CDN's (video/audio streaming systems)

TOTAL: 45 PERIODS

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, 4th 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

OBJECTIVE:

To obtain a broad understanding of the technologies and applications of embedded and real-time systems; understand the architecture of embedded systems and real-time systems; have

a basic knowledge on the various issues involved in real-time databases; know how these systems can be made more fault tolerant; and 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

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

OBJECTIVE

To gain understanding of the basic principles of service orientation, service oriented analysis techniques, technology underlying the service design, 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

TEXT BOOKS:

1.   Eric Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.

2.   JamesMcGovern,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 SOA",Apress,2007

| CS8022 | SOFTWARE AGENTS | L T P C |
| | | 3 0 0 3 |

OBJECTIVE

Understand the how software agents reduce information overhead, 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, gain knowledge in design of an agent interpreter and intelligent agent, and 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

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

OBJECTIVE

Gives an understanding of the basics of Software Quality, Functional testing, Control Flow based testing, Data Flow based testing Mutation testing, Software Reliability, and formal verification of programs.

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

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

OBJECTIVE

To understand the system, specify systems using natural models of computation, modeling techniques, prediction of behavior, and decision support.

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

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

OBJECTIVE

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

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

GAME PROGRAMMING

OBJECTIVE

To get subsequent understanding of game design and development, which includes the processes, mechanics, issues in game design, game engine development, modeling, techniques, handling situations, and logic. At the end, the student will be in a position to create interactive games. To learn this course an exposure to 3D graphics principles and animation techniques are the prerequisite.

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

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

OBJECTIVE

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

RDF, data elements in properly tagged XML, and the ontology), 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

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

OBJECTIVE

To provide knowledge about Unix operating system working principles, its file system and programming for interprocess communication. It also gives an understanding for 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

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

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 and Religion – Uses of Ethical Theories

UNIT III   ENGINEERING AS SOCIAL EXPERIMENTATION   9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law – The Challenger Case Study

UNIT IV   SAFETY, RESPONSIBILITIES AND RIGHTS   9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – The Three Mile Island and Chernobyl Case Studies

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT V   GLOBAL ISSUES   8

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

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- QS 9000 – ISO 14000 – Concepts, Requirements and Benefits –Quality Council – Leadership, Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward.

TOTAL : 45 PERIODS

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

OBJECTIVE:

This course gives the knowledge of effectively storing images, extracting interesting patterns from an image, discriminate between different classes of images, and mathematical

fundamentals for image processing. This may lead to the confidence in developing image-processing applications.

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

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

OBJECTIVE:

To provide exposure in FOSS and to develop open source software for society.

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, Libreoffice, Assistive technology

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

AIM

At the end of this course the student will 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

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

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.