UNIVERSITY DEPARTMENTS

ANNA UNIVERSITY : : CHENNAI 600 025

REGULATIONS - 2010

M.Sc. (INFORMATION TECHNOLOGY)
FIVE YEAR INTEGRATED PROGRAMME
Semester I

CODE	COURSE TITLE	L	T	P	C
Theory					
XC 9111	Communicative English	3	0	0	3
XC 9101	Mathematics – I	3	1	0	4
XC 9102	Fundamentals of Computer Science	3	0	0	3
XC 9112	Applied Physics	3	1	0	4
XC 9113	Chemistry of Materials	3	1	0	4
Practical					
XC 9114	Communication Skills Laboratory (Language)	1	0	2	2
XC 9103	Fundamentals of Computing Laboratory	0	0	4	2
	Total				**22**

Semester II

CODE	COURSE TITLE	L	T	P	C
Theory					
XC 9161	Technical Communication	3	0	0	3
XC 9151	Mathematics – II	3	1	0	4
XC 9152	Programming in C	3	0	0	3
XT 9151	Business Data Processing	3	0	0	3
XC 9153	Digital Systems	3	0	0	3
Practical					
XC 9154	C Programming Laboratory	0	0	4	2
XC 9155	Digital Systems Laboratory	0	0	4	2
XT 9152	Business Data Processing Laboratory	0	0	4	2
	Total				**22**

Semester III

CODE	COURSE TITLE	L	T	P	C
Theory					
XC 9201	Mathematics – III	3	1	0	4
XT 9201	Discrete Structures	3	0	0	3
XC 9203	Data Structures	3	0	0	3
XC 9204	Object Oriented Programming	3	0	0	3
XT 9202	Computer Organization	3	0	0	3
XC 9205	Database Management Systems	3	0	0	3
Practical					
XC 9206	Data Structures & Object Oriented Programming Laboratory	0	0	4	2
XC 9207	Database Management Systems Laboratory	0	0	4	2
	Total				**23**

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Semester IV

CODE	COURSE TITLE	L	T	P	C
Theory					
XT 9251	Advanced Databases	3	0	0	3
XT 9252	Principles of Communication	3	0	0	3
XC 9251	Java and Internet Programming	3	0	0	3
XC 9252	Operating Systems	3	0	0	3
XC 9254	Design and Analysis of Algorithms	3	1	0	4
Practical					
XT 9253	Advanced Databases Laboratory	0	0	4	2
XC 9255	Operating Systems Laboratory	0	0	4	2
XC 9256	Java and Internet Programming Laboratory	0	0	4	2
	Total				**22**

Semester V

CODE	COURSE TITLE	L	T	P	C
Theory					
XC 9301	Probability and Statistics	3	1	0	4
XT 9301	Computer Networks	3	0	0	3
XT 9302	.NET Programming	3	0	0	3
XC 9303	Software Engineering	3	0	0	3
XC 9304	Visual Programming	3	0	0	3
XT 9303	Cryptography and Data Security	3	0	0	3
	Elective I	3	0	0	3
Practical					
XT 9304	.NET Programming Laboratory	0	0	4	2
XC 9305	GUI Applications Laboratory	0	0	4	2
	Total				**26**

Semester VI

CODE	COURSE TITLE	L	T	P	C
Theory					
XT 9351	Operations Research	3	0	0	3
XC 9351	Object Oriented Analysis and Design	3	0	0	3
XC 9352	Network Programming	3	0	0	3
XC 9353	Web Technology	3	0	0	3
XC 9361	Environmental Science and Engineering	3	0	0	3
	Elective – II	3	0	0	3
Practical					
XC 9354	Network Programming Lab	0	0	4	2
XC 9355	Web Technology Laboratory (J2ee)	0	0	4	2
XC 9356	Case Tools Laboratory	0	0	4	2
	Total				**24**

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Semester VII

CODE	COURSE TITLE	L	T	P	C
Practical					
XT 9401	Project Work	0	0	32	**16**

Semester VIII

CODE	COURSE TITLE	L	T	P	C
Theory					
XC 9452	Numerical Methods	3	1	0	4
XT 9451	Software Project Management	3	0	0	3
XT 9452	Mobile Communication	3	0	0	3
XT 9453	Computer Graphics & Multimedia	3	0	0	3
	Elective – III	3	0	0	3
	Elective – IV	3	0	0	3
Practical					
XT 9454	Computer Graphics & Multimedia Laboratory	0	0	4	2
XC 9453	Open Source Software Laboratory (Mini Project)	0	0	4	2
	Total				**23**

Semester IX

CODE	COURSE TITLE	L	T	P	C
Theory					
XT 9501	Enterprise Computing	3	0	0	3
XT 9502	Principles of Management	3	0	0	3
XT 9503	Software Testing & Quality Assurance	3	0	0	3
XT 9504	Service Oriented Architecture	3	0	0	3
	Elective – V	3	0	0	3
	Elective – VI	3	0	0	3
Practical					
XT 9505	Software Testing Laboratory	0	0	4	2
XT 9506	Service Oriented Architecture Laboratory	0	0	4	2
	Total				**22**

Semester X

CODE	COURSE TITLE	L	T	P	C
Practical					
XT 9551	Project Work	0	0	32	**16**

Total Credits for the Programme: 216

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ELECTIVES

XC 9021	Bioinformatics	3	0	0	3
XC 9022	Information Coding Techniques	3	0	0	3
XC 9023	Geographic Information System	3	0	0	3
XC 9024	Digital Signal Processing	3	0	0	3
XC 9025	Wavelet Analysis	3	0	0	3
XC 9026	Embedded Systems	3	0	0	3
XC 9027	Fault Tolerant Systems	3	0	0	3
XC 9028	Software Metrics	3	0	0	3
XC 9029	Computation Complexity	3	0	0	3
XT 9021	Personal Software Processes	3	0	0	3
XT 9022	High Speed Networks	3	0	0	3
XT 9023	Pattern Recognition	3	0	0	3
XT 9024	Performance Evaluation of System and Networks	3	0	0	3
XT 9025	Modeling and Simulation	3	0	0	3
XT 9026	Digital Image Processing	3	0	0	3
XT 9027	Data Warehousing and Mining	3	0	0	3

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XC 9111 COMMUNICATIVE ENGLISH L T P C
3 0 0 3

LEARNING OBJECTIVES

- To develop the four basic skills of language (reading, writing, speaking and listening) in order to acquire a creative and analytical mind that would fit into this new age of technological and global communication.
- To explore the various ways language is used effectively in media.
- To learn the appropriate form and structure essential for effective communication

UNIT I **9**

Verbal forms – Descriptive Language– Meanings – Affixes – Prefixes – Vocabulary building for places and people - Importance of Listening Skills – Difference between Listening & Hearing – Active Listening – Barriers to Listening – Listening comprehension focusing on varying elements of vocabulary & structure - Pronunciation –Self Introduction – Reading Skills – Sub skills of Reading – Skimming & Scanning – Descriptive writing – People description –Letter Writing – Personal: To family – Social conversation – Introducing & Greeting.

UNIT II **9**

Tense forms – Suffix – Comparative Language – Adverbs – Suffix forms – Listening for general understanding – Listening Comprehension – Conversation: One to one – Introducing Others – Social Conversation – Initiating, carrying on and concluding a conversation – Understanding prose & poetry – Reading short stories – Place Description – Definition – Letter Writing: To friends – asking for information/advice/giving suggestions

UNIT III **9**

Conversion from noun to adjectives – Superlative Adjectives – Grammar in context – Subject-verb adjective – Listening to specific information – Listening to talks & description – Conversation One to many- Discussion Activities – Social Conversation – Politeness strategies – Reading a narrative – Reading for general information – Intensive reading exercises - Reading a one act play – Object description – Descriptive language development of equipment use and functions - Comparing & Contrasting in writing – Letter writing – official letter: Letter of Enquiry.

UNIT IV **9**

Development of basic writing skills applying studied grammatical structures - Conversion of verb to nouns – Perfect Tense forms – Prepositions – Abbreviations – Listening to Casual Conversation – Listening for grammatical points – Strategies adopted for speaking – social conversation – striking a conversation with strangers – Reading for Specific information – Reference skills – books – Scene description – Cause & effect in writing – Official letter – Answering a query.

UNIT V **9**

Use of suffixes to convert verb-noun-adjective – use of pronouns – Conditionals – Acronyms – Listening to collect information for discussion – Making short speeches – Whole class discussion – Extensive reading – reading between lines –Letter writing – Paragraph writing – developing the hints – Letter writing – to higher officials – Inviting, Making a complaint – Communication structure for expression of opinion.

Total : 45 Periods

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REFERENCES

1. Sood S.C.et al, **Developing Communication Skills: Oral Communication and Reading Comprehension, Writing Skills and Workbook**. New Delhi: Manohar, 2007.
2. S**.**P.Dhanavel, **Communication Skills**, New Delhi: Macmillan, 2008.
3. Dept. of Humanities & Social Sciences, Anna University, **English for Engineers and Technologists.** Chennai**:** Orient Longman, 2006
4. Sasikumar V., P.Kiranmayi Dutt & Geetha Rajeevan, **Listening & Speaking II** New Delhi: Foundation Books, 2007.
5. Murphy, Raymond, **Intermediate English Grammar**. Cambridge: Cambridge University Press, 1994.

XC 9101 **MATHEMATICS I** **L T P C**
3 1 0 4

UNIT I MATRICES **9**

Eigenvalues and Eigenvectors – Properties of eigenvalues - Cayley Hamilton theorem - Orthogonal reduction of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT II SEQUENCES & SERIES **9**

Sequences – Convergence – Series of positive terms – Tests of convergence (comparison tests, integral test, comparison of ratios and D'Alember's ratio test) – Alternating Series – Series of positive & negative terms – Power series – Convergence of exponential, logarithmic & Binomial series.

UNIT III FUNCTIONS OF SEVERAL VARIABLES **9**

Partial Differentiation - Total derivative – Approximations – Jacobian – Taylor's theore for functions of two variables – Maxima and Minima – Lagrange Multiplier's method.

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS **9**

Particular integral by operator method – Method of variation of parameters – Method of undetermined coefficients – Cauchy's and Legendre's linear equations – Linear dependence of solutions – Simultaneous linear equations with constant coefficients.

UNIT V LAPLACE TRANSFORM **9**

Transform of standard functions – Unit step and impulse functions – Periodic functions – Properties - Transforms of derivatives and integrals – Shifting theorems – Initial and Final Value Theorems – Inverse Transforms – Convolution Theorem – Application to linear differential equations with constant coefficients and simultaneous equation of first order with constant co-efficients

L: 45 +T:15 =Total 60 Periods

TEXT BOOK

1. Grewal B.S., "Higher Engineering Mathematics", 40th Education, Khanna Publishers, New Delhi, 2007.

REFERENCES

1. Alan Jeffrey, "Advanced Engineering Mathematics", Academic Press, 2002.
2. Ravish R. Singh and Mukul Bhatt, "Engineering Mathematics" A tutorial approach test MCGraw Hill Private Limited., New Delhi, 2010.
3. Babu Ram, Engineering Mathematics, Pearson, Delhi 2010.

XC 9102 FUNDAMENTALS OF COMPUTER SCIENCE **L T P C**
3 0 0 3

AIM : To provide an awareness to Computers and Computing

OBJECTIVES :
- To enable the student to learn the major Components of a Computer System
- To learn how arithmetic is handled in computers
- To know the correct and efficient ways of solving problems
- To learn to use office automation tools

UNIT I COMPUTER GENERATIONS AND CLASSIFICATIONS 6

World of Computers – Computers in Life – Computer and its scope – Computers to fit every need – Computer Networks and the Internet – Computer and Society

UNIT II DATA REPRESENTATION AND BINARY ARITHMETIC 6

Data and Program representation – System Unit- CPU – Performance and improvement

UNIT III INPUT/OUTPUT UNITS AND MEMORY DEVICES 12

Storage Units – Magnetic Disk Systems – Optical Disc Systems – Flash Memory Systems – Comparing Storage Alternatives – Input and Output : Key boards, Pointing devices, Scanners, Readers, Digital cameras, Audio input, Display devices, Printers, Audio Output.

UNIT IV OPERATING SYSTEMS AND LANGUAGES 9

System Software : Operating systems and Utility Programs, Operating Systems for Desktop PC's – Operating Systems for Handled PC's and Mobile Devices – Operating Systems for Larger Computers – Utility Programs – Future of Operating Systems

UNIT V APPLICATION SOFTWARE AND NETWORK 12

Basics of Application Software – Word Processing Software- Spreadsheet Concepts – Database Concepts – Presentation Graphics Concepts – Graphics and Multimedia Concepts – Other types of Application Software – Networking and Communications Applications – Types of Networks – Data Communications – Communications Protocols – Networking Hardware

Total : 45 Periods

TEXT BOOK

1. Deborah Morley and Charles S. Parker, "Understanding Computers – Today and Tomorrow ", 11th Edition, Thomson Learning, New Delhi – 2007 (Chapters 1- 7)

REFERENCES

1. Sanjay Saxena, MS-Office 2000 for Everyone" Vikas Publishing House Private Limited, Chennai, 2002.
2. ITL Education Solution Ltd. "Introduction to Information Technology" , Pearson Education, New Delhi, 2009
3. V. Rajaraman, "Fundamentals of Computers" Fourth Edition, PHI, New Delhi – 2009 (Chapters 2, 3, 4; 6, 9, 10.1 – 10.6, 14.1, 14.4

XC 9112 **APPLIED PHYSICS** **L T P C**
3 1 0 4

UNIT I ELECTRICAL PROPERTIES OF METALS 9

Classical theory: Drude model - thermal conductivity, thermal resistance - electrical conductivity of nonmetals: semiconductors, ionic crystals and glasses - thin metal films: conductivity and resistivity – Photons: Light as a wave, Photoelectric effect,-Uncertainty principle-Schrödinger wave equation – particle in a box – Fermi-Dirac statistics – density of states: electron concentration and Fermi Level - band theory of solids: energy band formation – electron effective mass.

UNIT IIV SEMICONDUCTOR PHYSICS 9

Intrinsic semiconductors: energy band-diagram - direct and indirect band gap semiconductors - carrier concentrations and conductivity - extrinsic semiconductors: n, p-type doping, compensation doping - temperature dependence of conductivity - degenerate and non-degenerate semiconductors - recombination and minority carrier injection: direct and indirect recombination - minority carrier lifetime - diffusion and conduction equations and random motion - continuity equation: time-dependent continuity equation, steady-state continuity equation - optical absorption - Hall effect and devices - Ohmic contacts - Schottky diode and solar cell.

UNIT III SEMICONDUCTOR AND OPTOELECTRONIC DEVICES 9

PN Junction: Forward bias: diffusion current, recombination and total current, Reverse bias, Bipolar Transistor, Junction Field Effect Transistor, MOSFET – Laser Characteristics- Semiconductor laser - Homojunction, Hetrojunction - Photo detectors-Photodiodes-phototransistors. Optical fiber and characteristics-Acceptance angle, Numerical aperture, fiber optic communication, -

UNIT IV DISPLAY DEVICES 9

Lumenescence: Photoluminescence, cathodoluminescence, electroluminescence, injection luminescence - plasma displays - LED construction and working – liquid crystals and LCD - construction and working – numeric displays.

UNIT V MAGNETIC DATA STORAGE AND OPTICAL MATERIALS 9

Magnetic material parameters – magnetic disk memories – optical data storage – phase change recording – magneto-optical data storage – Hi-tech involved in system development – capacity of CD in normal use – advantages of CD, CCD, optical data storage, Recording and read out information-Introduction to integrated circuit – Definition of LSI, MSI, VLSI circuits monolithic and hybrid circuits, Thin film and thick film technology.

L: 45 +T:15 =Total 60 Periods

TEXT BOOKS

1. S.O. Kasap Principles of Electronic Materials and Devices: TATA McGRAW-HILL,New Delhi, 2002.
2. Arumugam, M., Materials Science, Anirutha Publications., 2002.

REFERENCES

1. Streetman B.G. and Banerjee S. “Solid state Electronic Devices” Pearson Education, New Delhi, 5th Edition, 2000.
2. Wilson, J and Hawkes, J.F.B, Optoelectronics, Prentice Hall, 2002
3. Bhattacharya, B., Semiconductor optoelectronic devices, Pearson Education, New Delhi, 2nd Edition 2000.
4. Keiser. G, “Optical fibre communications” McGraw Hill Co. Tokyo, 1995.

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XC 9113 CHEMISTRY OF MATERIALS

L T P C
3 1 0 4

UNIT I POLYMER IN ELECTRONICS 9

Introduction – Conducting polymers – classification – applications. Piezo and pyro electric polymers – polyvinyl fluoride – polyvinylideneflouride. Potting and Encapsulation. Photoresists – positive and negative

UNIT II COMPOSITES 9

Introduction, Advantages, characteristics, classifications – particulate. Fibrous and laminated composites, hybrid composites – Application of composites in electrical and electronic components

UNIT III SPECIALITY MATERIALS 9

Dielectrics–characteristics, insulatingmaterials –Characteristics–Polymers–polyethylene, polystetrafluroethylene – ceramics – mica and glass. Magnetic materials – basis of magnetism – soft and hard magnetic materials – manufacturing of compact disk. Semiconductors – extensive and intensive. Metallic solids – characteristics. Nanomaterials – application – catalysis,hydrogen storage – carbon nano tubes

UNIT IV FABRICATION OF INTEGRATED CIRCUITS 9

Introduction – Fabrication – MOS – NMOS, PMOS, CMOS, Ga-As Technologies, Printed circuit boards **–** Fabrications (Single layer only) – lamination, printing (photo and screen printing) and mechanical operation

UNIT V BATTERIES 9

Primary and Secondary – Requirements – commercial batteries – Dry Cell, acid cells, alkaline batteries (Ni-Cd), Li-ion. Fuel cells – (hydrogen-oxygen) – UPS

Total : 45 Periods

TEXT BOOKS

1. Wong M.N., “Polymer for electronics and photonic applications”, John Wiley, New York, 2006.
2. Jain P. C and Monika Jain, “Engineering Chemistry”, Dhanpet Rai Publishing Company (P) Ltd., New Delhi, 2002

REFERENCES

1. Dyson R.W. “Speciality Polymers”, Blackie Academic and Professional, Chennai,2006
2. Sharma S.C. “Composite Materials”, Narosa Publishing House, New Delhi, 2000
3. Rodnay Zaks and Alexander Wolfe, From chips to Systems – An introduction to Micro Computers”, BPB Publications, New Delhi, 1996

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XC 9114 COMMUNICATION SKILLS LABORATORY L T P C
0 0 4 2

LEARNING OBJECTIVES

- to develop the students' language ability to a level that enables them to use English in their professional and academic environment
- To improve the communication skills of students seeking a career in IT industry

1. Listening Comprehension focusing on varying elements of vocabulary and structure
2. Video Comprehension developing combined audio-video receptive skills to deduce meaning from context - Use of online resources – Making short speeches
3. Seminar skills - agreeing and disagreeing, clarifying, questioning, persuading, emphasizing, concluding, interrupting; evaluating ideas and actions, presenting solutions, recommending action, comparing and contrasting, probability and possibility, cause and effect, criticizing - Group Discussion Activities on current issues – Presenting your viewpoints
4. Listening Comprehension of authentic materials – Self-instruction using listening and video materials from the self access language laboratory with comprehension exercises.
5. Use of the Internet to extract authentic materials on specific areas of interest

Total : 60 Periods

REFERENCES

1. Esteras, Santiago Remacha, Infotech: English for Computer Users. Cambridge: Cambridge University Press, 2008.
2. Newspapers and Technical Magazines can be used for reference

XC 9103 FUNDAMENTALS OF COMPUTING LABORATORY L T P C
0 0 4 2

a) WORD PROCESSING

1. Document creation, Text manipulation with Scientific notations.
2. Table creation, Table formatting and Conversion.
3. Mail merge and Letter preparation.
4. Drawing - flow Chart
5. LaTex Basics

b) SPREAD SHEET

6. Chart - Line, XY, Bar and Pie.
7. Formula - formula editor.
8. Spread sheet - inclusion of object, Picture and graphics, protecting the document and sheet.
9. Sorting and Import / Export features.

(c) DATABASE

10. Creating and Manipulating MS-ACCESS File

Total : 60 Periods

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XC 9161	TECHNICAL COMMUNICATION	L T P C
		3 0 0 3

LEARNING OBJECTIVES

- To develop the essential language skills needed to present technical material in oral and written form.
- To introduce different forms of technical writing and help students learn the required skills to write such technical material

UNIT I **9**

Reading Comprehension of Authentic Materials - Reading for real life context - Listening to different accents & understanding - Communicative & decision making activities based on authentic reading materials - Language Functions: agreeing, disagreeing, expressing likes & dislikes etc - Written communication tasks for authentic task oriented goals - Types of writing - process writing, Evaluative & Analytical Writing - Homophones - British / American Vocabulary - Framing Questions: Auxiliary Verbs, Question Tags

UNIT II **9**

Understanding reading materials like schedules, brochures etc - Listening to authentic broadcasts from Radio & TV - Group discussion activities - Descriptive language development of equipment use & functions - Giving directions / instructions - Language of Instruction, Writing Recommendations - Futuristic writing - Official letters - inviting, accepting. Refusing - Foreign Words in English - Technical Jargons - Abbreviations, Acronyms

UNIT III **9**

Reading Technical Documents & interpreting them - Listening to follow instructions – Note taking Exercises - Analysing problems & offering solutions - Presenting statistical information - Presenting numbers & figures – Role play -Mock Interviews - Job Application with CV - Writing a project proposal - Writing a post for a discussion forum - Compound Words - Time, Quality, Cost & Numbering Vocabulary - Numerical Expressions.

UNIT IV **9**

Reading Reports & Analysing them - Reading for Specific Purposes - Listening to tonal inflections - Listening & Responding - Listening for collecting information - Information gathering activities concerning time, place, cost and personal description - Discussion on blog post or about discussion forum - Report Writing - Letter to Editor - Taking part in an online conversation - Blog entry - Reported Speech - Editing & Error Correction

UNIT V **9**

Reading & understanding press releases pertaining to technical information Listening for technical information – Public Speaking - Non-verbal Communication – Body Language, Eye Contact – Effective use of space, silence - Writing Technical Documents - User Manual, Instruction Manual etc - Posting a comment in an Online Conversation - Collocations in IT context - Active & Passive - Phrasal Verbs

Total : 45 Periods

REFERENCES

1. Sood S.C.et al, Developing Communication Skills: Oral Communication and Reading Comprehension, Writing Skills and Workbook. New Delhi: Manohar, 2007.
2. Murphy, Raymond, Intermediate English Grammar. Cambridge: Cambridge University Press, 1994.
3. Esteras, Santiago Remacha, Infotech: English for Computer Users. Cambridge: Cambridge University Press, 2008.

XC 9151 **MATHEMATICS - II** **L T P C**
3 1 0 4

UNIT I IMPROPER INTEGRALS **9**

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 II MULTIPLE INTEGRALS **9**

Double integral – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume as triple integral.

UNIT III VECTOR CALCULUS **9**

Gradient, divergence and curl of functions – Line, surface and volume integrals – Green, Gauss and Stokes theorems – Verification and Applications.

UNIT IV FOURIER SERIES **9**

Dirichlet's conditions - General Fourier series – Half range sine and cosine series – RMS value – Parseval's identity.

UNIT V FOURIER TRANSFORMS **9**

Statement of Fourier Integral Theorem – Fourier Transform and its Inverse – Sine and Cosine transforms and their inverses – Properties – Convolution Theorem - Parseval's identity.

L: 45 +T:15 =Total 60 Periods

TEXT BOOK

1. Grewal B.S., Higher Engineering Mathematics (40th Edition), Khanna Publishers, Delhi (2007).

REFERENCES

1. Babu Ram, Engineering Mathematics, Pearson Education, Delhi 2010.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill Co. Ltd., New Delhi (2007).
3. Ravish R. Singh and Mukul Bhatt, "Engineering Mathematics" A tutorial approach test MCGraw Hill Private Limited., New Delhi, 2010.
4. Kreyszig E., "Advanced Engineering Mathematics", John Wiley and Sons, 7th Edition, 2001.

XC 9152	PROGRAMMING IN C	L T P C 3 0 0 3

UNIT I FUNDAMENTALS AND INPUT/OUTPUT STATEMENTS 9

Constants - Variables - Data types - Operators - Expressions - Library functions - Standard Input/Output functions.

UNIT II CONTROL STATEMENTS, FUNCTIONS AND STORAGE CLASSES 9

While, do-while, for, if-else, switch and go to statements - break and continue statements. Defining a function - accessing a function- passing arguments to a function - Recursion Automatic, External and Static variables.

UNIT III ARRAYS AND POINTERS 9

Defining and processing an array - passing arrays to a function - multi dimensional arrays Pointer declarations- passing pointers to a function - pointers and arrays - operations on printers - arrays of pointers – passing functions to other functions.

UNIT IV STRUCTURES AND UNIONS 9

Defining a structure - Processing a structure - user-defined data type - Structure and pointers – passing structures to a function - self-referential structures - Unions.

UNIT V FILE HANDLING 9

File Creation – Opening & Closing files – Read, Write, Appending data – ftell() and fseek() – File I/O – Command line arguments

Total : 45 Periods

TEXT BOOK

1. Gottfried, B.S.., "Schaum's Outline of Theory and Problems of Programming in C", Tata Mc-Graw Hill Publishing Company Ltd., New Delhi, 1995.

REFERENCES

1. Kernighan, B.W. and Ritchi, D.M., "The C Programming Language", Prentice-Hall of India Private ltd., New Delhi, (1998).
2. E.Balagurusamy, "Programming in ANSI C", 4th Edition, Tata Mcgraw-Hill Education Private Ltd., 2008.

XT 9151 BUSINESS DATA PROCESSING L T P C
3 0 0 3

UNIT I PROGRAMMING CONCEPTS, IDENTIFICATION AND ENVIRONMENT DIVISIONS AND DATA DIVISION 9

Introduction: Computer Programming - An Overview, the Applications Program Development Process, The Nature of COBOL, Techniques for Improving program Design. The IDENTIFICATION and ENVIRONMENT DIVISIONS: Basic Structure of a COBOL program, Coding Requirements of the Identification Division, The Sections of the Environment division, Assigning files to Devices in the Environment Division. The DATA DIVISION : Systems Design considerations, Forming Data-Names, The FILE SECTION of the Data Division, Types of Data, Internal representation of data. Working Storage Section

UNIT II PROCEDUREDIVISION 9

Coding Complete COBOL Programs: The PROCEDURE DIVISION, The format of the Procedure division, Statements typically coded in the Main Module of Batch Programs, Statements typically coded for Processing Input records and Producing output records. Moving Data, Printing Information, and Displaying Output Interactively, The instruction formats of the MOVE STATEMENT, Numeric MOVE, Nonnumeric or Alphanumeric MOVE, Other Options of the MOVE STATEMENT. PRINTING OUTPUT, Interactive output that is displayed on a screen. Computing in COBOL: The Arithmetic Verbs and Intrinsic Functions, the Basic Arithmetic Verbs, Options Available with Arithmetic Verbs, The COMPUTE Statement, Use of Signed Numbers in Arithmetic Operations, Improving Program Efficiency with the USAGE Clause.

UNIT III CONDITIONS AND CONDITIONAL STATEMENTS 9

Decision Making Using the IF and EVALUATE Statements, Selection using a simple IF statement, Selection using other Options of the IF statement, CONDITION-NAMES. Iteration: The simple PERFORM, Iteration using other types of PERFORM Statements, Using Nested PERFORM varying statements. Control Break Processing: An introduction to control break processing, Program Requirements for control break processing, Multiple-level control breaks. Data Validation: Avoiding logic errors by validating input, What to do if input errors occur, When data should be validated, Understanding program interrupts.

UNIT IV TABLE HANDLING 9

Single level OCCURS clause, Processing data stored in an array, Using an OCCURS clause for Table Handling, Use of the Search statement for Table and Array processing, Varying option of SEARCH verb SEARCH ALL statement, Multiple level OCCURS Clause. Systems overview of Sequential processing: Sequential file updating, Validity checking in update procedures, Update procedures with multiple transaction records, Rewriting records on a disk.

UNIT V SORTING, MERGING AND FILEHANDLING 9

Sorting and Merging: The SORT features - an overview, Processing data before/after sorting, MERGE statement, Indexed and Relative File Processing: Systems considerations for organizing disk files, Features of magnetic disks and disk drives, Processing indexed disk files, Processing relative Disk Files, Converting a key field to a relative key.

L: 45 +T:15 =Total 60 Periods

Attested

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TEXT BOOKS

1. Roy M K and Ghosh Dastidar, *"Cobol Programming"*, Second Edition, Tata McGraw Hill Pub. Co. New Delhi, 2008.
2. Nancy Stern and Robert A. Stern, *"COBOL for the 21st Century"*, 11th Edition - John Wiley & Sons, 2005.

REFERENCES

1. Nancy Stern and Robert A. Stern, "Structured COBOL Programming, Getting Started with Fujitsu COBOL", 9th Edition, John Wiley & Sons, 2000.
2. Philippakis A S and Kazmier L J, "Structured COBOL", McGraw Hill Book Co., Singapore,1986.
3. Collopy David M, "Introduction to Cobol Programming - A Guide to Modular Structured Programming", Pearson Education, Delhi, 1st Indian Reprint, India, 2005.
4. Philippakis A S and Kazmier L J, "Information Systems Through COBOL", McGraw Hill Book Co., Singapore,1987.
5. Some presentations, home work exercises in: http://www-03.ibm.com/systems/z/advantages/charter/skills_coursematerials.html#COBOL

XC 9153 **DIGITAL SYSTEMS** **L T P C**
3 0 0 3

UNIT I NUMBER SYSTEMS AND BINARY CODES 9

Introduction to Digital Systems - Binary Numbers – Number Systems and Conversions – Complements – Signed Binary Numbers - Binary Arithmetic – Binary Codes – BCD and other Weighted Codes, Excess-3, Gray Code, Hamming Code – Binary Logic.

UNIT II BOOLEAN ALGEBRA AND LOGIC GATE 9

Basic Definitions – Axiomatic Definitions of Boolean Algebra - Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Canonical and Standard Forms – Other Logic Operations – Digital Logic Gates – Integrated Circuits – TTL – MOS – CMOS Circuits.

UNIT III GATE-LEVEL MINIMIZATION 9

Karnaugh Map Method – Four Variable Map – Five Variable Map – Product-of-Sums Simplification – Don't Care Conditions – NAND and NOR Implementations - Other Two-Level Implementations - Quine McCluskey Method –Exclusive OR function – Hardware Description Language.

UNIT IV COMBINATIONAL LOGIC 9

Combinational Circuits – Binary Adder-Subtractor – Binary Multiplier – Comparator – Decoders-Encoders - Multiplexers - HDL Models of Combinational Circuits – Read Only Memories – Programmable Logic Devices.

UNIT V SEQUENTIAL LOGIC 9

Sequential Circuits – Storage Elements: Latches and Flip-Flops – Analysis of Clocked Sequential Circuits – HDL Models of Sequential Circuits – State Reduction and Assignment – Registers – Counters.

Total : 45 Periods

TEXT BOOK

1. Mano, M.M. and Ciletti, M.D., "Digital Design", 4th Edition, Pearson Education, 2007.

REFERENCES

1. Charles H. Roth Jr., "Fundamentals of Logic Design", Jaico Publishing House, Mumbai, 2006.
2. Tocci, R.C., "Digital System: Principles and Applications", 10th Edition, Pearson, 2009.
3. Palmer, J.E. and David E. Perlman, "Introduction to Digital System", Tata McGraw Hill Publishing Co. Ltd., 1996.

XC 9154 **C PROGRAMMING LABORATORY** **L T P C**
0 0 4 2

1. Input/Output statements
2. Control functions
3. Functions with recursion
4. Arrays
5. Pointers
6. Structures and Unions
7. File Handling

Total : 60 Periods

XC 9155 **DIGITAL SYSTEMS LABORATORY** **L T P C**
0 0 4 2

1. Study of logic gates
2. Simplification of Boolean expressions using K-maps
3. Adders - Subtractors
4. Code Converters
5. Multiplexers - Demultiplexers
6. Comparators
7. Parity Checkers
8. Pattern Detector
9. Construction of Flip Flops using logic gates
10. Study of Flip-flops using IC's
11. Shift Registers
12. Counters
13. Circuits Simulation for the above experiments

Total : 60 Periods

XT 9152 BUSINESS DATA PROCESSING LABORATORY L T P C
0 0 4 2

1. Develop a COBOL program to understand the arithmetic verbs viz., ADD, SUBTRACT, DIVIDE, MULTIPLY and COMPUTE.
2. Develop a COBOL program for the creation of a sequential data file. Assume suitable record structure.
3. Develop a COBOL program to access a desired record from a sequential file and to print it. Assume appropriate record structure.
4. Develop a COBOL program to create and manipulate an INDEXED file. The manipulation includes accessing a particular record, modify a desired record, add a record and delete a record. Assume a suitable record structure.
5. Develop a COBOL program to create and manipulate a RANDOM file. The manipulation includes accessing a particular record, to modify a desired record, to add a record to an existing file and to delete a record.
6. Develop a COBOL program to illustrate the concepts of REDEFINES and RENAMES clauses in COBOL.
7. Develop a COBOL program illustrating the usage of level-88 entry.
8. Develop a COBOL program for the implementation of 'mid-square' technique.
9. Develop a COBOL program illustrating the OCCURS clause.
10. Develop a COBOL program illustrating the SORT verb. Assume appropriate record structure.
11. Develop a COBOL program illustrating the MERGE verb. Assume appropriate record structure.
12. Develop a COBOL program to implement 'Bubble sort' technique on a file. Assume appropriate record structure.

Apart from the above problems, the course instructor may give some other exercise to the students from the topics of Business Data Processing.

Total : 60 Periods

XC 9201	MATHEMATICS III	L T P C 3 1 0 4

UNIT I ANALYTIC FUNCTIONS 9

Function of a complex variable – Analytic function – Cauchy-Riemnn Equations – Properties of analytic functions – Conformal mapping of $w = z + a, w = 1/z, w = cz, w = z^2, w = e^z$ and Bilinear transformations.

UNIT II COMPLEX INTEGRATION 9

Line integral – Cauchy's theorem – Cauchy's integral formula – Taylor's and Laurent's series – Singularities and classification – Residues – Cauchy's residue theorem – Contour integration around circular and semi-circular contours. (excluding poles on real axis).

UNIT III Z-TRANSFORM 9

Transforms of elementary sequences – Unit Step and impulse functions – Properties – Shifting theorems – Initial and Final Value Theorems - Convolution Theorem – Inverse transform by power series and partial fractions – Application to linear difference equations with constant coefficients.

UNIT IV FIRST ORDER PARTIAL DIFFERENTIAL EQUATIONS 9

Formation of partial differential equations – Solutions of a partial differential equation – Equations solvable by direct integration – Standard types of first order equation – Lagrange's linear equation.

UNIT V HIGHER ORDER PARTIAL DIFFERENTIAL EQUATIONS 9

Homogeneous linear equations with constant coefficients – Complementary function – Particular integral – Non-homogeneous linear equations.

L: 45 +T:15 =Total 60 Periods

TEXT BOOK

1. Grewal B.S., "Higher Engineering Mathematics", 40th Education, Khanna Publishers, New Delhi, 2007.

REFERENCES

1. Ravish R. Singh and Mukul Bhatt, "Engineering Mathematics" A tutorial approach test MCGraw Hill Private Limited., New Delhi, 2010.
2. Alan Jeffrey, "Advanced Engineering Mathematics", Academic Press, 2002.
3. Babu Ram, Engineering Mathematics, Pearson, Delhi 2010.

XT 9201 **DISCRETE STRUCTURES** **L T P C**
3 0 0 3

UNIT I FUNDAMENTALS OF LOGIC **9**

Basic connectives and Truth Tables – Logical Equivalences: The Laws of Logic – Logical Implications: Rules of Inference – Quantifiers, Definitions and the Proofs of Theorems.

UNIT II COMBINATORICS **9**

The Rules of Sum and Product – Permutations and Combinations – The Pigeon hole principle – The Principle of Inclusion and Exclusion – Recurrence relations.

UNIT III GROUPS **9**

Groups – Definitions and Examples – Subgroups and Homomorphisms – Cosets and Lagrange's theorem – Normal Subgroups – Group codes.

UNIT IV LATTICES **9**

Posets – Lattices – Definition and examples – Properties of Lattices – Lattices as Algebraic Systems – Some special Lattices – Boolean Algebra.

UNIT V GRAPH THEORY **9**

Definitions and examples – Sub-graphs – Graph Isomorphism – Euler Trails and circuits – Planar Graphs – Hamilton Paths and Cycles –Graph Coloring – Trees – Rooted Trees.

Total 45 Periods

TEXT BOOKS

1. Grimaldi, R.P., "Discrete and Combinatorial Mathematics", Pearson Education, 4th Edition, 2002.
   [Sections: Chapter 2 ; 1.1 to 1.3, 5.5, 8.1, 8.2, 10.1 to 10.3; Chapter 11; 12.1, 12.2]
2. Tremblay, J.P. and Manohar, R., "Discrete Mathematical Structures with applications to Computer Science", McGraw-Hill, 1997.
   [Sections: 3-5.1 to 3-5.4, 3-7.2 to 3-7.3; 4-1, 4-2]

REFERENCES

1. James L. Hein, "Discrete Structures, Logic and Computability", 2nd Edition, Narosa Publishing House, 2004.
2. Judith L. Gersting, "Mathematical Structures for Computer Science", Freemann & Co., New York , 5th Edition, 2003.

XC 9203	DATA STRUCTURES	L	T	P	C
		3	0	0	3

UNIT I STACKS AND RECURSION **9**

Arrays, Structures and Stacks – Recursion.

UNIT II QUEUES AND LISTS **9**

Queue and its sequential representation, Linked lists, Lists, Circular Linked lists.

UNIT III TREES **9**

Binary Trees – Binary tree representation – Application of trees.

UNIT IV SORTING **9**

Exchange sorts – Selection and Tree sorting – Insertion sorts – Merge sort.

UNIT V SEARCHING **9**

Basic Search Technique (except Interpolation search) – Tree Searching (except Balance Trees) – Hashing - Open Addressing – Deleting Items .

Total : 45 Periods

TEXT BOOK

1. Langsam Y., Augenstein M. and Tenenbaum A. M. – " Data Structures using C and C++.", Prentice Hall of India, New Delhi – 2009.
   (Chapter 1 : Sections 1.2, 1.3 , Chapter 2, Chapter 3 : Sections 3.1 to 3.3, Chapter 4 : Sections 4.1 to 4.3 and 4.5, Chapter 5 : Sections 5.1, 5.2 and 5.5 , Chapter 6 : Sections 6.2 to 6.5, Chapter 7 : Sections 7.1, 7.2 and 7.4(topics mentioned in the syllabus alone)

REFERENCE

1. Kruse C. L., Lenny B.P. and Tonto C. L., - "Data Structures and Program Design in C.", Prentice Hall of India 1995.

XC 9204 OBJECT ORIENTED PROGRAMMING AND C++

L T P C
3 0 0 3

UNIT I OOP AND C++ FUNDAMENTALS 9

Object-oriented paradigm - Elements of object oriented programming – Merits and demerits of OO methodology - Characteristics of OOP - C++ data types - Operators - Expressions- Pointers - References - Enumeration - Classes.

UNIT II CLASSES 9

Classes and Objects - Members and Member function - This pointer Constructors and Destructors – Friend functions - Template classes - New and Delete operators.

UNIT III FUNCTIONS IN C++ 9

Function Prototype - Arguments passing - Return type - Default arguments - Inline functions – Operator overloading - Function overloading - Operator function - Template functions.

UNIT IV INHERITANCE 9

Derived class - Single Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance - Virtual Functions - Virtual Base class - Nesting of classes.

UNIT V INPUT/OUTPUT 9

Input/Output operations - Overloading the insertion and extraction operators - I/O stream classes – File input/output - Exception handling command line arguments.

Total : 45 Periods

TEXT BOOKS

1. Stanley B. Lippman, Josee Lajoie, “C++ Primer”, Pearson Education, Fourth Edition, 2005.
2. Robert Lafore, "Object Oriented Programming in Microsoft C++", Pearson Education, Fourth Edition, 2010.

REFERENCES

1. Kamthane, ”Object Oriented Programming with ANSI and Turbo C++”, Person Education, 2002.
2. Bhave, “Object Oriented Programming With C++”, Pearson Education ,2004.
3. Dietel & Dietel, “C++ How to Program”, Second Edition, Prentice Hall.
4. Bjarne Stroustrup, "The C++ Programming Language", Addison Wesley, 1999.

XT 9202	COMPUTER ORGANIZATION	L T P C 3 0 0 3

UNIT I INTRODUCTION **9**

Computer evolution and performance – Instruction Sets – Characteristics and Functions – Instruction Cycle – Addressing modes and formats – Register reference instructions – Input – Output instructions.

UNIT II ARITHMETIC AND LOGIC UNIT **9**

Introduction –Binary addition and subtraction – Complement representation of numbers - Binary multiplication and division – Floating point representation – Floating point arithmetic operations – Bit-Sliced ALU

UNIT III CONTROL UNIT **7**

Micro-operations – Micro-programmed control - Micro instruction sequencing – Macro instruction execution - Hardwired Control

UNIT IV MEMORY AND I/O UNIT **12**

CPU – Memory interaction – Storage technology – Memory array – Associative memory – Virtual memory – Auxillary memory – Cache memory – Internal memory – Secondary Storage – I/O devices – I/O processing

UNIT V ADVANCED ARCHITECTURE **8**

RISC – Parallel processing – Pipeline processors – Multiprocessors – Interconnection Structures : Time-shared Common Bus, Multiport Memory, Crossbar Switch, Multistage Switching network, Hypercube Interconnections

Total : 45 Periods

TEXT BOOKS

1. Morris Mano, “Computer System Architecture”, Pearson Education, Third Edition, 2007.
2. William Stallings, “Computer Organization and Architecture: Designing for Performance”, Pearson Education, 2006.

REFERENCES

1. Rajaraman, V. and Radhakrishnan, T., “Computer organization and Architechture”, Prentice Hall of India, 2009.
2. Pal Chaudhuri, P. “Computer Organization and Design”, Prentice Hall, Third Edition, 2009

XC 9205 DATABASE MANAGEMENT SYSTEMS LT P C
3 0 0 3

UNIT I DATABASE SYSTEM CONCEPTS 11

File systems Vs Database Systems – Data Models – Database Languages – Database System Architecture – Database Users and Administrators – ER Model – EER Model – Transforming ER models to Tables.

UNIT II RELATIONAL DATABASE SYSTEM DESIGN 9

Relational Databases – Relational Algebra – Views – Tuple and Domain Relational Calculus – Domain Constraints – Referential Integrity – SQL – QBE – Triggers

UNIT III NORMALIZATION 6

Functional Dependencies – Inference rules – Decomposition – Properties – Normal Forms (NF) – First NF, Second NF, Third NF, Boyce-Codd NF, Forth NF, and Fifth NF.

UNIT IV DATA STORAGE AND QUERYING 10

File Organisation – Data Dictionary Storage – Indexing – Static Hashing – Dynamic Hashing – B+ tree index files - Query Processing Overview – Measures of Query Cost – Selection Operation – Sorting – Join Processing.

UNIT V TRANSACTION MANAGEMENT 9

Transaction Concept – Properties of Transaction – Concurrent Executions – Serializability – View Serializability – Conflict Serializability – Testing for Serializability – Protocols for Concurrency Control – Lock Based protocols – Timestamp based protocols – Recovery – Log Based Recovery.

Total : 45 Periods

TEXT BOOK

1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, ***"Database System Concepts"***, 5th Edition, Mc Graw Hill, New Delhi, 2006.

REFERENCES

1. Ramez Elmasri and Shamkant B.Navathe, ***"Fundamentals of Database Systems"***, 5rd Edition, Pearson Education India, 2007.
2. C.J. Date, A.Kannan and S.Swamynathan, ***"An Introduction to Database Systems",*** 8th Edition, Addison Wesley, 2006.
3. Raghu Ramakrishnan and Johannes Gehrke, ***"Database Management Systems"***, 3rd Edition, Mc Graw Hill, Singapore, 2004.
4. Gary W. Hansen and James V. Hansen. ***"Database Management and Design"***, 2nd Edition, PHI, 2009.

XC 9206 **DATA STRUCTURES AND OOP LABORATORY** **L T P C**
0 0 4 2

Data Structures :

1. Arrays and structures in C
2. Infix, Postfix, Prefix expressions using Stack
3. Linked list, Circular Linked list
4. Queues as Circular list
5. Operation on binary trees
6. Insert sort, Quick Sort, Heap Sort
7. Sequential Search and Binary Search

OOP :

1. Create a complex number class with all possible operators
2. Static members, Friend functions.
3. Operator overloading, overloading of assignment operator
4. Type conversions such as integer to complex, double to complex, complex to double.
5. Constructor, Destructor, Copy constructor.

Total : 60 Periods

XC 9207 DATABASE MANAGEMENT SYSTEMS LABORATORY L T P C
0 0 4 2

1. DDL, DML, DCL
2. Subquery, Set functions
3. Date, Time, String functions
4. Queries
5. Single row functions, Group functions
6. Joins – Left, Right, Full, Equi
7. Index, Views
8. Triggers
9. PL/SQL Functions, Procedures
10. Database design and implementation with any one of the following case studies
    a. Library Information System
    b. Railway Reservation System
    c. Provisional Stores Information System

Total : 60 Periods

REFERENCE

1. Pranab Kumar Das Gupta, ***"Database Management System ORACLE SQL and PL/SQL"***, Prentice Hall of India Delhi, 2009.

XT 9251	ADVANCED DATABASES	L T P C
		3 0 0 3

UNIT I DISTRIBUTED DATABASES 9

Overview of Distributed databases – types of data fragmentation –Integrity constraints – framework of distributed database design – allocation of fragments – optimization of access strategies – Management of distributed transactions – concurrency control-reliability .

UNIT II PARALLEL DATABASES 9

Introduction to Parallel database – architecture - I/O Parallelism – Inter Query and Intra Query Parallelism – Inter and Intra Operation Parallelism – Design of Parallel Systems. Concurrency Control – Transaction Commit Protocols. Temporal database – Spatial database.

UNIT III OODBMS AND ORDBMS 9

OODBMS - New data types – structured data types – operations on row, arrays and other collection types, encapsulating and ADT , Inheritance, objects, OIDs, reference types , query optimization . ORDBMS – Data Model – ODL – OQL – ADT – user defined data types.

UNIT IV ACTIVE AND XML DATABASES 9

Active Database - Concepts and Triggers. XML Databases: XML Data Model – DTD – XML Schema – XML Querying – Geographic Information Systems.

UNIT V MOBILE DATABASES 9

Mobile Databases: Location and Handoff Management – Effect of Mobility on Data Management – Location Dependent Data Distribution – Mobile Transaction Models

Total : 45 Periods

TEXT BOOKS

1. Raghu Ramakrishnan, Johannes Gehrke, ***"Database Management Systems"***, McGraw Hill, Third Edition 2004.
2. Henry F Korth, Abraham Silberschatz, S. Sudharshan, ***"Database System Concepts"***, Fifth Edition, McGraw Hill, 2006.

REFERENCES

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, " Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.
3. C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
4. Stefano Ceri, Giuseppe Pelagatti, "Distributed Databases principles and systems", McGraw-Hill , Edition 2008.

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

XT 9252 PRINCIPLES OF COMMUNICATION L T P C
3 0 0 3

UNIT I SIGNAL AND SYSTEMS ANALYSIS 9

Classification of Signals and Systems – Convolution – Complex Fourier Series – Fourier Transform – Magnitude and Phase Spectrum – Power Spectral Density – LTI System Properties – Impulse Response

UNIT II ANALOG MODULATION TECHNIQUES 9

Amplitude Modulation – Conventional AM, DSB-SC, SSB-SC, VSB – Frequency Modulation – Modulation and Demodulation Principles –Spectrum – Bandwidth-Threshold Effects.

UNIT III ANALOG TO DIGITAL CONVERSION AND CODING TECHNIQUES 9

Sampling – Quantization – Signal to Quantization Noise Ratio– Companding Information – Entropy – Entropy Coding Techniques - Shannon Fano Coding – Huffman Coding

UNIT IV PULSE MODULATION AND MULTIPLEXING 9

Pulse Code Modulation - Delta Modulation - Granular and Slope-Overload Errors - Frequency Division Multiplexing - Time Division Multiplexing - Digital Telephone System.

UNIT V DIGITAL MODULATION AND TRANSMISSION 9

Shift Keying Techniques – Binary ASK, Binary FSK, Binary PSK, QPSK – Modulation and Demodulation Principles – Comparison in terms of Bandwidth and Bit Error Rate

Total : 45 Periods

TEXT BOOK

1. H.Taub, D.L Schilling ,Goutam Saha, “Principles of Communication Systems”, Third Edition , Tata McGraw Hill , 2008

REFERENCES

1. B.P.Lathi., “Modern Digital and Analog Communication Systems”,Third Edition, Oxford University Press, 2008.
2. John G. Proakis, Masoud Salehi, “ Fundamentals of Communication Systems”, Pearson Edcation, 2008

XC 9251 JAVA AND INTERNET PROGRAMMING L T P C
3 0 0 3

UNIT I MARKUP AND SCRIPTING LANGUAGES 9

HTML – Javascript and VB Script – Control Structures – Functions – Arrays – Objects – DHTML – Cascading style sheets – Object model and collections – Event model – Filters and Transitions – Data binding with tabular control – ActiveX control – Multimedia

UNIT II JAVA FUNDAMENTALS 9

Objects and Classes – Packages – Inheritance – Interfaces and Inner classes – Exceptions – Generic programming – Collections

UNIT III JAVA I/O, NETWORKING, THREADING 9

Streams – Text Input and Output – Reading and Writing Binary data – Object Streams and Serialization – File Management – Looking up internet addresses – Retrieving Data with URLs – Sockets for clients – Sockets for servers – Secure Sockets – UDP datagrams and sockets – Muticast Sockets – URLConnection class – Protocol Handlers – Content Handlers – Multithreading – Thread States – Thread Priorities – Synchronization.

UNIT IV APPLETS AND GUI 9

Applet Basics – Life cycle of an applet – Passing information to Applets – Applet Context – Inter-applet communication – JAR files – Event Handling – AWT – SWING – Layout management – GUI programming using Applets and Frames – Dialog Boxes.

UNIT V SERVER SIDE PROGRAMMING 9

Servlets – Java Server Pages – Database Connectivity - JDBC.

Total : 45 Periods

TEXT BOOKS

1. Cay Horstmann and Gary Cornell, Core Java, Volume1 & Volume2, Pearson Education , 2008
2. Deitel and Deitel, “Internet and World Wide Web **:** How to program”, Pearson Education Publishers, 2009
3. Elliotte Rusty Harold, “Java Network Programming”, Fifth Indian Reprint, O’Reilly Publications, 2003
4. Robert Sebesta, Programming with world wide web, Pearson Education, 4th Edition, 2009

REFERENCES

1. Deitel and Deitel, “Java – How to program”, Prentice Hall of India, 2009
2. Douglas E. Comer, “The Internet Book”, Fourth Edition, Prentice Hall of India, 2009
3. Herbert Schildt, “Java **:** The Complete Reference”, Tata Mcgraw-Hill, 2009

XC 9252 **OPERATING SYSTEMS** **L T P C**
3 0 0 3

UNIT I INTRODUCTION AND PROCESSES 10

Systems –Operating-system Structure – Operating System Operation - Protection and Security - Process Concept – Process Scheduling – Operations on Processes – - Inter process communication – Communication in Client – Server Systems.

UNIT II PROCESS MANAGEMENT 12

Threads – Multithreading Models – Threading Issues – Critical-Section Problem – Synchronization Hardware - Semaphores – Classic Problems of Synchronization –– Monitors - CPU scheduler – Scheduling criteria – Scheduling algorithms – Multiple-Processor Scheduling

UNIT III DEADLOCKS, MEMORY MANAGEMENT AND VIRTUAL MEMORY 9

Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection –Recovery from Deadlock – Swapping – Contiguous Memory Allocation – Paging – Page Table - Segmentation – Demand Paging – Page replacement – Allocation of Frames – Thrashing.

UNIT IV FILE SYSTEM 9

File concept – Access methods – Directory structure – File-System Mounting – File Sharing - Protection – File-System Structure – File-System Implementation – Directory Implementation – Allocation Methods – Free-Space Management

UNIT V CASE – STUDY : LINUX OPERATING SYSTEM 5

Design Principles – Kernel Modules – Process Management – Scheduling – Memory Management – File Systems – Inter Process Communication - Security

Total : 45 Periods

TEXT BOOK

1. Silberschatz, A. Galvin, P.B. and Gagne, G. “Operating System Concepts”, John Wiley, 8th Edition, 2009

REFERENCES

1. Andrew S. Tanenbaum, “Distributed Operating Systems”, Pearson Education Asia, 2003
2. Dhamdhere, D.M. “Operating Systems”, 2nd Edition, Tata McGraw Hill, 2006
3. Pramod Chandra P. Bhatt “An introduction to Operating Systems: Concepts and Practice”, 2nd Edition, Prentice Hall of India, 2007
4. Sibsankar Haldar, Alex A. Aravind “Operating Systems”, Pearson Education , 2009

XC 9254	DESIGN AND ANALYSIS OF ALGORITHMS	L T P C 3 1 0 4

UNIT I ANALYZING ALGORITHMS 7

Algorithms – Analyzing algorithms – Designing algorithms – Growth of functions – Recurrences

.

UNIT II SORTING 8

Insertion sort – Quick sort – Divide and Conquer – Merge sort – Heap sort – Lower bounds for sorting.

UNIT III GRAPH ALGORITHMS 11

Representations of graphs – Breadth-first search – Depth-first search – Minimum spanning tre– The algorithms of Kruskal and Prim – Shortest paths – Dijkstra's algorithm – Bellman and Ford algorithm.

UNIT IV STRING MATCHING 6

The naïve string-matching algorithm – String matching with finite automata – The Knuth-Morris – Pratt algorithm.

UNIT V NP COMPLETENESS 13

Polynomial time – The complexity class NP – NP completeness – Reducibility – NP-complete problems.

L: 45 +T:15 =Total 60 Periods

TEXT BOOK

1. Cormen, T.H., Leiserson, C.E. and Rivest, R.L. Introduction to Algorithms, 2nd Edition, Prentice Hall of India, New Delhi ().
   Chapters 2.3,6.7,23: Sections: 1.1, 4.1 to 4.3, 8.1, 22.1to 23.3, 24.1, 24.3, 32.1,32.3, 32.4, 30.1, 30.2, 34.1, to 34.3, 34.5.1, 34.5.4.

REFERENCES

1. Baase, S. Computer Algorithms: Introduction to Design and Analysis, Second Edition, Addison and Wesley, 1993.
2. Levitin, A., Introduction to the Design & Analysis of Algorithms, Pearson Education (Asia) Pvt. Ltd., New Delhi (2003).

XT 9253 ADVANCE DATABASES LABORATORY L T P C
0 0 4 2

1. Introduction to, used DB system (Oracle), simple post-relational database creation
2. Manipulation techniques for post-relational data - simple queries (e.g. Object-oriented database systems).
3. More complicated queries
4. Different kinds of queries
5. Connection to DB via JDBC
6. Demonstration of Java client

Total : 45 Periods

XC 9255 OPERATING SYSTEMS LABORATORY L T P C
0 0 4 2

1. Basic LINUX commands
2. Shell programming
3. Filters – grep, sed, awk
4. Introduction to C programming with Linux (cc, Makefile, gdb)
5. File Systems - create, open, read, write, close, lseek, stat
6. Process management - Fork, Exec commands, Wait

Total : 60 Periods

XC 9256 JAVA AND INTERNET PROGRAMMING LABORATORY L T P C
0 0 4 2

1. Console Java Applications
2. Convert hostname to IP address and vice versa
3. Identify the component parts (protocol, path, query string etc) of a URL and construct a URL from its component parts
4. Retrieve data from a URL
5. Socket Programming
6. Multi-threaded Applications
7. Applet programs
8. GUI programming using applets and frames
9. Client side scripting
10. Server side scripting
11. Designing and developing a website

Total : 60 Periods

XC 9301 PROBABILITY AND STATISTICS L T P C
3 1 0 4

UNIT I ONE-DIMENSIONAL RANDOM VARIABLES 9

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

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 9

Joint distributions – Marginal and conditional distributions –Conditional expectations – Correlation – Regression curves.

UNIT III RELIABILITY MODELS 9

Failure distributions – Reliability and hazard functions – Exponential and Weibull failure models - Reliability of series and parallel systems – k-out of m systems – Redundancy – Weakest link technique.

UNIT IV TESTING OF HYPOTHESIS 9

Sampling distributions – Type I and Type II errors - Tests of hypothesis for Mean, Difference of means, Variance, Ratio of variances, independence of attributes and goodness of fit using normal, t, chi-square and F – distributions.

UNIT V DESIGN OF EXPERIMENTS 9

Analysis of variance – Completely randomized design – Randomized block design – Latin square design.

L: 45 +T:15 =Total 60 Periods

TEXT BOOKS

1. R.E. Walpole, R.H. Myers, S.L. Myers, and Keying Ye, "Probability and Statistics for Engineers and Scientists", Pearson eduction, 8th edition, New Delhi, 2007.
2. E. Balagurusamy, "Reliability Engineering", Tata McGraw Hill, New Delhi, 2003.

REFERENCES

1. R.A. Johnson, "Miller and Freund's Probability and Statistics for Engineers", PHI Learning Private Ltd., 7th edition, New Delhi, 2008.
2. Jay L. Devore, "Probability and Statistics for Engineers", Cengage Learning India Private Ltd., 2008.
3. K.S. Trivedi, "Probability and Statistics with Reliability and Computer Science Applications, John-Wiley and Sons, Inc., 2nd edition, 2003.
4. A.O. Allen, "Probability, Statistics, and Queueing Theory with Computer Science Applications", Academic Press, 2nd edition, 2005.

XT 9301 **COMPUTER NETWORKS** **L T P C**
3 0 0 3

UNIT I COMMUNICATION FUNDAMENTALS 9

Data Communications – Network Criteria – Network models – Protocols and Standards – OSI Model – Layers in the OSI model – TCP/IP protocol – Addressing.

UNIT II DATA LINK LAYER 9

Error Detection and Correction: Introduction – Cyclic codes – Framing – Flow and Error Control – Protocols – Noiseless channels – Noisy channels – CSMA – CSMA/CD – Gigabit Ethernet – Frame relay – ATM.

UNIT III NETWORK LAYER 9

Logical addressing: IPv4 addresses – IPv6 addresses – Internetworking – IPv4 – IPv6 – Address Mapping – ICMP – Delivery – Forwarding – Unicast Routing protocols – Multicast Routing Protocol.

UNIT IV TRANSPORT LAYER 9

Process to Process Delivery – UDP – TCP – Data traffic – Congestion – Congestion control – QOS – Network Security: Security Services – Digital Signature – IP Security – Firewalls.

UNIT V APPLICATION LAYER 9

Domain Name System (DNS) – E-mail – World Wide Web (HTTP) – Simple Network Management Protocol – Web services – File Transfer Protocol (FTP).

Total : 45 Periods

TEXT BOOKS

1. Behrouz A Forouzan, “Data Communications and Networking”, Fourth Edition, McGraw-Hill Publishers (Unit I: 1.1, 1.2, 1.4, 2.2-2.5, Unit II: 10.1, 10.4, 11.1-11.5, 12.1, 13.5, 18.1, 18.2, Unit III: 19.1, 19.2, 20.1-20.3, 21.1, 21.2, 22.1-22.4, Unit IV: 23.1-23.3, 24.1-24.3, 24.5, 31.1, 31.5, 32.1, 32.4, Unit V: 26.3).
2. Larry L. Peterson, Bruce S. Davie, “Computer Networks A Systems Approach”, Fourth Edition, Morgan Kauffmann Publishers Inc., (Unit V: 9.1, 9.2).

REFERENCES

1. Andrew .S. Tanenbaum, “Computer Networks”, Fourth Edition, 2003.
2. William Stallings, “Data and Computer Communication”, Eighth Edition, Pearson Education, 2008.
3. James F. Kuross, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Third Edition, Addision wesley, 2004.
4. Nader F.Mir “Computer and Communication Networks”, Pearson Education, 2007.

XT 9302	.NET PROGRAMMING	L T P C 3 0 0 3

UNIT I BASIC FEATURES OF C# 9

C# and the .Net framework – Introduction – C# Language fundamentals –Classes and objects – Inheritance and polymorphism – Operator overloading.– Structs.

UNIT II ADVANCED FEATURES OF C# 9

Interfaces – Arrays – Indexers and collections – Multithreading .– Strings and regular expressions – Handling Exceptions – GUI Concepts - Delegates and Events.

UNIT III DATABASE PROGRAMMING 9

Windows Applications – Advanced Controls – Accessing data with ADO.Net – SQL – Executing SQL Statements (Insert, Delete, Update)

UNIT IV ASP.NET, WEB FORMS AND WEB CONTROLS 9

Web Server/Client interaction – Three-tier architecture – Web Forms – Web controls commonly used in ASP.Net applications – Cookies – Sessions.

UNIT V ASP.NET AND WEB SERVICES 9

Service description for a web service – SOAP – Publishing Web Services – Consuming Web services – Remoting.

Total : 45 Periods

TEXT BOOKS

1. H.M. Deitel , P.J. Deitel, J.Listfield, " C# How to Program " 2002 , Pearson Education
2. Andrew Troelsen, " C# and the .NET Platform ", Apress Publisher , 2008

REFERENCES

1. Jesses Liberty, " Programming C#", Second Edition, O'Reilly press ,2002.
2. Herbert Schildt, " The Complete Reference : C#", Fifth Edition, Wrox Press, 2002.

XC 9303	SOFTWARE ENGINEERING	L T P C 3 0 0 3

UNIT I INTRODUCTION **9**

Attributes of good software- System Dependability-Availability and reliability-Safety-Security- Waterfall life cycle model-Evolutionary development –process iteration-Incremental Delivery-Spiral model.

UNIT II SOFTWARE PROJECT MANAGEMENT AND REQUIREMENT ENGINEERING **9**

Management activities –project planning-project scheduling-Risk analysis and management- Functional and non-functional requirements-user requirements-system requirements-feasibility study-requirements elicitation and analysis - requirements validation -requirement management

UNIT III REQUIREMENT ENGINEERING AND DESIGN **9**

System Organization-Modular Decomposition-Cohesion Coupling - multi processor architecture –Client server Architecture-distributed object architecture-Object Oriented design Process

UNIT IV SOFTWARE TESTING AND COST ESTIMATION **9**

System testing – Integration Testing –Release testing-performance testing-Component Testing-Interface testing-Test Case Design-Partition testing-Structural testing-path testing –Software productivity-Estimation techniques-Algorithmic Cost modeling-Project duration and staffing

UNIT V SOFTWARE QUALITY AND CONFIGURATION MANAGEMENT **9**

Process and product Quality- Quality assurance and standards- Quality planning-Quality control and software measurements and metrics- Configuration management planning-Change management- Version and release management- System building-CASE tool for configuration management.

Total : 45 Periods

TEXT BOOK

1. Sommerville, I. “Software Engineering”, 8th Edition, Pearson Education 2009.

REFERENCES

1. Pressman, R.S. “Software Engineering: A Practitioner Approach”, 6th Edition,McGraw Hill 2005.
2. Carlo Ghezzi, Mehdi Jazayeri and Dino Mandrioli, Software Engineering, Prentice Hall India 2009.
3. Gopalasamy Ramesh,” Managing Global Software Project”,Tata McGraw Hill,2001

XC 9304 **VISUAL PROGRAMMING** **L T P C**
3 0 0 3

UNIT I VB.NET FUNDAMENTALS 9

Introduction to .NET Framework - Controls – Menus and Dialog Boxes – Variables and Operators – Decision Structures –Loops and Timers - Debugging -Trapping and Handling Errors

UNIT II VB.NET PROGRAMMING 9

Modules and Procedures – Arrays and Collections – Exploring Text Files and String Processing – Automating Microsoft Office Applications – Deployment of VB.NET Applications.

UNIT III VB.NET UI DESIGN AND DATABASE APPLICATIONS 9

Windows Forms – Graphics and Animation - Inheriting Forms and Creating Base Classes – Working with Printers – ADO.NET – Data Grid Control

UNIT IV VC++ FUNDAMENTALS 9

Windows Programming Fundamentals - Event Driven Programming – Visual C++ components - MFC Library Application Framework – App Wizard – Class Wizard –Event Handling – Message Mapping – Device Context Interface, Color, Fonts – Dialog Data Exchange and Validation (DDX and DDV)

UNIT V VC++ UI DESIGN AND DATABASE APPLICATIONS 9

Dialog Based Applications - Windows Common Controls – Using ActiveX Controls -– Document View Architecture - Splitter Windows - Serialization – Reading and Writing Documents - SDI and MDI applications – ODBC – MFC Database Classes

Total : 45 Periods

TEXT BOOKS

1. Michael Halvorson, “Visual Basic.NET”, Prentice Hall of India, New Delhi, 2002. (Units 1, 2, 3 – Chapters 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20)
2. David J. Kruglinski, “Programming VC++”, Microsoft Press, 1998. (Units 4, 5 – Chapters 1, 2, 3, 4, 5, 6, 7, 8, 17, 18, 20, 31)

REFERENCES

1. Chris H. Pappas & William H. Murray, “The Complete Reference Visual C++”, Tata McGraw Hill Publishing Co. Ltd., 2002.
2. Deitel & Deitel, “ Visual Basics .NET ,How to Program” Second edition, Pearson Education (Asia) Pvt.Ltd., 2004.
3. MSDN Library

XT 9303 CRYPTOGRAPHY AND DATA SECURITY L T P C
3 0 0 3

UNIT I INTRODUCTION TO NUMBER THEORY 9

Modular arithmetic – Fermat Theorem-Euler's theorem – Euclid's algorithm –Extended Euclid's Algorithm, Chinese remainder theorem, Modular Exponentiation –Galois Fields, - Discrete logarithm- Primality Testing Using Miller-Rabin-Introduction to AKS algorithm.

UNIT II CONVENTIONAL ENCRYPTION 9

Conventional encryption model – Crypt Analysis of Caesar Cipher- Mono alphabetic Cipher-Hill Cipher-DES – RC 5 – AES – Random number generation.

UNIT III PUBLIC KEY CRYPTOGRAHY AND DIGITAL SIGNATURES 9

RSA algorithm – Diffie-Hellman key exchange-Digital Signature– Authentication protocols- Digital Signature Standard.

UNIT IV MESSAGE AUTHENTICATION 9

MAC functions, Hash functions – Authentication requirements – authentication functions – Authentication Mechanisms Using Hash and MACs – Secure Hash Algorithms-SHA512-WHIRLPOOL,HMAC, CMAC.

UNIT V NETWORK SECURITY 9

Prettry good privacy – S/MIME-IP Security Overview – Web Security.

Total : 45 Periods

TEXT BOOK

1. Stallings, W., "Cryptography and Network Security Principles and Practice", Pearson Education, FourthEdition, 2006

REFERENCES

1. Menezes A.J, Van Oorschot and Vanstone S.A, "Handbook of Applied Cryptography", CRC Press, 1996.
2. Behrouz A. Forouzan, Cryptography & Network Security,Tata McGraw-Hill, Special Indian Edition-2007.
3. Kobilitz, N., "A course in Number Theory and Cryptography", Springer Verlag, 1994.
4. Biham, E., and Shamir, A., "Differential Crypt analysis of the data encryption standard", Springer Verlag, 1993.
5. Dennig, D., "Cryptography and data security", Addison Wesley, 1982.
6. Abhiji Das and Veni Madhavan C.E ," Public Key Cryptography – Principles and Practices", Pearson Education, New Delhi, 2009.

XT 9304 **.NET PROGRAMMING LABORATORY** **L T P C**
0 0 4 2

1. Console applications using C#
2. Windows applications using C# with DB connectivity
3. Web applications using ASP.net
4. Programs that utilize ADO.net to add / modify / delete / view database records
5. Usage of cookies and sessions in web applications
6. Publishing and Consuming Web Service
7. Remoting Applications

Total : 60 Periods

XC 9305 **GUI APPLICATIONS LABORATORY** **L T P C**
0 0 4 2

1. Dialog based applications with common controls and ActiveX Controls
2. Applications with menus and toolbars
3. Database Applications to Add, Delete, Modify and View Records
4. Applications with document/view architecture (SDI, MDI)
5. Applications with serialization
6. Database connectivity.

Total : 60 Periods

XT 9351	OPERATIONS RESEARCH	L	T	P	C
		3	0	0	3

UNIT I LINEAR PROGRAMMING 9

Formulation of linear programming models - Graphical solution -The simplex method - The dual simplex method.

UNIT II APPLICATIONS OF LINEAR PROGRAMMING AND GOAL PROGRAMMING 9

Transportation problem - Assignment problem – Goal programming Formulation – Goal programming algorithms- The preemptive method.

UNIT III NON-LINEAR PROGRAMMING 9

Lagrange multipliers – Equality constraints – Inequality constraints – Kuhn-Tucker conditions – Quadratic programming.

UNIT IV QUEUEING MODELS 9

Poisson process – Markovian queues – Single and multi-server models – Little's formula – Machine interference model – Steady-state analysis – Self service queue – P-K formula for M/G/1 queue.

UNIT V DETERMINISTIC DYNAMIC PROGRAMMING 9

Recursive nature of computations in dynamic programming – Forward and backward recursion – Applications: Resource Allocation model, Cargo-loading model, Work-force size model, Investment model.

Total : 45 Periods

TEXT BOOKS

1. H.A. Taha, " Operations Research : An Introduction", Pearson Education, 8th edition, New Delhi, 2008.
2. J.K. Sharma, "Operations Research: Theory and Applications", Macmillan India Ltd., 2nd edition, New Delhi, 2003.

REFERENCES

1. Richard Bronson and Govindasami Naadimuthu, "Operations Research, (Schaum's Outlines – TMH edition), Tata McGraw Hill Publishing Company Ltd., 2nd edition, New Delhi, 2004.
2. R. Panneerselvam, "Operations Research", PHI Learning Private Ltd., 2nd edition, 2006.
3. F.S. Hillier and G.J. Lieberman, "Introduction to Operations Research", Tata McGraw Hill, 8th edition, New Delhi, 2005.

XC 9351 OBJECT ORIENTED ANALYSIS AND DESIGN L T P C
3 0 0 3

UNIT I OVERVIEW OF OBJECT ORIENTED SYSTEM DEVELOPMENT 9

Overview of OOSD - Unified approach - Object basis - Classes - Software development process - OO methodologies

UNIT II METHODOLOGY, MODELING AND UML OBJECT MODELING TECHNIQUE 9

Rumbaugh object modeling technique - Booch methodology – Jacobson methodologies - patterns - framework - UML

UNIT III OBJECT ORIENTED ANALYSIS USE CASE DRIVEN 9

Use case - Business process modeling - classification - Association - Aggregation identifying object relationships, attributes and methods

UNIT IV OBJECT ORIENTED DESIGN AND DEVELOPMENT PROCESS 9

OOD Process - Designing classes – Access Layer – Object Storage and Object Interoperability, View Layer – Designing Interface Objects.

UNIT V CASE STUDIES IN OBJECT ORIENTED DESIGN AND DEVELOPMENT 9

Total : 45 Periods

TEXT BOOK

1. Ali Bahrami, "Object Oriented Systems Development" Irwin-McGraw Hill (International Edition), New Delhi (1999).

REFERENCES

1. G. Sudha Sadasivam, " Object-Oriented Analysis and Design " , First Edition, Mac Millan, Delhi (2010).
2. Martin Fowler, "UML Distilled: A Brief Guide to the standard Object Modeling Language", Third Edition, Pearson Education. (2007).
3. Grady Booch, "Object Oriented Analysis and Design with applications", II edition, Pearson Education Pvt. Ltd., Delhi (1994).
4. Richard C. Lee, "UML & C++ - A Practical guide to Object Oriented Development", Prentice Hall.
5. James Rumbaugh, "Object Oriented Modeling and Design", Prentice Hall of India.

XC 9352	NETWORK PROGRAMMING	L T P C 3 0 0 3

UNIT I DISTRIBUTED DATABASES **9**

Introduction – Overview of UNIX OS - Environment of a UNIX process - Process control - Process relationships Signals – Interprocess Communication- overview of tcp/ip protocols

UNIT II ELEMENTARY TCP SOCKETS **9**

Introduction to Socket Programming –Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write , close functions – Iterative Server – Concurrent Server.

UNIT III APPLICATION DEVELOPMENT **9**

TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

UNIT IV SOCKET OPTIONS, ELEMENTARY UDP SOCKETS **9**

Socket options – getsocket and setsocket functions – generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function – getservbyname and getservbyport functions.

UNIT V ADVANCED SOCKETS **9**

Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

Total : 45 Periods

REFERENCES

1. W. Richard Stevens, “Advanced Programming in The UNIX Environment”, Addison Wesley, 2005.
2. W. Richard Stevens, “Unix Network Programming - Volume 1”, Prentice Hall International, 2009
3. W. Richard Stevens, “Unix Network Programming - Volume 2”, Prentice Hall International, 2009

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DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

XC 9353	WEB TECHNOLOGY	L T P C 3 0 0 3

UNIT I XML BASICS 9

XML – XHTML – DTD – Namespace – XML Schema – DOM – SAX – XSL – XSLT – XPath XQuery – XLink – Web Services Basics – SOAP – REST – Markup Languages

UNIT II DATABASE PROGRAMMING 9

JDBC/ODBC/OLE DB Architecture – Configuration – SQL – Executing SQL statements – Query Execution – Scrollable and Updatable Result sets – Row Sets – Transactions – LDAP

UNIT III SERVERSIDE PROGRAMMING 9

Configuring Web Server – IIS – Apache – HTTP Get and Post Requests – Cookies – Session Tracking – Overview of ASP, JSP and PHP - Implicit objects – Scripting Components – Standard Actions – Directives – Custom Tag Libraries – Case Study

UNIT IV EJB AND WEB SERVICES 9

Model-View-Controller architecture – Java Beans Components – EJB overview – Session Beans – Distributed Transactions – Entity Beans – Messaging with JMS – Web Services – Case Study

UNIT V WEB FRAMEWORKS AND SCRIPTING 9

Struts – Java Server Faces – Ruby on Rails – Ajax

Total : 45 Periods

TEXT BOOKS

1. Deitel and Deitel, "Internet and World Wide Web **:** How to program", Pearson Education Publishers, 2009
2. Ed Roman et al, "Mastering Enterprise JavaBeans",Wiley,2008

REFERENCES

1. Cay Horstmann and Gary Cornell, Core Java, Volume II, Pearson Education, 2009
2. Deitel, Deitel and Santry, Advanced Java 2 Platform, Prentice Hall, NJ, 2002
3. Deitel and Deitel, "Java – How To Program", PHI, Eighth Edition, 2009
4. James Holmes, "Struts: The Complete Reference", Tata McGraw Hill, 2007
5. Robert Sebesta, Programming with world wide web, Pearson Education, 4th Edition, 2009
6. Ron Schmelzer and et al., "XML and Web Services", Pearson Education, 2008

XC 9361 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C
3 0 0 3

AIM

To create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional endeavour that they participates.

OBJECTIVE

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

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).

REFERENCES

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).

XC 9354 NETWORK PROGRAMMING LABORATORY L T P C
0 0 4 2

1. Socket Programming
    a. TCP Sockets
    b. UDP Sockets
    c. Applications using sockets.
2. Simulation of ARP/RARP.
3. Simulation of Sliding Window Protocol.
4. Simulation of routing protocols.
5. RPC.
6. DNS/HTTP.

Total : 60 Periods

XC 9355 WEB TECHNOLOGY LABORATORY L T P C
0 0 4 2

1. Creating DTD/XML schema
2. Working with XSL
3. Using DOM and SAX Parser
4. Data Base Programming (JDBC/ ODBC/OLE DB)
5. Server Side Programming(ASP/JSP/PHP)
6. Session and Entity Bean
7. AJAX enabled Rails Applications

Total : 60 Periods

XC 9356 CASE TOOLS LABORATORY LT P C
0 0 4 2

Solving Sample Problems using CASE tools for Design – Testing with Object Oriented Analysis and Design – Unified Modeling language Diagrams – Use Case diagram, class diagram, sequence and collaboration diagram, activity diagram, state chart diagram, component and deployment diagram.

Suggested List of Applications

1. Student Marks Analyzing System
2. Online Ticket Reservation System
3. Payroll System
4. Course Registration System
5. ATM Systems

Total : 60 Periods

XC 9452 **NUMERICAL METHODS** **L T P C**
3 1 0 4

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9

Iterative method and Newton-Raphson method for Algebraic and Transcendental Equations. Solutions of linear system by Gaussian, Gauss-Jordan, Jacobi and Gauss-Seidel methods. Inverse of a matrix by Gauss-Jordan method. Eigenvalue of a matrix by Power methods.

UNIT II INTERPOLATION 9

Newton's divided difference formula, Lagrange's formula. Newton's forward and backward difference formulae, Natural Cubic Spline

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9

Numerical differentiation with interpolating polynomials, Numerical integration by Trapezoidal and Simpson's 1/3rd rule. Double integrals using Trapezoidal and Simpson's rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9

Single Step Methods-Taylor Series, Euler and Modified Euler, methods for first order differential equations, Runge-Kutta method of order four for first and second order differential equations. Multistep Methods-Milne and Adam's-Bashforth predictor and corrector methods for first order differential equations.

UNIT V BOUNDARY VALUE PROBLEMS FOR ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9

Finite difference solution for the second order ordinary differential equations. Finite difference solution for one dimensional heat equation (explicit scheme), one dimensional wave equation and two dimensional Laplace and Poisson equations.

L: 45 +T:15 =Total 60 Periods

TEXT BOOK

1. Grewal, B.S, and Grewal J.S., "Numerical Methods in Engineering and Science", 6th Edition, Khanna Publishers, New Delhi, 2002.

REFERENCES

1. Sankara Rao, K., "Numerical methods for scientists and Engineers", 3rd Edition, Prentice-Hall of India, New Delhi, 2008.
2. Veerarajan, T. and Ramachandran, T., "Numerical Methods with Programming in C", Tata McGraw-Hill Publishing Company Limited, New Delhi, 2009.
3. John H. Mathews, "Numerical Methods for Mathematics, Science and Engineering", 2rd Edition, Prentice-Hall of India, New Delhi, 2005.
4. Sastry, S. S., "Introductory Methods of Numerical Analysis", 3rd Edition, Prentice-Hall of India, New Delhi, 2004.

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DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

XT 9451 SOFTWARE PROJECT MANAGEMENT L T PC
3 0 0 3

Aims & Objectives:

1. To provide a firm understanding of modern practices in software engineering.
2. To study the concepts, methods, and tools for the analysis, design, construction, and measurement of complex software-intensive systems. Emphasize underlying principles.
3. To cover state-of-the-art software engineering and promising research areas, including principles of software engineering, requirements analysis, design, implementation, testing, and project management.

UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT II PROJECT EVALUATION 9

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT III ACTIVITY PLANNING 9

Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

UNIT IV MONITORING AND CONTROL 9

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS 9

Introduction – Understanding Behavior – Organizational Behavior: A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

Total : 45 Periods

TEXT BOOK

1. Bob Hughes, and Mike cotterell, "Software Project Management", 4th Edition, Tata McGraw Hill, 2006.

REFERENCES

1. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Walker Royce, “Software Project Management”, Pearson Education, 1999.
3. Pankaj Jalote, “Software Project Management in Practice”, Pearson Education, 2002.

XT 9452	MOBILE COMMUNICATION	L T P C 3 0 0 3

UNIT I WIRELESS COMMUNICATION FUNDAMENTALS 9

Introduction-wireless transmission-frequencies for radio transmission-signals antennas-signal propagation-multiplexing-modulations-spread spectrum- MAC-SDMA-FDMA-TDMA-CDMA-Comparison of S/T/F/CDMA - Introduction to 2G and 3G - Concerns and Issues in wireless communication.

UNIT II WIRELESS SERVICES 9

Voice services-Data services-GSM -system Architecture- protocols- connection establishment-Handover-Routing-GPRS-EDGE- Voice over IP.

UNIT III WIRELESS NETWORKS 11

Wireless LAN- IEEE802.11 Standards-Architecture-Services- Mobility in wireless LAN-Deploying wireless LAN- Mobile AdHoc Networks and sensor networks-wireless LAN security- WiFi versus 3G- Bluetooth- protocol-security-Jini-Comparison of Bluetooth and Jini.

UNIT IV WIRELESS DEVELOPMENT ENVIRONMENTS 9

WAP- WAP Architecture-WDP-WTLS-WTP-WSP-WML-WML Script-WAE- WTA- J2ME Overview-J2ME Architecture and Development Environment.

UNIT V MOBILE LAYERS 7

Mobile IP-DHCP-Routing-TCP over wireless networks and types of TCP.

Total : 45 Periods

TEXT BOOKS

1. Jochen Schiller, ”Mobile Communications”, Pearson Education, 2nd Edition, 2003. (Chapters : 1,2,3,4,7,8,9,10.3,10.4.10.5,10.6)
2. Asoke K. Talukder and Roopa R.Yavagal,”Mobile Computing Technology, Applications And Service Creation”, Tata Mcgraw-Hill publishing company limited, 2005. (Chapters : 10).

REFERENCES

1. C.S.R Prabhu, A.Prathap Reddi,”bluetooth technology and its applications with Java and J2ME”, PHI, 2007. (Chapters: 2,6,9,19,20).
2. JAMES KEOGH.”The complete reference J2ME”, Tata McGraw-Hill Publishing company Limited 2003. (Chapters: 1,3).
3. Basics of wireless communications, NIIT, PHI, 2007. (Chapters: 4,5).

XT 9453 COMPUTER GRAPHICS AND MULTIMEDIA L T P C
3 0 0 3

UNIT I OVERVIEW OF COMPUTER GRAPHICS 9

A Survey of Computer Graphics – Overview of Graphics System – Video Display Devices – Raster-Scan and Random-Scan Systems – Input Devices – Hard Copy Devices – Graphics .

UNIT II OUTPUT PRIMITIVES AND 2D TRANSFORMATIONS 9

Point Generation – Line and Circle Generating Algorithms – Scanline Polygon Filling – 2D Transformations – Windowing & Clipping – Cohen-Sutherland Line Clipping – Liang-Barsky Line Clipping.

UNIT III 3D GRAPHICS 9

3D Concepts – Representations – Polygon Surfaces – Splines – 3D Transformations – Projections – Visible Surface Detection Methods – Backface Detection – Scanline Method – Depth-Sorting Method.

UNIT IV INTRODUCTION TO MULTIMEDIA 9

Multimedia – Multimedia and Hypermedia – World Wide Web – Overview of Multimedia Elements – Text – Image – Animation – Audio - Video file formats – Features of Authoring tools.

UNIT V MULTIMEDIA INFORMATION REPRESENTATION 9

Digitization principles – Text – Unformatted text – formatted text – Hyper text - Images – Graphics – Digitized documents – Digitized pictures - Audio – PCM – CD quality audio – Synthesized audio – Video – Broadcast television – Digital video – PC video

Total : 45 Periods

TEXT BOOKS

1. Hearn, D. and Pauline Baker, M., “Computer Graphics”, Second Edition, Pearson Education, Asia, Delhi, 2002.
2. Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia, Pearson Education, 2005.
3. Fred Halsall, Multimedia communications – Applications, Networks, Protocols and Standards, Pearson Education, 2002.

REFERENCES

1. Rogers, D.F., “Procedural Elements for Computer Graphics”, Second Edition, Tata Mc-Graw Hill Publications, New Delhi, 2001.
2. Foley, J.D. , Andries Van Dam, Feiner, S. K. and Hughes J.F. , “Computer Graphics – Principles and Practice”, Pearson Education, Asia, Delhi, 2001.
3. Ralf Steinmetz, Klara Nehrstedt, Multimedia, Computing, Communications and Applications, Prentice Hall, 1995.

XT 9454 COMPUTER GRAPHICS AND MULTIMEDIA LABORATORY L T P C
0 0 4 2

Point Generation – Implementation of Line Algorithms – Implementation of Circle Algorithm – Clipping – Implementation of 2D Transformations – 3D Objects – Sphere, Ellipsoid. **(9 labs)**

The above exercises are to be carried out in open GL environment.

Tweened Animation- Motion tween – Motion along open/closed guided path - Shape tween – Size tween – Color Tween **(6 labs)**

Total : 60 Periods

XT 9501	ENTERPRISE COMPUTING	L T P C 3 0 0 3

UNIT I ENTERPRISE RESOURCE PLANNING 9

ERP – Introduction – Scope – Technology – Benefits of ERP – Benefits of ERP. Business Engineering – overview – Significance – principles of Business Engineering. Business modeling for ERP.

UNIT II ERP IMPLEMENTATION 9

Implementation of ERP – overview – post-implementation methodology – Guidelines for ERP Implementation. ERP Domain – Success and failure factors of an ERP implementation - Bann IV – SAP - SAP R/3 applications.

UNIT III ERP AND TECHNOLOGY 9

ERP and Technology –Introduction - Business intelligence – E-commerce and E-Business – Business process re-engineering (BPR) – online analytical processing (OLAP)-Supply Chain Management (SCM) – Customer Relational ship Management (CRM).

UNIT IV MODULES IN ERP 9

Business Modules in ERP- Finance – Manufacturing (production) – Human resources – plant maintenance – Material management – Marketing – sales, Distribution and services.

UNIT V CURRENT TRENDS IN ERP 9

Introduction – New markets – New channels – customization tools – SOA factor . ERP Case Studies.

Total : 45 Periods

TEXT BOOKS

1. Vinod Kumar Garg, N.K.Venkitakrishnan , “Enterprise Resource Planning”, Second Edition, Prentice –Hall India .
2. Alexis Leon , “ ERP Demystified ”, Second Edition, McGraw- Hill publishing company Limited , 2008

XT 9502 PRINCIPLES OF MANAGEMENT L T P C
3 0 0 3

UNIT I MANAGEMENT AND ITS EVOLUTION 10

Definition - importance - different approaches to management - classical, behavioral and modern perspectives - business environment and its relevance - business ethics and social responsibility – Business ethics and social responsibility in the Perspective of Software Industry.

UNIT II PLANNING 7

Definition - purpose of planning - types of planning - formulation of objectives - premising and forecasting - guides to planning – planning methodologies in software companies.

UNIT III ORGANISING 8

Definition - line and staff functions - delegation of authority - co-ordination of functions - organizational structure - Different types of organizational structure specifically in software industry - centralization and decentralization of decisions - staffing.

UNIT IV LEADING 10

Definition - management versus leadership - different approaches to leadership - motivation - theories of motivation – Motivational tools for software employees - communication - Types of communication - communication process - Effective communication barriers in software companies.

UNIT V CONTROLLING 10

Definition - characteristics - importance - budgetary and non-budgetary controlling techniques - management by objectives and management by exception - management decision-making – Exclusive western and eastern management practices in software companies.

Total : 45 Periods

TEXT BOOKS

1. Harold Koontz and Heinz Weihrich, “Essentials of Management”, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1998.
2. James A.F.Stoner, R.Edward Freeman and Daniel R. Gilbert Jr., “Management”, Pearson Education, New Delhi, 2004.

REFERENCES :

1. Stephen P.Robbins and Daniel A.Decenzo, “Fundamentals of Management”, Pearson Education Asia, New Delhi, 2002.
2. Michael A. Hitt J. Stewart Black Lyman W. Porter, “Management, Pearson Education, 1st Edition, 2006.

XT 9503 SOFTWARE TESTING AND QUALITY ASSURANCE L T P C
3 0 0 3

UNIT I BASICS OF SOFTWARE QUALITY ASSURANCE 8

Ethical Basis for Software Quality – Total Quality Management Principles –SQA components in project life cycle – SQA defect removal policies – Reviews

UNIT II SOFTWARE QUALITY STANDARDS AND PLAN 8

Quality Standards, Practices and Conventions – Software Configuration Management – Reviews and Audits – Software Cost Estimation(COCOMO)- Quality Management Standards – Reliability

UNIT III DESIGNING TEST CASE 11

Role of process in software quality, Testing as a process, Software Testing principles, The Tester's role in software development organization, Testing Design strategies – using black box approach to test case design, Equivalence class partitioning , boundary value analysis – using White box approach to test design , test adequacy criteria, covering code logic, paths - role in white box based test design, evaluating test adequacy criteria - levels of testing and different types of testing .

UNIT IV MANAGEMENT ON TESTING 9

Introduction – Testing and debugging goals and policies, Test planning, Test plan components, Test plan attachments, locating test items, reporting test results. Skills needed by a test specialist, building a testing group.

UNIT V TRACKING AND CONTROLLING 9

Definition terms, measurement and milestones for controlling and monitoring, reports and control issues, criteria for test completion, Developing a review program, Components of review plans and reporting review results .

Total : 45 Periods

TEXT BOOKS

1. Daniel Galin, Software quality assurance – from theory to implementation , Pearson education, 2009.
2. Aditya Mathur, Foundations of software testing, Pearson Education, 2008

REFERENCES

1. Srinivasan Desikan and Gopalaswamy Ramesh, Software testing – principles and practices , Pearson education, 2006
2. Ron Patton, Software testing , second edition, Pearson education, 2007
3. William E.Perry , "Effective methods for software testing", Third Edition, Wiley , 2006.
4. Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education, 2004.
5. Alan C Gillies, "Software Quality Theory and Management", Cengage Learning, Second edition, 2003
6. Schulmeyer, G. Gordon, James McManus, "Handbook of Software Quality Assurance", Second Edition, Van Nostrand Reinhold, 1992.
7. Ilene Burnstein, " Practical Software Testing", Springer International Edition, Chennai, 2003.

XT 9504	SERVICE ORIENTED ARCHITECTURE	L T P C 3 0 0 3

UNIT I SOFTWARE ARCHITECTURE AND SOA 9

Types of IT Architecture-SOA (Service Oriented Architecture)-Evolution-key components- Enterprise-wide SOA-Enterprise Applications-Software platforms for Enterprise Applications-contents Service-Oriented Enterprise Applications.

UNIT II SOA DESIGN AND GOVERNANCE 9

Service Oriented Analysis and Design-Technologies for SOA-Business case for SOA-SOA Implementation and Governance-Trends in SOA.

UNIT III WEB SERVICES 9

XML-Web Service standards-SOAP-WSDL-UDDI-ebXML-Web Service Security-XML Digital signature-Canonical XML-XML Encryption-SAML.

UNIT IV WEB SERVICES IMPLEMENTATION 9

Java implementation-JAXP-JAX-RPC-JAXM-JAXR-JAXB- .NET framework- Web Service through .NET.

UNIT V ADVANCED TOPICS 9

Semantic web-Web 2.0 standard- web ontology-RDF-OWL-Transaction Management-Transaction model for web services- current trends.

Total : 45 Periods

TEXT BOOKS

1. Shankar Kambhampaly, "Service-Oriented Architecture for Enterprise Applications", Wiley India Pvt Ltd, 2008. (UNIT I, II).
2. James McGovern, and et.al, "Java Web Service Architecture", MORGAN KAUFMANN PUBLISHER, 2003. (UNIT III, IV, V).

REFERENCES

1. Eric Newcomer and Greg Lomow, "Understanding SOA with web services", Pearson Education publisher, 2005.
2. Ron Schmelzer and et.al."XML and Web Services Unleashed", Pearson Education publisher, 2008.
3. H.M. Deitel and P.J.Deitel "C# 2008 for programmers", third edition, Pearson Education 2009.
4. http://www.w3C.org .

XT 9505 SOFTWARE TESTING LABORATORY L T P C
0 0 4 2

Testing of the following software using software engineering methodology:

Use Rational Suite and other Open source Tools.

1. Perform experiments to do the following:

a. Unit Testing

b. System and Integration Testing

c. Regression Testing

d. User Acceptance Testing (UAT)

e. Performance Testing – Front-end and Back-end

2. Mini projects on any relevant current topics. Suggested topics:

a. Insurance Management Application

b. Reservation Systems for Air lines, Railways etc.

c. Knowledge Management System in education

d. Remote Procedure Call Implementation

e. Banking Applications

Total : 60 Periods

XC 9506 SERVICE ORIENTED ARCHITECTURE LABORATORY L T P C
0 0 4 2

1. XML-RPC and SOAP implementation.
2. Web services using Java.
3. Web services using .NET.
4. Implementation of XML Encryption and Decryption.
5. Integration of heterogeneous Web services.
6. Case studies.

Total : 60 Periods

XC 9021 **BIOINFORMATICS** **L T P C**
3 0 0 3

UNIT I INTRODUCTORY CONCEPTS 9

The Central Dogma – The Killer Application – Parallel Universes – Watson's Definition – Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks – Geographical Scope – Communication Models – Transmissions Technology – Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership – Implementation – Management.

UNIT II SEARCH ENGINES AND DATA VISUALIZATION 9

The search process – Search Engine Technology – Searching and Information Theory – Computational methods – Search Engines and Knowledge Management – Data Visualization – sequence visualization – structure visualization – user Interface – Animation Versus simulation – General Purpose Technologies.

UNIT III STATISTICS AND DATA MINING 9

Statistical concepts – Microarrays – Imperfect Data – Randomness – Variability – Approximation – Interface Noise – Assumptions – Sampling and Distributions – Hypothesis Testing – Quantifying Randomness – Data Analysis – Tool selection statistics of Alignment – Clustering and Classification – Data Mining – Methods – Selection and Sampling – Preprocessing and Cleaning – Transformation and Reduction – Data Mining Methods – Evaluation – Visualization – Designing new queries – Pattern Recognition and Discovery – Machine Learning – Text Mining – Tools.

UNIT IV PATTERN MATCHING 9

Pairwise sequence alignment – Local versus global alignment – Multiple sequence alignment – Computational methods – Dot Matrix analysis – Substitution matrices – Dynamic Programming – Word methods – Bayesian methods – Multiple sequence alignment – Dynamic Programming – Progressive strategies – Iterative strategies – Tools – Nucleotide Pattern Matching – Polypeptide pattern matching – Utilities – Sequence Databases.

UNIT V MODELING AND SIMULATION 9

Drug Discovery – components – process – Perspectives – Numeric considerations – Algorithms – Hardware – Issues – Protein structure – AbInitio Methods – Heuristic methods – Systems Biology – Tools – Collaboration and Communications – standards - Issues – Security – Intellectual property.

Total : 45 Periods

TEXT BOOK

1. Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education, 2003.

REFERENCE

1. T.K.Attwood and D.J. Perry Smith, "Introduction to Bio Informatics, Longman Essen, 1999.

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Centre For Academic Courses
Anna University, Chennai-600 025.

XC 9022 INFORMATION CODING TECHNIQUES L T P C
3 1 0 4

UNIT I SOURCE CODING 9

Information Theory-Measure of Information-mutual and self information-entropy-conditional and differential entropy-Kraft's Inequality-Source Coding Theorem- Huffman coding-Lempel-Ziv algorithm-Run Length Encoding.

UNIT II CHANNEL CAPACITY AND CODING 9

Channel Models-Channel Matrix-Channel Capacity-Channel Coding Theorem-Information Capacity Theorem and Shannon Limit.

UNIT III ERROR CONTROL CODING 9

Error Correction using Linear block codes-Generator and Parity-Check Matrices-Cyclic Codes-BCH codes-Gorenstein Zierler Decoding algorithm-Golay codes-efficiency of LBC--Convolution coding-decoding algorithms-Viterbi decoding

UNIT IV TEXT AND IMAGE COMPRESSION 9

Compression principles-Text compression-Dynamic Hufffman Coding-Arithmetic Coding-Image Compression-Graphic interchange format-Tagged image file format. Discrete Cosine Transform-Discrete Fourier Transform

UNIT V AUDIO AND VIDEO COMPRESSION 9

Audio Compression-Differential Pulse Code Modulation- Adaptive Coding-Video Compression-MPEG2 and MPEG4

L : 45 + T : 15 = Total 60 Periods

TEXT BOOKS

1. Ranjan Bose, "Information Theory Coding and Cryptography", Tata McGraw-Hill, 2002.
2. Fred Halsall, "Multimedia Communications", Pearson Education, 2001.

REFERENCES

1. Richard Wells, "Applied Coding and Information Theory", Pearson Education, 2004
2. D.G. Hoffman, D.A Leonard, C. C Linder, K. T. Phelps, C. A Rodger and J.R. Wall, "Coding Theory: The Essentials", Marcel Dekker Inc., 1991.

XC 9023 GEOGRAPHIC INFORMATION SYSTEM L T P C
3 0 0 3

UNIT I **7**

GIS – Definition -History of GIS -Basic Components of GIS – Hardware, Software, Data, Methods, People – List of GIS Software: Popular software, Open Source software

UNIT II **10**

Data: Spatial and Non-Spatial Data – Spatial Data: Points, Lines, Polygons/Area and Surface - Non-Spatial Data - Levels of Measurement: Nominal, Ordinal, interval, ratio – Data Base – Functions -Data Base Structures – Hierarchical, Network, Relational-Relational Data Base Management System – Normalization, E-R Diagram

UNIT III **10**

Raster Data Model – Grid Cell/Pixel -Tesselations – Regular, Irregular – Geometry of Regular Tesselations: Shape, Adjacency, Connectivity, Orientation - Size of Grid Cell – Data Encoding: Rule of dominance, Rule of importance, Centre of Cell -Data Compression: Runlength, Chain, Block and Quadtree coding -Vector Data Model – Topology - Euler Equation, Rules for Topological Consistency – Arc-Node Data Structure – Raster vs. Vector Comparison

UNIT IV **9**

Vector Data Input – Digitizer: Principles, Co-ordinate transformation – Errors in digitizing – Scanner: Principles, On Screen Digitization, Georeferencing – Raster File Formats, Vector File formats – Import/Export Functionality – Linking Non-spatial data with Spatial data – Linking digital databases: ODBC – GPS data integration

UNIT V **9**

Discrete and Continuous Surfaces – Interpolation Techniques - Digtial Elevation Models – Sources of DEM: Ground Survey, Photogrammetry, Stereo Satellite data, Airborne Laser Terrain Mapping- DEM representation – Gridded DEM, TIN structure – Extraction of Topographic Parameters: Slope, Aspect, Delienation of Watershed and Drainage Network – DEM Applications

Total : 45 Periods

TEXT BOOK

1. Lo, C.P. and Yeung, Albert K.W., Concepts and Techniques of GeographicInformation Systems Prentice Hall, 2/E,2006.

REFERENCES

1. Peter A. Burrough, Rachael A. McDonnell, Principles of GIS, Oxford University Press, 2000
2. 2.Robert Laurini and Derek Thompson, Fundamentals of Spatial Information Systems,Academic Press, 1996
3. Paul Longley , Geographic Information Systems and Science, John Wiley & Sons Inc ,2001.

XC 9024 **DIGITAL SIGNAL PROCESSING** **L T P C**
3 0 0 3

UNIT I SIGNALS SYSTEMS **9**

Basic Elements of Digital Signal Processing – Concept of Frequency In Continuous Time And Discrete Time Signals – Sampling Theorem – Discrete Time Signals. Discrete Time Systems – Analysis of Linear Time Invariant Systems – Z Transform – Convolution and Correlation.

UNIT II FFT **9**

Introduction To DFT – Efficient Computation of DFT Properties of DFT – FFT Algorithms – Radix-2 And Radix-4 FFT Algorithms – Decimation in Time – Decimation in Frequency Algorithms – Use of FFT Algorithms in Linear Filtering And Correlation.

UNIT III IIR FILTER DESIGN **9**

Structure of IIR – System Design of Discrete Time IIR Filter From Continuous Time Filter – IIR Filter Design By Impulse Invariance – Bilinear Transformation – Approximation Derivatives – Design of IIR Filter In The Frequency Domain.

UNIT IV FIR FILTER DESIGN **9**

Symmetric and Antisymmetric FIR Filters – Linear Phase Filter – Windowing Technique – Rectangular – Kaiser Windows – Frequency Sampling Techniques – Structure For FIR Systems.

UNIT V FINITE WORD LENGTH EFFECTS **9**

Quantization Noise – Derivation For Quantization Noise Power – Fixed Point And Binary Floating Point Number Representation – Comparison – Over Flow Error – Truncation Error – Co-Efficient Quantization Error –Limit Cycle Oscillation – Signal Scaling – Analytical Model Of Sample And Hold Operations – Application Of DSP – Model Of Speech Wave Form – Vocoder.

Total : 45 Periods

TEXT BOOK

1. John G Proakis, and Dimtris G Manolakis, “Digital Signal Processing Principles, Algorithms and Application”, Third Edition, Pearson Education, 2000.

REFERENCES

1. Sanjit K.Mitra, “Digital Signal Processing – A Computer Base Approach”, Tata Mcgraw Hill, 2001.
2. Alan V. Oppenheim, Ronald W. Schafer, and John R. Back, “Discrete Time Signal Processing”, 1st Edition, Pearson Education, 2000.
3. Johny R. Johnson, “Introduction to Digital Signal Processing”, Prentice Hall, 1989.
4. N. Sarkar, “Elements of Digital Signal Processing”, 2nd Edition, Khanna Publishers, 2000.
5. Proakis, “A Self-Study Guide for Digital Signal Processing”, 1st Edition, Pearson Education, 2003.
6. Itearchor, “Digital Signal Processing”, 2nd Edition, Pearson Education, 2002.

XC 9025 WAVELET ANALYSIS L T P C
3 0 0 3

UNIT I FOURIER ANALYSIS 9

Fourier and inverse Fourier transforms – Continuous time convolution and the delta function – Fourier transform of square integrable functions – Poisson's summation formula.

UNIT II WAVELET TRANSFORMS AND TIME-FREQUENCY ANALYSIS 9

The Gabor transform – Short time Fourier transforms and the uncertainty principle – The integral wavelet transform – Diadic Wavelets and inversions – Frames.

UNIT III MULTI RESOLUTION ANALYSIS AND WAVELETS 11

The Haar wavelet construction – Multi resolution analysis – Riesz basis to orthonormal basis – Sealing function and scaling identity – Construction of wavelet basis.

UNIT IV COMPACTLY SUPPORTED WAVELETS 10

Vanishing moments property – Meyer's wavelets – Construction of a compactly supported wavelet – Smooth wavelets.

UNIT V APPLICATIONS 6

Digital Filters – Discrete wavelet transforms and Multi resolution analysis – Filters for perfect reconstruction – Para unitary filters and orthonormal wavelets – Filter design for orthonormal wavelets – Biorthogonal filters.

Total : 45 Periods

TEXT BOOKS

1. C.K. Chui, An Introduction to Wavelets, Academic Press, San Diego, CA 1992. (Sections:2.1-2.3, 2.5, 3.1-3.5)
2. P.Wojtaszczyk, A mathematical introduction to Wavelets, London Mathematical Society Student ?Texts 37, Cambridge University Press, 1997, (Sections 1.1,2.1-2.4, 3.1,3.2,4.1,4.2).
3. Y.T. Chan, Wavelet Basics, Kluwer Academic Publishers, 1995. (Sections 3.1-3.7).

XC 9026 **EMBEDDED SYSTEMS** **L T P C**
3 0 0 3

UNIT I INTRODUCTION **9**

Challenges of Embedded Systems – fundamental components – examples of embedded systems – hardware fundamentals – gates – timing diagrams – memory – direct memory access – buses – interrupts – schematics – build process of embedded systems.

UNIT II MEMORY MANAGEMENT AND INTERRUPTS **9**

Memory access procedure – types of memory – memory management methods – Pointer related issues – polling versus interrupts – types of interrupts – interrupt latency – re-entrancy – interrupt priority – programmable interrupt controllers – interrupt service routines.

UNIT III REAL-TIME OPERATING SYSTEMS – RTOS **9**

Desktop Operating Systems versus RTOS – need for Board Support Packages – task management – race conditions – priority inversion – scheduling – inter task communication – timers – semaphores – queues.

UNIT IV EMBEDDED SYSTEM DESIGN AND IMPLEMENTATION **9**

Requirements of an embedded system – architecture styles and patterns – design practices – implementation aspects and choices.

UNIT V EMBEDDED SOFTWARE DEVELOPMENT TOOLS **9**

Host and target machines – cross compilers – linker and locators for embedded software – address resolution – locating program components – initialized data and constant strings – PROM programmers – ROM emulators – Flash memory.

Total : 45 Periods

TEXT BOOKS

1. Sriram V.Iyer, Pankaj Gupta, “Embedded Real-time Systems Programming”, Tata McGraw Hill publishers, 2004.
2. David E.Simon, “An Embedded Software Primer”, Pearson Education publishers, 1999.

REFERENCES

1. Raj Kamal, “Embedded Systems”, Tata McGraw Hill.
2. “Frank Vahid and Tony Givargis, “A unified Hardware/Software Introduction to Embedded System Design” John Wiley & Sons publishers, 2002.

XC 9027	FAULT TOLERANT SYSTEMS	L T P C 3 0 0 3

UNIT I FAULT TOLERANT DESIGN 9

Fundamentals of Reliability – Error Detecting and Correcting Codes – Hardware Redundancy – Information Redundancy – Software Redundancy – System Level Fault Tolerance.

UNIT II SOFTWARE RELIABILITY MODELING 9

Concepts – General Model Characteristic – Historical Development of models – Model Classification scheme – Markovian models – General concepts – General Poisson-Type Models – Binomial – Type Models – Poisson-Type models – Fault reduction factor for Poisson-Type models.

UNIT III COMPARISON OF SOFTWARE RELIABILITY MODELS 9

Comparison Criteria – Failure Data – Comparison of Predictive Validity of Model Groups – Recommended Models – Comparison of Time Domains – Calendar Time Modeling – Limiting Resource Concept – Resource Usage model – Resource Utilization – Calendar Time Estimation and confidence Intervals.

UNIT IV INFORMATION SECURITY AND INTEGRITY 9

Critical Characteristics of Information – Security Models – Needs for Security – Legal, Ethical and Professional Issues.

UNIT V SECURITY ANALYSIS 9

Risk Management – Identifying and Assessing Risk – Risk Control – Control Strategies – Categories – Feasibility Studies – Practices in Controlling Risk.

Total : 45 Periods

REFERENCES

1. Paray K.Lala, “Self-Checking and Fault Tolerant Digital Design”, Morgan Kauffman, 2001.
2. John D.Mura, “Software Reliability Engineering”, Tata McGraw Hill, 1998.
3. Michael E.Whitman, Herbert J.Mattord, “Principles of Information Security”, Thompson (Vikas Publishing House), 2003.

XC 9028 **SOFTWARE METRICS** **L T P C**
3 0 0 3

UNIT I MEASUREMENTS THEORY **9**

Fundamentals Of Measurement – Measurements In Software Engineering – Scope Of Software Metrics – Measurements Theory – Goal Based Framework – Software Measurement Validation.

UNIT II DATA COLLECTION AND ANALYSIS **9**

Empirical Investigation – Planning Experiments – Software Metrics Data Collection – Analysis Methods – Statistical Methods.

UNIT III PRODUCTS METRICS **9**

Measurement Of Internet Product Attributes – Size And Structure – External Product Attributes – Measurement Of Quality.

UNIT IV QUALITY METRICS **9**

Software Quality Metrics – Product Quality – Process Quality – Metrics For Software Maintenance – Case Studies Of Metrics Program – Motorola – Hp And IBM.

UNIT V MANAGEMENT METRICS **9**

Quality Management Models – Rayleigh Model – Problem Tracking Report (Ptr) Model – Reliability Growth Model – Model Evaluation – Orthogonal Classification.

Total : 45 Periods

REFERENCES:

1. Norman E. Fentar, and Share Lawrence Pflieger, "Software Metrics", International Thomson Computer Press, 1997.
2. Stephen H.Kan, "Metric and Models in Software Quality Engineering", Addison Wesley, 1995.

XC 9029 COMPUTATION COMPLEXITY L T P C
3 0 0 3

UNIT I TIME AND SPACE BOUNDED COMPUTATIONS AND MODELS OF COMPUTATIONS 9

Finite Automaton, Turing machines , Non-deterministic Turing Machines, Oracle Turing Machines – Order of magnitude, running time and work space of TMs – Time and Space constructability

UNIT II CETRAL COMPLEXITY CLASSES 9

Basic definitions and relationships – Computing functions – Invertibility and honesty – Polynomial time many-one reducibility – Natural Np Complete Sets – Natural PSPACE complete sets.

UNIT III TURING REDUCIBILITY AND NON-UNIFORM COMPLEXITY 9

Polynomial Turing reducibility – Strong nondeterministic polynomial time reducibility – Self reducibility Non-uniform complexity – Classes defined by advice functions – Boolean circuits – Polynomial advice – Logarithmic advice – Self-producible circuits.

UNIT IV UNIFORM DIAGONALIZATIONS 9

Uniform Deagonalization – Presentability and other properties – Recursive sets and diagonalization – Applications to recursively presentable sets – Delayed diagonalization.

UNIT V POLYNOMIAL TIME HIERARCHY 9

Polynomial time hierarchy – Characterization – Relations with quantifies – Complete sets and presentability – Alternating TM

Total : 45 Periods

TEXT BOOK

1. Balcazar, J.I., Diaz.J and Gabarro, J. “Structural Complexity-I”, Springer Verlag, 1988.

REFERENCES

1. Balcazar, J.I., Diaz.J and Gabarro, J. “Structural Complexity-I I ”, Springer Verlag, 1990.
2. Garey, M.R. and Johnson, D.S. “Computer and Intracibility, A guide to the theory of NP Completeness” , WH Freeman and Co, 1979.
3. Papadimitriou, C., “Computational Complexity” , Addison Wesley, 1994.

XT 9021	PERSONAL SOFTWARE PROCESSES	L T P C 3 0 0 3

UNIT I OVERVIEW AND PLANNING PROCESS 9

Overview of Software Development Life cycle – Overview of PSP – Different levels of PSP – Importance of Statistical data - Why do planning? – Size and Time – Process and sequencing – Tracking – Making the plan – Common planning tools – Software size.

UNIT II SOFTWARE SIZE, PROBE SIZE ESTIMATION AND SCHEDULE ESTIMATION 9

Estimation Process - Common estimation techniques – Function points – PROBE overview - Time estimation – size estimation – Time in phase - Planning development time – Estimating task time – Schedule estimating -– Software size estimation –

UNIT III DESIGN AND CODE METHODOLOGIES AND REVIEWS 9

Advantages – Effectiveness data – justifying time investment – setting up a review process – Heuristics for design review – - Design and Coding methodologies - Review metrics – Derived metrics – checklists – Different Review Mechanism – Importance of review – Different types of testing

UNIT IV SOFTWARE QUALITY MANAGEMENT AND PROCESS DESCRIPTION 9

Quality Management, Hurdles to Quality – Different Statistical tools - Quality economics – Metrics for cost of quality – Effects of yield variance on schedule – Defect removal process – using casual analysis – Benefits of process definition – process components – Defining phases –

UNIT V DATA SUMMARY AND CAUSAL ANALYSIS AND DEVELOPING PSP PROCESS SCRIPTS 9

Defect removal – Basic resource – Causal Analysis Techniques –– Tracking – Overall defect rates – Reduce compile and test defects –Refining time estimation – Developing PSP Process scripts Tailoring PSP Process Scripts to the needs.

Total : 45 Periods

TEXT BOOK

1. Humphrey, W.S., “Introduction to Personal Software Process”, Pearson Education (Singapore) Pvt., Ltd., Delhi, 2003.

XT 9022	HIGH SPEED NETWORKS	L T P C 3 0 0 3

UNIT I HIGH SPEED NETWORKS 9

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

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 8

Queuing Analysis – Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III TCP AND ATM CONGESTION CONTROL 12

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats – ABR Capacity allocations – GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 8

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

UNIT V PROTOCOLS FOR QOS SUPPORT 8

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

Total : 45 Periods

TEXT BOOK

1. William Stallings, "High speed networks and internet", Second Edition, Pearson Education, 2002.

REFERENCES

1. Warland, Pravin Varaiya, "High performance communication networks", Second Edition , Jean Harcourt Asia Pvt. Ltd., , 2001.
2. Irvan Pepelnjk, Jim Guichard, and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.

XT 9023	PATTERN RECOGNITION	L T P C 3 0 0 3

UNIT I OVERVIEW OF PATTERN RECOGNITION 9

Discriminant functions- Supervised learning - Parametric estimation-Maximum Likelihood estimation - Bayesian parameter estimation - Perceptron Algorithm-LMSE Algorithm-Problems with Bayes Approach-Pattern classification by distance functions -minimum distance Pattern classifier.

UNIT II UNSUPERVISED CLASSIFICATION 8

Clustering for unsupervised learning and classification ,clustering concepts C- means algorithm - hierarchical clustering - Graph theoretic approach to pattern clustering-Validity of clustering solutions.

UNIT III FEATURE EXTRACTION AND STRUCTURAL PATTERN RECOGNITION 8

KL Transforms - feature selection through functional approximation - Binary selection - Elements of formal grammars, syntactic description, Stochastic grammars, Structural representation. .

UNIT IV AI TECHNIQUES 10

Search and control strategies - Uniformed search - Informed search - searching AND graphs- Matching techniques-Knowledge for recognition and classification process-visual image understanding - Expert system architectures.

UNIT V RECENT ADVANCES AND IMAGE APPLICATIONS 10

Learning of neural pattern recognition - Fuzzy logic - Fuzzy pattern classifiers - image segmentation - Credit scoring - Techniques for colon endoscopy - Target classification of Cancer cells - Cell cytology classification - Mixture modeling of excited and living ovine hearts- bacterial classification.

Total : 45 Periods

REFERENCES

1. Duda R.O., and Hart P.G., “Pattern Classification and scene analysis”, JohnWiley, New York, 1973.
2. Elaine Rich, “Artificial Intelligence”, McGraw Book Company, Singapore, 1988.
3. Robert J. Schalkoff , “Pattern recognition: Statistical, Structural and Neural approaches”, John Wiley and Sons inc, New York, 1992.
4. Morton Nadier and Eric Smith P., “Pattern Recognition Engineering”, John Wiley and sons, New York, 1993.
5. Dan Patterson, “Introduction to artificial Intelligencce and Expert Systems”, Prentice Hall of India, 1997.
6. Andrew Webb, “Statistical Pattern Recognition”, Arnold publishers, London,1999.
7. Donna L. Hudson, and Maunee E. Cohan, “Neural Networks & Artificial Intelligence for Biomedical Engineering”, Prentice Hall of India, New Delhi, 2001.

Attested

DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

XT 9024 PERFORMANCE EVALUATION OF SYSTEMS AND NETWORKS

L T P C
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UNIT I **9**

Performance Characteristics – Requirement Analysis: Concepts –User, Application, Device, Network Requirements – Single Queueing systems: M/M/1 Queueing System – Little's Law – Reversibility and Burke's theorem – M/M/1/N – M/M/∞ - M/M/m – M/M/m/m – M/M/1/∞ - M/G/1 Queueing System.

UNIT II **9**

Network of Queues: Product form solution – Algebraic Topological interpretation of the product form solution – Recursive solution of Nonproduct form networks – Queueing Networks with negative customers.

UNIT III **9**

Stochastic Petri Nets: Bus oriented multiprocessor model – Toroidal MPN Lattices – Dining Philosophers problem – Station oriented CSMA/CD protocol model – The Alternating Bit Protocol – SPN's without product form solutions.

UNIT IV **9**

Discrete Time Queueing Systems – Discrete time Arrival Processes – Geom/Geom/m/N – Geom/Geom/1/N – Geom/Geom/1 Queueing Systems.

UNIT V **9**

Network Traffic Modeling: Continuous Time Models – Discrete Time Models – Solution Methods – Burstiness – Self Similar Traffic.

Total : 45 Periods

TEXT BOOKS

1. Thomas G.Robertazzi, "Computer Networks and Systems – Queueing Theory and Performance Evaluation", Third Edition, Springer Verlag, New York Inc, 2009.
2. James D.McCabe, "Network Analysis, Architecture and Design", 2nd Edition, Elsevier, 2003
3. Bertsekas & Gallager, "Data Networks", 2nd Edition, PHI Learning Private Limited, New Delhi, 2009

REFERENCES

1. D. Bertsekas, A. Nedic and A. Ozdaglar, "Convex Analysis and Optimization", Athena Scientific, Cambridge, Massachusetts, 2003
2. Nader F.Mir, "Computer and Communication Networks", Pearson Education, 2007
3. Paul J.Fortier and Howard E.Michel, "Computer Systems Performance Evaluation and Prediction", Elsevier, 2003

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DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

XT 9025	MODELING AND SIMULATION	L T P C
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UNIT I INTRODUCTION 3

Systems – modeling – general – systems theory – Concept of simulation –Simulation as a decision making tool types of simulation.

UNIT II RANDOM NUMBERS 5

Pseudo random numbers – methods of generating random variables –discrete and continuous distributions – testing of random numbers.

UNIT III DESIGN OF SIMULATION EXPERIMENTS 8

Problem formulation – data collection and reduction– time flow mechanism – key variables – logic flow chart –starting condition–run size, experimental design consideration – output analysis and interpretation validation.

UNIT IV SIMULATION LANGUAGES 14

Comparison and selection of simulation languages – study of anyone simulation language.

UNIT V CASE STUDY 15

Development of simulation models using simulation language studied for systems like queuing systems – Production systems – Inventory systems–maintenance and replacement systems and Investment analysis.

Total : 45 Periods

REFERENCES

1. Jerry Banks John S. Carson, Barry L. Nelson, and David M.Nicol, “Discrete “Event System Simulation”, 3rd Edition, Prentice Hall,India, 2002.
2. Geoffrey Gordon, “System Simulation”, second Edition, Prentice Hall, India, 2002.
3. Narsingh Deo, “System Simulation with Digital Computer, “Prentice Hall, India, 2001.
4. Shannon, R.E. Systems simulation, The art and science, Prentice Hall, 1975.

Thomas J. Schriber, Simulation using GPSS, John Wiley, 1991.

XT 9026	DIGITAL IMAGE PROCESSING	L T P C 3 0 0 3

UNIT I FUNDAMENTALS OF IMAGE PROCESSING 9

Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Colour 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 – Colour Image Processing.

Total : 45 Periods

REFERENCES

1. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing”, Second Edition, Pearson Education, 2003.
2. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision”, Second Edition, Thomson Learning, 2001.
3. Anil K.Jain, “Fundamentals of Digital Image Processing”, Person Education, 2003.

XT 9027 DATA WAREHOUSING AND MINING L T P C
3 0 0 3

UNIT I DATAWAREHOUSING 9

Data Warehousing -Introduction - Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools – Metadata – reporting – Query tools and Applications.

UNIT II MULTI – DIMENSIONAL DATA MODEL 9

Online Analytical Processing (OLAP) – stars, snowflakes and fact constellations-schemas for multidimensional databases – roll-up – drill-down – slice and dice – pivot . Starnet Query Model. Types of OLAP servers : ROLAP vs MOLAP vs HOLAP.

UNIT III DATA MINING 9

Data Mining Functionalities – Steps in Knowledge Discovery Process – Data Discretization and Concept Hierarchy Generation. Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT IV CLASSIFICATION AND PREDICTION 9

Issues Regarding Classification and Prediction –Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Support Vector Machines –Associative Classification – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT V CLUSTER ANALYSIS 9

Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

Total : 45 Periods

TEXT BOOKS

1. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” Second Edition, Elsevier, Reprinted 2008.
2. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.

REFERENCES

1. K.P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
2. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2007.