

B.Tech - IT (Information Technology)

THIRD TO EIGHTH SEMESTER SYLLABUS

(For the students admitted from 2009-2010 and subsequently)



COIMBATORE INSTITUTE OF TECHNOLOGY

(Government Aided Autonomous Institution Affiliated to Anna University and Accredited by NBA)

COIMBATORE – 641 014.

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SEQUENTIAL LOGIC DESIGN USING VHDL

Latches and Flip Flops – Counters – Shift Registers – Synchronous Circuits - Design Methodology – Finite State Machines - Synchronizer Failure and Meta Stability. (9)

Total : 45

TEXT BOOK

1. John F. Wakerly, "Digital Design Principles and Practices", Pearson Edition, Fourth Edition, 2003.
2. Stephen Brown and Zvonko Vranesic, "Fundamentals of Digital Logic with VHDL Design", McGraw Hill, Second Edition, 2004.

REFERENCE BOOKS

1. Charles H. Roth, Jr., "Digital Systems Design Using VHDL", PWS Publishing Company, 1998.
2. Douglas L. Perry, "VHDL Programming by Example", Tata McGraw Hill, Fourth Edition, 2002.
3. Neil H.E Weste, Kemran Eshragian, "Principles of CMOS VLSI Design, A Systems Perspective", Addison Wesley, New Delhi, Second Edition, 2000.

COIMBATORE INSTITUTE OF TECHNOLOGY

(Autonomous Institution Affiliated to Anna University Coimbatore)

Coimbatore - 641 014.

B. Tech - IT (INFORMATION TECHNOLOGY) - FULL TIME

SUBJECTS OF STUDY

III Semester

Code No.	Subject	L	T	P	C
	THEORY				
09CE31	Mathematics - III	3	1	0	4
09IT32	Automata Theory and Discrete Mathematics	3	1	0	4
09IT33	Data Structures and Algorithms - I	3	1	0	4
09IT34	Electrical and Electronic circuits	3	1	0	4
09IT35	Computer Architecture	3	1	0	4
09IT36	Object Oriented Programming using C++ and Java	3	0	0	3
	PRACTICALS				
09IT47	Electrical & Electronics and Microprocessor Laboratory	0	0	3	-
09IT48	Data Structures and Algorithms, OOP and Automata Laboratory	0	0	3	-
09CE49	Science of Creativity and Professional Ethics	2	-	-	-
	Total				23

IV Semester

Code No.	Subject	L	T	P	C
	THEORY				
09IT41	Mathematics - IV	3	1	0	4
09IT42	Principles of Communication - I	3	1	0	4
09IT43	Data Structures and Algorithms - II	3	1	0	4
09IT44	Signals and Systems	3	1	0	4
09IT45	Microprocessors and Microcontrollers	3	0	0	3
09IT46	Principles of Environmental Science and Engineering	3	0	0	3
	PRACTICALS				
09IT47	Electrical & Electronics and Microprocessor Laboratory	0	0	3	4
09IT48	Data Structures and Algorithms, OOP and Automata Laboratory	0	0	3	4
09CE49	Science of Creativity and Professional Ethics	2	-	-	2
	Total				32

V Semester

Code No.	Subject	L	T	P	C
	THEORY				
09IT51	Operating Systems	3	0	0	3
09IT52	Principles of Communication - II	3	0	0	3
09IT53	Computer Networks	3	0	0	3
09IT54	Resource Management Techniques	3	1	0	4
09IT55	Software Engineering	3	0	0	3
09IT56	Database Management Systems	3	1	0	4
	PRACTICALS				
09IT67	Communication and Systems Laboratory	0	0	3	-
09IT68	DBMS and Visual programming Laboratory	0	0	3	-
09IT69	Mini Project	0	0	3	-
	Total				20

E-22 - VLSI DESIGN

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To know the basics of CMOS circuits, VHDL and to understand the implementation of combinational and sequential logic design using VHDL.

EXPECTED OUTCOME

Upon completion of this course, students should be able to understand the characteristics and interfacing of CMOS circuits and to design the various digital circuits in hardware description languages

CMOS CIRCUITS

Logic signals and Gates – CMOS logic – Electrical behavior: Steady state and dynamic – I/O structures – Low voltage CMOS logic and Interfacing - Design Rules and Layout. **(9)**

INTRODUCTION TO VHDL

Design flow – Program structure – Types and constants – Functions and procedures – Libraries and Packages – Structural Design Elements - Dataflow Design elements – Behavioral Design elements – Time dimension and Simulation – Synthesis. **(9)**

MEMORY, CPLDs AND FGAs

Memory structures – ROM, SRAM, DRAM – Xilinx XC9500 CPLD Family: Architecture, Switch Matrix – I/O block– Xilinx XC4000 FPGA Family: Logic block, I/O block – Using CAD tools to implement circuits in CPLD and FPGA. **(9)**

COMBINATIONAL LOGIC DESIGN USING VHDL

Decoders – Encoders - Multiplexers – Demultiplexer – Comparator - Adder/Subtractors – Multipliers/Dividers – ALU/CPU. **(9)**

scheduler. Memory Management Policies: Swapping - Demand paging
 - A Hybrid system with swapping and demand paging.

(9)

THE I/O SUB SYSTEM AND INTERPROCESS COMMUNICATION

Driver interfaces - Disk drivers - Terminal Drivers - Streams. Inter process communication: Process tracing - System V IPC - Network communication - Sockets. Case Study: Comparison of UNIX and LINUX.

(9)

Total : 45

TEXT BOOK

1. Maurice J Bach, "The Design of Unix Operating System ", Prentice Hall of India, Third Edition, 2007.

REFERENCE BOOKS

1. Uresh Vahalia, "Unix Internals: The New Frontiers", Dorling Kindersley (India) Pvt Ltd, 2008.
2. John Strang, Jerry Peek, Grace Todino, "Learning the UNIX OS", O'Reily, Fifth Edition, 2001.

VI Semester

Code No.	Subject	L	T	P	C
	THEORY				
09IT61	High Speed Networks	3	0	0	3
09IT62	Software Testing and Project Management	3	0	0	3
09IT63	Data Mining and Data Warehousing	3	0	0	3
09IT64	Multimedia Systems	3	0	0	3
09IT65	Digital Signal Processing	3	1	0	4
09IT66	Distributed Systems	3	0	0	3
	PRACTICALS				
09IT67	Communication and Systems Laboratory	0	0	3	4
09IT68	DBMS and Visual programming Laboratory	0	0	3	4
09IT69	Mini Project	0	0	3	2
	Total				29

L - Lecture P - Practical
 T - Tutorial C - Credit

VII Semester

Code No.	Subject	L	T	P	C
	THEORY				
09IT71	Industrial Economics and Management	3	0	0	3
09IT72	Information Coding Techniques	3	1	0	4
09IT73	Web Technology	3	1	0	4
09IT74	Elective - I	3	0	0	3
09IT75	Elective - II	3	0	0	3
	PRACTICALS				
09IT86	Web programming and Multimedia Laboratory	0	0	3	-
09IT87	Networks, .NET and SE tools Laboratory	0	0	3	-
09IT88	Project and Viva - Voce	0	0	6	-
	Total				17

VIII Semester

Code No.	Subject	L	T	P	C
	THEORY				
09IT81	Mobile Computing	3	0	0	3
09IT82	Supply Chain Management	3	0	0	3
09IT83	Cryptography and Network Security	3	0	0	3
09IT84	Elective - III	3	0	0	3
09IT85	Elective - IV	3	0	0	3
	PRACTICALS				
09IT86	Web programming and Multimedia Laboratory	0	0	3	4
09IT87	Networks, .NET and SE tools Laboratory	0	0	3	4
09IT88	Project and Viva - Voce	0	0	6	6
	Total				29

E-21 - UNIX INTERNALS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the concepts of open system architecture - UNIX kernel, file management, process management and I/O system in UNIX.

EXPECTED OUTCOME

At the end of the course, students will have through knowledge in the concept of process management, scheduling, inter process communication and file management in UNIX.

INTRODUCTION TO KERNEL

Architecture of UNIX operating system - Introduction to system concepts - Kernel data structures. The Buffer Cache: Buffer headers - Structure of buffer pool - Scenarios for retrieval of a buffer - Reading and writing disk blocks - Advantages and disadvantages of buffer cache. **(9)**

INTERNAL REPRESENTATION OF FILES

Inodes - Structure of regular file - Directories - Conversion of pathname to an inode - Super block - Inode assignment to a new file - Allocation of disk blocks - System calls for the file system. **(9)**

THE STRUCTURE OF PROCESSES

Process states and transitions - Layout of system memory - The context of a process – Saving the context of a process - Manipulation of the process address space – Sleep-Process control. **(9)**

PROCESS SCHEDULING AND MEMORY MANAGEMENT POLICIES

Process Scheduling: Algorithm – Scheduling parameters- examples of process scheduling – Controlling process priorities – Fair share

NETWORK MONITORING

RMON SMI and MIB - RMON1 Ethernet Management Information Base - RMON2 Management Information Base - RMON2 Conformance Specifications - ATM Remote Monitoring - Telecommunication network management - TMN conceptual model-architecture - Network management applications - Network Topology - Data Monitoring. (9)

ADVANCED SOCKETS

I/O multiplexing: select and poll functions - Socket options - Advanced UDP sockets - Advanced SCTP sockets - Raw sockets - Data link access - STREAMS - IPv4 and IPv6 interoperability - Daemon processes and inetd superserver - Advanced I/O functions - Routing sockets - Key management sockets - Broadcasting - Multicasting. (9)

Total : 45

TEXT BOOKS

1. Douglas E. Comer, "Internetworking with TCP/IP, Principles, Protocols and Architectures", Volume I, Prentice Hall, Fifth Edition, 2006.
2. Mani Subramanian, "Network Management, Principles and Practice", Pearson Education, 2000. (Chapters 3, 4, 5 – Unit 3, Chapters 11, 12, 13 – Unit 4).

REFERENCE BOOKS

1. Richard Stevens, "UNIX Network programming, The sockets Networking API", Volume I, Pearson Education Asia, Third Edition, 2004. (Chapters 3, 4, and 5 – Unit 3).
2. Behrouz A. Forouzan, "TCP/IP Protocol Suite", Tata McGraw Hill, Fourth Edition, 2009.

LIST OF ELECTIVES

Code No.	Subject	L	T	P	C
E-1	Ad-hoc and Sensor Networks	3	0	0	3
E-2	Automotive Electronics - Embedded Software Developer	3	0	0	3
E-3	E-Commerce	3	0	0	3
E-4	Enterprise Resource Planning	3	0	0	3
E-5	Geographical Information Systems and Remote Sensing	3	0	0	3
E-6	Grid Computing	3	0	0	3
E-7	Human Computer Interface	3	0	0	3
E-8	Information Security	3	0	0	3
E-9	Information Storage and Management	3	0	0	3
E-10	Intelligent Agents	3	0	0	3
E-11	Introduction to Compiler Design	3	0	0	3
E-12	Introduction to Virtualization	3	0	0	3
E-13	Java 2 Enterprise Edition	3	0	0	3
E-14	Machine Learning	3	0	0	3
E-15	Robotics	3	0	0	3
E-16	Service Oriented Architecture and Web Services	3	0	0	3
E-17	Soft Computing	3	0	0	3
E-18	Software Agents	3	0	0	3
E-19	Speech and Language Processing	3	0	0	3
E-20	TCP/IP and Network Management	3	0	0	3
E-21	Unix Internals	3	0	0	3
E-22	VLSI Design	3	0	0	3

E-20 - TCP / IP AND NETWORK MANAGEMENT

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To provide an overview of TCP/IP protocol suite and introduce the tasks involved in network management.

EXPECTED OUTCOME

The student will gain knowledge on the structure of TCP/IP protocol suite & identify the different services delivered using TCP/IP. The student can understand about the management protocols and management information.

ADDRESSING & ROUTING

Classful and classless addressing (CIDR) - Address mapping: ARP, RARP, BOOTP, DHCP - ICMP, Basic IP routing algorithm - Routing protocols: BGP, RIP, OSPF - Internet Multicasting - IGMP, multicast routing protocols. **(8)**

TRANSPORT AND SERVICES

UDP - Pseudo header - Ports - TCP - Timeout and retransmission - Congestion control - TCP state machine - TCP performance - Real-Time Transport Protocol (RTP) - TELNET protocol, options - Secure Shell (SSH) - File transfer and access: FTP, TFTP & NFS - Virtual Private network (VPN) - Addressing and routing -Network address translation (NAT) - Security: IPsec, Secure sockets, Firewalls. **(9)**

NETWORK MANAGEMENT

Network Management goals, organization, and functions - Standards, Models, and Language - Network Management Standards, Network Management Models -Organization Model - Information Model - Management Information Tree - Managed Object Perspective - Communication Model - SNMPv1 Network management organization and communication function models structure of SNMP management information-standards. **(10)**

TEXT BOOK

1. Daniel Jurafsky and James H. Martin, "Speech and Language Processing", Pearson Edition Asia, Second Edition, 2009.

REFERENCE BOOKS

1. Christopher D. Manning and Hinrich Schuetze, "Foundations of Statistical Natural Language Processing", MIT Press, 2003.
2. Childers D.G., "Speech Processing and Synthesis Toolboxes", John Wiley, 2000.

09CE31 - MATHEMATICS- III

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To incorporate the ideas of complex variables, partial differential equations and its applications and Fourier transforms that are imperative for effective understanding of Engineering subjects. The topics introduced will serve as basic tools for specialized studies in many Engineering fields.

EXPECTED OUTCOME

At the end of the course, the students will be familiar in applying Complex variables ideas to solve engineering problems, Partial differential equation ideas in modeling and solving engineering problems and Fourier transform ideas to analyze and solve communication related problems.

COMPLEX DIFFERENTIATION

Analytic functions–Definitions and properties–Cauchy Riemann equations in Cartesian and polar coordinates-construction of analytic functions – Conformal mappings – Bilinear Transformation -the mappings of the form $w = z+a$, az , $1/z$, z^2 , e^z , $\sin z$, $\cos z$, -Simple problems.

(9)

COMPLEX INTEGRATION

Cauchy's integral theorem-Integral formula-Taylor's and Laurent's series (without proof)-Types of singularities, Poles and residues-Cauchy's residue theorem-Applications-Contour integration using circular and semicircular contours.

(9)

PARTIAL DIFFERENTIAL EQUATIONS

Formation by elimination of arbitrary constants and functions-solution by direct method-solution of first order non-linear PDE-standard types-Lagrange's linear equation-Linear higher order homogeneous PDE with constant coefficients.

(9)

FOURIER TRANSFORMS

Fourier integral theorem (without proof)-Infinite Fourier transform-infinite Fourier sine and cosine transforms-properties and problems-Convolution theorem-Parseval's identity-Finite Fourier sine and cosine Transforms- properties and problems. (9)

BOUNDARY VALUE PROBLEMS

Vibration of strings-one dimensional wave equations, one dimensional heat flow- unsteady state and steady state -Two dimensional heat flow steady state in Cartesian coordinates-Separation of variables-Fourier series solution. (9)

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Kandasamy P et al., "Engineering Mathematics", Volume – II & III S.Chand & Co., 2004.
2. Veerarajan T, "Engineering Mathematics", (for Semester III), Tata Mc-Graw Hill Publishing Company Ltd., III Edition (Fifth Reprint), 2008.
3. Venkataraman M K, "Engineering Mathematics III", (for B.E., Third Semester), The National Publishing Company, Revised and Enlarged Fourteenth Edition, 2008.
4. Venkataraman M K, "Engineering Mathematics III-A", The National Publishing Company, Eleventh Edition, 2008.

REFERENCE BOOKS

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons (Asia) Private Limited., Eighth Edition, 2008.
2. Grewal, B.S., "Higher Engineering Mathematics", Khanna Publishers, Fortieth Edition, 2007.

PHONETICS, SPEECH SYNTHESIS AND AUTOMATIC SPEECH RECOGNITION

Phonetics - Speech Sounds and Phonetic Transcription - Articulatory Phonetics - Phonological Categories and Pronunciation Variation - Acoustic Phonetics and Signals - Phonetic Resources - Speech Synthesis - Text Normalization - Phonetic Analysis - Prosodic Analysis - Automatic Speech Recognition - Speech Recognition Architecture - Applying the Hidden Markov Model to Speech - Feature Extraction: MFCC vectors - Acoustic Likelihood Computation - The Lexicon and Language Model - Search and Decoding - Embedded Training - Evaluation: Word Error Rate (9)

SYNTAX AND FEATURES AND UNIFICATION

Syntax - Grammar Rules for English – Treebanks - Grammar Equivalence and Normal Form - Finite-State and Context-Free Grammars - Dependency Grammars - Spoken Language Syntax - Grammars and Human Processing - Features and Unification - Feature Structures - Unification of Feature Structures - Feature Structures in the Grammar - Implementation of Unification - Parsing with Unification Constraints - Types and Inheritance . (9)

COMPUTATIONAL SEMANTICS AND LEXICAL SEMANTICS

Computational Semantics - Syntax-Driven Semantic Analysis - Semantic Augmentations to Syntactic Rules - Quantifier Scope Ambiguity and Underspecification - Unification-Based Approaches to Semantic Analysis - Integration of Semantics into the Earley Parser - Idioms and Compositionality - Lexical Semantics - Word Senses - Relations Between Senses - WordNet: A Database of Lexical Relations - Event Participants - Primitive Decomposition - Advanced: Metaphor (9)

Total : 45

E-19 - SPEECH AND LANGUAGE PROCESSING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To introduce the basics of the computational aspects of Natural language processing and Speech Processing.

EXPECTED OUTCOME

Students can get an insight of the statistical, symbolic and machine learning approaches to language processing and the methods used for speech processing.

INTRODUCTION

Words and Transducers - Finite-State Morphological Parsing - Construction of a Finite-State Lexicon - Finite-State Transducers - FSTs for Morphological Parsing - Transducers and Orthographic Rules - The Combination of an FST Lexicon and Rules - Lexicon-Free FSTs: The Porter Stemmer - Word and Sentence Tokenization **(9)**

N-GRAMS, PART-OF-SPEECH TAGGING AND ENTROPY MODELS

N-grams - Training and Test Sets - Evaluating *N*-grams: Perplexity – Smoothing - Interpolation - Backoff - Part-of-Speech Tagging - English Word Classes - Tagsets for English - Part-of-Speech Tagging - Rule-Based Part-of-Speech Tagging - HMM Part-of-Speech Tagging - Transformation-Based Tagging - Hidden Markov and Maximum Entropy Models - Markov Chains - The Hidden Markov Model - Likelihood Computation: The Forward Algorithm - Decoding: The Viterbi Algorithm - HMM Training: The Forward-Backward Algorithm **(9)**

09IT32- AUTOMATA THEORY AND DISCRETE MATHEMATICS

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To introduce the fundamental concepts in theory of computation and provide insight into the relationship among formal languages, formal grammars, automata and discrete mathematics.

EXPECTED OUTCOME

Upon completion of this course, the student should be able to define the syntax and semantic rules for context free grammar, language processing machines like FSA, Mealy & Moore machines. The students will also be able to check the validity and correctness of simple algorithms, creatively construct simple instances of valid logical arguments and correct algorithms.

FINITE AUTOMATA

Finite State systems - Basic definitions - Transition diagrams - Deterministic & Nondeterministic Finite Automata - Finite automata with λ -moves - Finite automata with output - Moore & Mealy Machine. **(7)**

CONTEXT FREE GRAMMARS

Context-Free grammars - Simplification of Context-Free Grammars - Chomsky Normal Form. **(3)**

PUSH DOWN AUTOMATA

Definitions - Pushdown Automata and Context-Free Languages - Solving problems like $0^n, 1^n$ etc., **(3)**

TURING MACHINES

Introduction - The Turing Machine Model - Simulating Computers using Turing Machines - Well-formed ness of parentheses - Addition of unary numbers - Multiplication of unary numbers - Recognition of binary palindromes - Recognition of words of the form $0^n, 1^n$ - Halting problems.

(9)

MATHEMATICAL LOGIC

Connectives - Conditional and Biconditional statements - Statement formulae and Truth tables - Tautologies and Tautological Implications - Normal forms - Disjunctive and Conjunctive normal forms - The Theory of Inference for the statement calculus - Consistency of premises - The Predicate Calculus - Variables and Quantifiers - Special variable formulae involving quantifiers - Theory of inference for the predicate calculus. **(8)**

ALGEBRAIC STRUCTURES I

Rings, Integral domains and Fields - Properties - Polynomial Rings - Construction of finite fields - Irreducible polynomials - Primitive element of a finite field -Primitive irreducible polynomials. **(7)**

ALGEBRAIC STRUCTURES II

Residue arithmetic for Computers - Coding theory - Error Detection - Correction - Distance between code words - Minimum distance and weight - Group code, Linear code and Cyclic code. Problems under encoding and decoding techniques. **(8)**

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Gerhard Weiss, "Multiagent systems: A Modern Approach to Distributed Artificial Intelligence", MIT Press, USA, 2001.
2. Bradshaw, "Software Agents ", MIT Press, USA, 2000.
3. Mitsuru Oshima, "Programming and Deploying Java Mobile Agents with Aglets", Addison- Wesley, USA, 1998.

REFERENCE BOOKS

1. Richard Murch and Tony Johnson, "Intelligent Software Agents ", Prentice Hall, USA, 2000.
2. Russel and Norvig, " Artificial Intelligence: a Modern Approach", Prentice Hall, USA, 2007.

E-18 - SOFTWARE AGENTS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the basic concepts of intelligent agents, mobile agents, agent security and construction tools.

EXPECTED OUTCOME

The learners will understand the concepts of agents and will be able to develop agent based applications.

AGENTS – OVERVIEW

Agent Definition - Agent Programming Paradigms – Agent Vs Object - Abstract and concrete architectures for Intelligent Agents- Mobile Agents. (9)

MULTIAGENT SYSTEMS AND SOCIETIES OF AGENTS

Introduction- Agent Communications - Agent Interaction Protocols - Societies of Agents. Learning: Introduction - Learning and Activity Coordination -Learning about and from other Agents-Learning and Communication. (9)

AGENT COMMUNICATION LANGUAGES

Agent knowledge representation– KQML- KIF- Agent adaptability - Belief Desire Intention –BDI Architecture (9)

AGENTS AND SECURITY

Agent Security Issues - Mobile Agents Security - Protecting Agents against malicious hosts - Untrusted Agent - Black Box Security - Authentication for agents - Security issues. (9)

AGENT CONSTRUCTION TOOLS

Aglets-Agent builder- Java based agent tools-Simple programs. (9)

Total : 45

TEXT BOOKS

1. Tremblay J.P., Manohar R., “Discrete Mathematical structures with applications to computer science”, Tata McGraw Hill, Edition 1, Reprint 2001.
2. John E.Hopcroft, Rajeev Motwani, Jeffery D. Ullman, “Introduction to Automata Theory, Languages and Computation”, Addison Wesley, Third Edition, 2006.

REFERENCE BOOKS

1. Ralph P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Addison Wesley Publishing Company, Fourth Edition, 1998.
2. Kenneth H. Rosen,” Discrete Mathematics and its Applications”, Tata McGraw-Hill, New Delhi, Sixth Edition, 2006.
3. Martin J., “Introduction to Languages and the Theory of Computation”, Tata McGraw Hill, Third Edition, 2003.
4. Mishra K.L.P , Chandrasekaran. N. “Theory Of Computer Science: Automata, Languages and Computation”, Prentice Hall of India, Third Edition, 2007.

09IT33 - DATA STRUCTURES AND ALGORITHMS - I

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To study the basic data structure concepts, related algorithms and their applications.

EXPECTED OUTCOME

Student should have learnt data structures concepts, related algorithms and use them in applications.

DATA, INFORMATION AND ALGORITHM ANALYSIS

Data vs. Information - Representation of numbers: Integer, Real, Representation of Characters -Definition of an algorithm - Basic steps in development of an algorithm - Algorithm notations-Sparks-Algorithm complexity- Space and Time complexity-Order notations-Definition of NP Hard - NP complete. (6)

LINEAR LIST

Definition -Arrays: Representation and Characteristics - Array of structures - Polynomial representation - Multidimensional arrays - Sparse Matrices: Representation, Transpose and Multiplication of sparse matrices in three- tuple form. (7)

STACKS AND QUEUES

Fundamentals of Stacks, Queues and Deques - Application of stacks: Recursion, Conversion of infix to postfix and prefix expressions, Evaluation of postfix expressions - Application of Queues: Wire routing- Dequeue-Priority queue-Multiple stacks and queues. (7)

LINKED LISTS

Singly and Doubly linked lists, Basic operations - Linked stacks and queues, Polynomial manipulation, Multiprecision arithmetic, Equivalence relations of Sparse matrices using linked lists. (7)

NEURO FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework- Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum. (8)

GENETIC ALGORITHMS

Introduction – Terminologies – Genetic operators – Selection, cross-over, reproduction and mutation – fitness function – a simple genetic algorithm – hybrid genetic algorithm, Applications, Function maximization and word matching problem using genetic algorithm (9)

Total : 45

TEXT BOOK

1. Jang J.S.R., Sun C.T., and Mizutani E., “Neuro-Fuzzy and Soft Computing”, Prentice Hall, 2006.

REFERENCE BOOKS

1. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, Second Edition,Wiley, 2004.
2. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, First Edition, 2002.
3. Eberhart R., Simpson P., and Dobbins R., “Computational Intelligence - Concepts to Implementations”, Morgan Kaufmann, First Edition, 2007.
4. Vijayalakshmi Pai and Rajshekaran, “Neral networks, Fuzzy Logic and Genetic algorithms-Synthesis and Applications”, Prentice Hall of India, 2006.

E-17 - SOFT COMPUTING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the basic concepts of fuzzy sets, neural networks, neuro fuzzy systems, genetic algorithms and applications.

EXPECTED OUTCOME

Students shall acquire the basic knowledge of fuzzy sets and neural networks and their application in neuro- fuzzy modeling. In addition the students will get exposed to the basics of genetic algorithms and its application in function maximization and word matching problems.

FUZZY SET THEORY

Introduction to Neuro–Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Defuzzification strategies.

(10)

SUPERVISED LEARNING NEURAL NETWORKS

Introduction- Single layer and Multi layer Perceptrons- Back propagation networks - Adaline –Madaline- Radial Basis Function Networks -Modular Networks.Self supervised Learning- Adaptive Resonance Technique.

(9)

UNSUPERVISED LEARNING NEURAL NETWORK

Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning -Principal Component Networks - The Hopfield Network.

(9)

CHARACTER STRINGS

Representation: Fixed length, Workspace/index, Linked list-Operations: Concatenation, Insertion, Deletion, Sub-string, Pattern matching. (4)

TREES

Definition - Binary Trees: Representations, Traversal, Properties, Threaded binary trees - Copying and Equivalence of binary trees - Binary tree representation of general trees, Application of trees : Decision Trees, Game Trees, Search Trees. (7)

GRAPHS

Terminology and Representations - Warshall algorithm - Traversals - Biconnectivity - Connected components and Spanning Trees - Shortest path and Transitive closure – Activity networks - Topological sort - Critical paths - Enumerating all paths - Euler problem. (7)

* **Note : Algorithms will be taught in Sparks notation.**

Theory : 45

Tutorial :15

Total : 60

TEXT BOOKS

1. Jean-Paul Tremblay and Paul G.Sorenson, “An Introduction to Data Structures with Applications”, McGraw Hill, Second Edition, 2008.
2. Ellis Horwitz, Sartaj Sahni, “Fundamentals of Data Structures in C”, Galgotia Publications, 2008.

REFERENCE BOOK

1. Satraj Sahani, “Data structures, Algorithms and applications in C++”, McGraw Hill, International Edition, 2005.

09IT34 - ELECTRICAL AND ELECTRONIC CIRCUITS

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To enable the students to understand the basic concepts of network theorems, FET, Wave shaping circuits and power devices. An introduction to D.C motors and special motors is also given.

EXPECTED OUTCOME

At the end of the course the students get familiarized with various network theorems. They also learn the details of field effect transistor, wave form generators, power semiconductor devices and DC motors.

NETWORK THEOREMS

Superposition – Thevenin’s and Norton’s theorems – Maximum power transfer theorem - Compensation theorem – Millman’s theorem – Reciprocity theorem – Statements and simple problems for DC circuits.
(9)

FIELD EFFECT TRANSISTORS

Ideal voltage controlled current source – Junction Field Effect Transistor – VI characteristics and its construction. MOSFET: Enhancement and Depletion type, construction of MOSFETs. MOS V-I characteristic – MOSFET as a resistance – DC analysis of FETs – FET as a switch and as an amplifier – CMOS devices.
(9)

WAVE FORM GENERATORS AND REGULATORS

Introduction to Operational Amplifiers – Adder – Integrator – Differentiator - Barkhausen’s criteria – Hartley, Clapp and Colpitt’s Oscillators – RC Phase Shift Oscillators – Wein bridge Oscillators – Crystal Oscillators

BUILDING SOA (PLANNING & ANALYSIS)

SOA Delivery Strategies: SOA delivery lifecycle phases – The top-down strategy – The bottom-up strategy – The agile strategy. Service-Oriented Analysis: Introduction to service oriented analysis – Benefits of business-centric SOA – deriving business services – Service modeling – Service modeling guidelines – classifying service model logic – contrasting service modeling approaches.
(9)

BUILDING SOA (TECHNOLOGY & DESIGN)

Service-Oriented Design: Introduction to service oriented design – WSDL related XML schema language basics – WSDL language basics - SOAP language basics – service interface design tools - SOA Composition Guidelines: Steps to composing SOA – considerations for choosing service layers – considerations for positioning core SOA standards – considerations for choosing SOA extensions – Service Design -Business Process Design – Fundamental WS-* Extensions – SOA Platforms.
(9)

Total : 45

TEXT BOOK

1. Thomas Erl, “Service-Oriented Architecture: Concepts, Technology and Design”, Prentice Hall of India, First Edition, 2005.

REFERENCE BOOKS

1. Dirk Krafzig, Karl Banke, Dirk Salma, “Enterprise SOA: Service-Oriented Architecture Best Practices “, Pearson Education, First Edition, 2004.
2. Thomas Erl, “SOA Principles of Service Design”, Prentice Hall of India, First Edition, 2007.

E-16 - SERVICE ORIENTED ARCHITECTURE AND WEB SERVICES

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the basics of SOA, Web Services, various service layers and to build a service oriented architecture.

EXPECTED OUTCOME

The students would be able to understand the fundamentals of web services, their internals, design and build service oriented architecture and reuse.

SOA AND WEB SERVICES FUNDAMENTALS

Introducing SOA: Fundamental SOA – Common characteristics of contemporary SOA – Common misperceptions about SOA – Common tangible benefits of SOA – Common pitfalls of adopting SOA. Evolution of SOA: SOA timeline – Continuing evolution of SOA – The roots of SOA. Web Services and Primitive SOA: The Web services framework – Services (as Web services) – Service descriptions (with WSDL) – Messaging (with SOAP). **(9)**

PRINCIPLES OF SERVICE ORIENTATION

Service-orientation and the enterprise – Anatomy of a service-oriented architecture – Common principles of service-orientation – How service-orientation principles inter-relate – Service-orientation and object-orientation – Native Web service support for service-orientation principles. **(9)**

SERVICE LAYERS

Service-orientation and contemporary SOA – Service Layer Abstraction – Application service layer – Business service layer – Orchestration service layer – Agnostic services – Service layer configuration scenarios. **(9)**

– UJT and UJT Oscillator - Series , shunt and IC voltage regulators – SMPS - UPS **(9)**

POWER SEMICONDUCTOR DEVICES

Power diodes – thyristors – diac- triac – GTO – SUS – SBS – SCS – LASCR – power transistors – power BJTs – power MOSFETs – IGBTs – SIT – FCT – MCT – PIC – steady and switching characteristics – Protection circuits – cooling and mounting of thyristors – series and parallel connection. **(9)**

D.C MOTORS AND SPECIAL MOTORS

Motor principle – Types - Voltage Equation – Electrical and Mechanical Characteristics – Special Motors: Stepper motor – Types – Permanent Magnet DC motor **(9)**

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Sudhakar , Shyam Mohan. S.P, “Circuits, Networks Analysis and Synthesis”, Tata McGraw Hill Publishers, New Delhi, 2004.
2. Neaman Donald A, “Electronic Circuit Analysis and Design”, Tata McGraw Hill Publishers, New Delhi, 2002.
3. Theraja B.L, Theraja A.K., “A Textbook of Electrical Technology”, S.Chand & Company Ltd, II Edition, 2005.

REFERENCE BOOKS

1. Rashid, M.H. “Power Electronics: Circuits, Devices and Applications”, Prentice Hall of India Private Ltd., II Edition, 2002.
2. Syed Nasar, “Schaum’s Solved Problems Series”, Tata McGraw Hill Publishers, New Delhi, 2004.

09IT35 - COMPUTER ARCHITECTURE

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To learn the basic structure, functions and characteristics of computer systems and understand the design of its various functional units.

EXPECTED OUTCOME

The learners will understand the basic structure and operations of computers and gain knowledge about the functional units of a basic computer system and their interactions .

BASIC STRUCTURE OF COMPUTERS

Functional units - Basic operational concepts - Bus structures - Software Performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues-Subroutines-Encoding of Machine Instructions. **(10)**

BASIC PROCESSING UNIT

Fundamental concepts: Register Transfers-Performing an Arithmetic or Logic Operation-Fetching a word from memory- Storing a Word from Memory. Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed Control: Microinstructions-Micro program sequencing-Wide-Branch Addressing-Microinstructions with Next-Address Field- Perfecting Microinstructions-Emulation-RISC Vs CISC. **(9)**

PIPELINING

Basic concepts: Role of Cache Memory – Pipeline Performance. Data hazards: Operand Forwarding-Handling Data Hazards in Software. Instruction Hazards : Unconditional Branches - Conditional

ADVANCED ROBOTICS

Advanced Robotics in space – Specific features of Robotics systems – Long term technical development – Advanced Robots in underwater operations – Robotics Technology of future – Future applications. **(9)**

Total : 45

TEXT BOOK

1. Richard D. Klafter, Thomas A. Chmielewski , Michael Negin, "Robotic Engineering – An integrated approach", Prentice Hall of India , 2003.

REFERENCE BOOKS

1. K.S.Fu, R.C. Gonzales, C.S.G. Lee, "Robotics: Control, Sensing, Vision, and Intelligence", Mc-Graw Hill , 1988.
2. Barry Leatham Jones, "Elements of Industrial Robotics", Pitman Publishing, 1987.
3. Robert J.Schilling, "Fundamentals of Robotics - Analysis & Control", Prentice Hall of India, 2002.

E-15 - ROBOTICS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the mathematical representation of a Robot Co-ordinate system and to learn the behavior of the mechanical components and the sensors.

EXPECTED OUTCOME

Students shall be able to acquire the knowledge of theoretical and practical concepts of robot design and functioning, working of various components and its utilization in an automated system.

INTRODUCTION

Classification of Robots – Robots like devices – Classification by coordinate system – Fixed Versus Flexible automation - System Overview of a Robot – Basic component of a Robot System – The Robot system in an application – Function of a Robot system. (9)

ROBOTIC SENSORY DEVICES

Sensors – Velocity sensors – Accelerometers – Proximity sensors – Non-contact proximity sensors – Touch and Slip sensors – Force and Torque sensors. (8)

COMPUTER VISION FOR ROBOTICS – A FUNCTIONAL APPROACH

Introduction – Imaging components – Image representation – Hardware consideration – Picture coding – Object recognition and Categorization – Software considerations – Need for vision training and adaptations – Review of existing systems. (9)

COMPUTER CONSIDERATION FOR ROBOTICS SYSTEMS

Introduction – Architectural considerations – Hardware considerations – Computational elements in Robotic applications – Real time considerations – Robot programming – Path planning – The Robots computer system. (10)

Branches and Branch Prediction. Influence on Instruction sets: Addressing modes-Condition Codes. Data path and control consideration – Superscalar operation: Out-of-Order Execution - Execution Completion- Dispatch Operation-RISC pipelining. (9)

MEMORY SYSTEM

Memory Hierarchy-Memory Address Map-Memory Connection to CPU – Associative Memory: Hardware Organization-Match Logic-Read and Write Operation-Cache Memory : Associative mapping-Direct Mapping-Set Associative Mapping-Writing into Cache-Cache Initialization -Virtual Memory : Address Mapping using Pages-Associative Memory Page Table-Page Replacement-Memory management hardware (8)

I/O ORGANIZATION

Accessing I/O devices – Interrupts – Direct Memory Access: Bus Arbitration. Buses: Synchronous Bus and Asynchronous Bus. Interface circuits: Parallel Port and Serial Port. Standard I/O Interfaces: PCI, SCSI, USB. (9)

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", McGraw-Hill, Fifth Edition, 2002.
2. Morris Mano, "Computer System Architecture", Prentice Hall of India, Third Edition, 2008. (for RISC Vs CISC, RISC Pipelining and Memory Systems Only).

REFERENCE BOOKS

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", Pearson Education, Eighth Edition, 2009.
2. David A.Patterson and John L.Hennessy, "Computer Organization and Design: The Hardware / Software Interface", Morgan Kaufmann, Fourth Edition, 2008.
3. John P.Hayes, "Computer Architecture and Organization", McGraw Hill, Third Edition, 2002.

ANALYTICAL AND COMBINING ANALYTICAL AND INDUCTIVE LEARNING

Analytical learning- Explanation based learning – Inductive Analytical approaches to learning – Using Prior knowledge to, initialize the hypothesis, alter the search objective and augment search operators. (6)

INSTANCE-BASED AND REINFORCEMENT LEARNING

K-nearest Neighbor learning-Locally weighted regression-Radial Basis functions-Case based reasoning- Reinforcement Learning: Learning task-Q Learning-Q function-Algorithm for learning Q-convergence - updating sequence-Temporal difference learning-Non deterministic rewards and actions (9)

Total : 45

TEXT BOOK

1. Tom M Mitchell,"Machine Learning", McGraw Hill, First Edition, 2003.

REFERENCE BOOK

1. Ethem Alpaydin,"Introduction to Machine Learning",MIT Press, Second Edition, 2010.
2. Stephan Marsland, "Machine Learning- An Algorithmic Perspective", Chapman and Hall, First Edition, 2009.
3. Nils Nilsson," Introduction to Machine Learning", MIT Press, 1997.
4. Jude Shavil, Thomas G Dietterich, "Readings in Machine Learning", Morgan Kaufmann Publishers,1990.

E-14 - MACHINE LEARNING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the basics of machine learning, various machine learning techniques and design issues.

EXPECTED OUTCOME

The learners shall understand the machine learning techniques – Bayesian, Decision tree, Analytical and Instance based learning and to apply the techniques in computing.

INTRODUCTION

Designing a learning system - Perspectives and issues in machine learning- Concept learning task- Concept learning as search- Version spaces-Candidate Elimination learning algorithm-Inductive Bias. (9)

DECISION TREE LEARNING

Decision Tree representation-Appropriate Problems for Decision tree Learning-Basic Decision tree learning algorithm-Hypothesis space search and Inductive Bias in Decision tree learning – Issues in Decision Tree Learning. ANN : Perceptrons-Back propagation Algorithms. Evaluating Hypothesis: Deriving confidence intervals – Hypothesis testing – comparing learning algorithms. (12)

BAYESIAN LEARNING

Bayes Theorem and Concept learning-Maximum Likelihood and Least-Squared error hypotheses-Maximum Likelihood hypotheses for predicting probabilities - Minimum description Length principle-Bayes optimal classifier-Gibbs algorithm-Naïve Bayes classifier-Bayesian Belief networks-EM algorithm. (9)

09IT36 - OBJECT ORIENTED PROGRAMMING USING C++ AND JAVA

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the fundamental concepts of object oriented programming using C++ and java.

EXPECTED OUTCOME

At the end of the course the students will write the programs using Object Oriented concept.

PRINCIPLES OF OOP

Programming Paradigms- Object Oriented Technology -Basic concepts and benefits of OOP- Application of OOP- OOP languages. INTRODUCTION TO C++: Basic data types- Derived data types- Symbolic constants- Scope resolution operator- Type modifiers- Type casting- Operators and control statements- Input and output statements- Function Prototyping- Inline function- Overloaded function- Introduction to friend function. (9)

CLASSES AND OBJECTS

Class specification- Member function definition- Nested member function- Access qualifiers- Static data members and member functions - Instance creation- Array of objects- Dynamic objects-Static Objects- Objects as arguments- Returning objects.

CONSTRUCTORS AND DESTRUCTORS: Constructors - Parameterized constructors- Overloaded Constructors- Constructors with default arguments -Copy constructors- Dynamic constructors- Dynamic initialization using constructors- Destructors. (9)

OPERATOR OVERLOADING

Operator function -Overloading unary and binary operator -Overloading the operator using friend function -Stream operator overloading -Data Conversion. (4)

INHERITANCE

Defining Derived classes- Single Inheritance- Protected Data with private inheritance- Multiple Inheritance- Multi level inheritance- Hierarchical Inheritance- Hybrid Inheritance-Multipath inheritance- Constructors in derived and base class- Template in inheritance-Abstract classes- Virtual function and dynamic polymorphism-Virtual Destructor- Nested Classes.

(5)

INTRODUCTION TO JAVA

Java and Internet - Byte codes - Features of Java- Java Development Environment. Keywords and control structures. OBJECT-ORIENTATION IN JAVA: Classes - Methods - Inheritance- Packages - Interfaces -Programming examples. EXCEPTION HANDLING: Fundamentals - Exception Types - Try Catch block - throw, throws clause- finally -user-defined Exceptions.

(9)

THREADS

Thread model – Thread priorities – Runnable interface – Creating a thread, multiple threads – Synchronization – Interthread communication – Suspending, Resuming and Stopping threads. INPUT/OUTPUT: String handling – Exploring java.io package. APPLETS: Applet Basics.

(9)

Total : 45

TEXT BOOKS

1. Herbert Schildt, "C++: The Complete Reference", Tata McGraw Hill Publishing Company, New Delhi, 2003.
2. Patrick Naughton , Herbert Schildt, "JAVA2 – The Complete Reference", Tata McGraw Hill Publishing Company, Seventh Edition, New Delhi, 2006.

Request Strings-Session Management-User Sessions-Session Objects-TOMCAT-JSTL.

(9)

ENTERPRISE JAVA BEANS

Introduction-EJB Container-EJB classes- EJB Interfaces-Deployment descriptors-Session java bean-Entity Java bean-Message Driven bean-JAR file. Java Message Services-J2EE Security concepts-Java Naming and Directory Interface API.

(12)

Total : 45

TEXT BOOK

1. Jim Keogh, "J2EE - The Complete Reference", Tata McGraw-Hill, First Edition, Second Reprint, 2003.

REFERENCE BOOKS

1. James . L . Weaver et al., "Beginning J2EE 1.4", Shroff Publishers and Distributors Pvt., Ltd, New Delhi, 2004.
2. Tom Valesky, "Enterprise Java Beans", Addison Wesley, New Delhi, Sixth Indian Reprint, 2001.
3. Bell, Loton,et.al, "Professional Java Servlets 2.3", Shroff Publishers and Distributors Pvt., Ltd, New Delhi, 2004.
4. James McGovern et al., "J2EE 1.4 Bible", Wiley Publishing, 2004.
5. Kathy Sierra, Bert Bates, "Head First EJB", O'Reilly Media, First Edition, 2003.

E-13 - JAVA 2 ENTERPRISE EDITION

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the J2EE architecture, its components and their use in the design of Enterprise applications.

EXPECTED OUTCOME

The students shall understand the J2EE framework and be able to develop enterprise applications using XML, Servlets, JSP and EJB.

INTRODUCTION TO J2EE

J2EE overview-J2EE multi tier architecture:Distributive Systems-Implementation of Client tier, Web Tier, EJB tier and Enterprise Information System Tier- Enterprise Application Strategy-The Enterprise application- Clients-Session Management-Web Tier.J2EE Design Patterns and Frameworks : The pattern concepts- Pattern Catalog.(6)

JAVA AND XML

The XML flow- XML Parsers-Browsers.Design of an XML document-Nesting elements-DTD-XML schema- XSLT-XML Database program.Generating an XML document-Parsing XML-DOM Parser-SAX Parser. (9)

JAVA SERVLETS

Design-Servlet life cycle- Reading HTTP Request Headers- Writing HTTP Response Headers- Multithreaded servlets-Handling exception-Working with Cookies-Session Tracking-Filters. (9)

JAVA SERVER PAGES

Basic JSP life cycle-JSP elements:Variables and objects-Methods-Control Statements-Loops.Implicit objects-Parsing

REFERENCE BOOKS

1. Venugopal K R , Rajkumar Buyya and Ravishankar T, “ Mastering C++”, Tata McGrawHill Publishing Company, New Delhi, 2006.
2. Bjarne Stroustrup, “C++ Programming Language”, Pearson Education, New Delhi, 2001.
3. Deitel H M and Deitel P J, “JAVA - How to Program”, Pearson Education, New Delhi, 2009.

09IT41 - MATHEMATICS- IV

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

The objective is to incorporate the basic Numerical methods required for solving Engineering problems and also to study the basic statistical ideas and vector spaces that are imperative for effective understanding of Engineering subjects. The topics introduced will serve as basic tools for specialized studies in many Engineering fields.

EXPECTED OUTCOME

At the end of the course, the students will be familiar in the ideas of applying numerical methods for solving system of equations and ODE's, and also will be familiar two dimensional random variables, curve fitting, fundamentals of random process, vector spaces and sampling theory.

NUMERICAL METHODS

Linear simultaneous equations : Gauss elimination method – Gauss Jordan method – Crout's method - Gauss seidal method – Relaxation method Ordinary differential equations : Taylor series – Modified Euler – Runge-kutta fourth order methods – Milne's predictor – corrector method. **(9)**

TWO DIMENSIONAL RANDOM VARIABLES

Probability mass function - Probability distribution function - Cumulative distribution function – Marginal probability functions – Conditional distribution - Expectation of two dimensional random variables – Covariance - Correlation – regression - curve fitting - least square technique – only curves of the form or reducible to the form $y = ax + b$, **(9)**

APPLICATION AND DESKTOP VIRTUALIZATION

Approaches – Portable Application – Cross Platform Virtualization – Application Streaming – Thin Client – Virtual desktop infrastructure – Advantages and Limitations – Virtual Appliances. Case Study: VMware – Cloud computing – Xen – PowerVM **(9)**

Total : 45

REFERENCE BOOKS

1. Tom Clark, "Storage Virtualization: Technologies for simplifying data storage and management", Addison Wesley, 2005.(Chapter 4,5,6)
2. Rogier Dittner and David Ruk, "Best Damn Server Virtualization Book Period", Syngress – Elsevier Publisher, 2007.
3. Chris Wolf and Erick M. Halter, "Virtualization – from Desktop to the Enterprise", Apress, 2005.
4. Victor Moreno, Kumar Reddy, "Network Virtualization" Cisco System, 2006.

$$y = ax^2 + bx + c$$

E-12 - INTRODUCTION TO VIRTUALIZATION

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE:

To learn the concepts of virtualization, virtualization types and various virtualization approaches.

EXPECTED OUTCOME

At the end of the course, students shall be able to understand the different virtualization technologies – server, storage and network virtualization and its benefits.

INTRODUCTION

Virtualization benefits – Types of virtualization – Basic approaches of virtual systems – Hardware virtualization – OS level virtualization – Partial Virtualization – Paravirtualization. (9)

SERVER VIRTUALIZATION

Virtual machine – Virtual PC – Virtualization Server – Virtual Machine Monitor (VMM) – Hypervisor – Host and Guest Operating system – Emulation – Bare metal approach. (9)

STORAGE VIRTUALIZATION

Storage Interconnects – Abstracting physical storage – Logical block address mapping – Virtualized mirroring – Storage metadata integrity – Logical Volume management – Storage metadata servers – Server based storage APIs. (9)

NETWORK VIRTUALIZATION

Internal Virtualization-External Virtualization- Virtual LAN – IEEE 802.1Q Standard – Virtual IP – Virtual Private Network (VPN) – Virtual Private Wire and Private line services(VPWS &VPLS) - Virtual Private LAN Service (VPLS) – Pseudowire (PW) – IP only LAN like Service (IPLS). (9)

RANDOM PROCESSES

Classification of random processes–Special classes of Random processes–Average values of Random processes – Stationarity – Analytical representation of random processes–Auto correlation function and its properties–Cross–Correlation function and its properties–Ergodicity–Mean Ergodic theorem – Correlation Ergodic process–Distribution Ergodic process–Power spectral Ergodic density function and its properties. (9)

SAMPLING THEORY

Elements of sampling theory – Large sample tests – test for mean, variance and proportions – small sample tests-t, F, chi-square tests – contingency table – test for independence. (9)

VECTOR SPACES AND LINEAR MAPPING

Definition of vector spaces-linear dependence and independence-sub spaces-Basis and dimension of vector space-Representation of linear maps by matrices-rank and nullity of linear transformation.-Inner product-properties-Cauchy Schwartz inequality- norm and its properties-Introduction of orthogonal basis and Gram-Schmidt-orthogonalisation–process. (9)

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Kandasamy . P., et *al.*, “Numerical Methods”, S Chand and Company, 2008.
2. Veerarajan T , “Probability Statistics and Random Process”, Tata Mc Graw Hill Publishing Company Ltd, Third Edition, 2000.
3. Venkataraman. M .K , “Higher Mathematics for Engineering and Science” National Publishing Company, 2000.

4. Krishnamurthi V., et al., "An Introduction to Linear Algebra", Affiliated East West Press, 2004.
5. Kandasamy P., et al, "Probability Statistics and Random Process", S Chand and Company, 2008.

REFERENCE BOOKS

1. Erwin Kreyszig., "Advanced Engineering Mathematics", John Wiley and Sons (Asia) Private Limited, Eighth Edition, 2008.
2. Grewal, B.S., "Higher Engineering Mathematics", Khanna Publishers, Fortieth Edition, 2007.
3. Kapoor .J.N and Saxena, H.C., "Mathematical Statistics", S.Chand and Company, Twelfth Edition, 2003.
4. Grewal, B.S., "Numerical Methods in Science and Engineering", Khanna Publishers, Fortieth Edition, 2007.
5. Stephen, H and Friedberg, "Linear Algebra", Prentice Hall of India, 2003.
6. Trivedi, K.S., "Probability and Statistics with Reliability, Queuing and Computer Science Applications, Prentice-Hall, Inc., Englewood Cliffs, New Jercey, 2003.

2. Alfred V. Aho and Jeffrey D. Ullman, "Principles of Compiler Design", Narosa Publishing House. Reprint 2002.

REFERENCE BOOK

1. Jean Paul Tremblay and Paul G.Sorenson. , "Theory and Practice of Compiler Writing", BS Publication, Reprint 2008.

BASIC PARSING TECHNIQUES

Bottom up parsing: Handle, Handle pruning - Operator precedence parsing - Simple precedence parsing- Top down parsing: Recursive descent parsing, Predictive parsers-LR parser-SLR parser. (8)

SYNTAX DIRECTED TRANSLATION

Syntax directed translation schemes- Synthesized and Inherited attributes - Implementation of syntax directed translators - Intermediate code - Postfix notation - Parse trees and Syntax trees - Three address code, Quadruples and Triples - Translation of assignment statement - Boolean expressions-Statement that alter the flow of control –Array references - Symbol tables: Contents – Structure. (8)

INTRODUCTION TO CODE OPTIMIZATION

The Principle Sources of Optimization -Loop Optimization - The DAG representation of Basic Blocks - Global data flow analysis - Dominators - Reducible flow graphs - Loop invariant computations - Induction variable elimination - Other loop optimizations. (8)

CODE GENERATION

Object programs - Issues in Code generation - A simple code generator - Register allocation and assignment - Code generation from DAG's - Peephole optimization. (5)

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Alfred V. Aho, Ravi Sethi, Jeffrey. D. Ullman, "Compilers Principles, Techniques and Tools", Pearson / Addison Wesley, Second Edition, 2007.

09IT42 - PRINCIPLES OF COMMUNICATION - I

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVES

To study the principles of analog modulation schemes & their demodulation, Transmitters & Receivers and to study the different types of noise in communication systems.

EXPECTED OUTCOME

Upon completion of this syllabus, learners will be able to understand the principles of analog communication systems and the effect of noise in communication systems.

AMPLITUDE MODULATION

Types of signals –Concept of base band and bandwidth – Electromagnetic spectrum – Telecommunication services – Transmission media and their characteristics – Communication system model – Need for modulation.

Amplitude Modulation: DSB-SC - Conventional AM – SSB - VSB – AM modulators: Power law modulator - Switching Modulator - Balanced modulator - Ring modulator - AM demodulators: Envelope detector – Demodulation of DSB-SC AM - Demodulation of SSB - Demodulation of VSB – Multiplexing: Frequency division multiplexing - Quadrature carrier multiplexing. (10)

ANGLE MODULATION

Representation of FM and PM signals – Spectral characteristics of Angle modulated signals: Angle modulation by a sinusoidal signal and arbitrary message signal –Direct FM generation: Varactor diode modulator – Reactance modulator - Narrowband FM generation - Indirect FM generation - Angle demodulators: Slope detector - Balanced slope detector – Foster Seely discriminator – Ratio detector - PLL-FM demodulator - Quadrature FM demodulator. (8)

TRANSMITTERS AND RECEIVERS

AM transmitter: Low level transmitter - High level transmitter – SSB Transmitter: Filter method – Phase shift method – ISB transmitter - Receiver parameters - AM Receiver: Tuned radio frequency receivers – Super heterodyne receivers –SSB receiver: Non coherent BFO – Coherent BFO – Multi channel pilot carrier - FM transmitters: Direct FM transmitter – Indirect FM transmitter – Stereo FM transmitter - Stereo FM receiver. (10)

PULSE ANALOG MODULATION

Sampling theorem: Low pass signals, band pass signals – PAM generation: Natural sampling – Flat top sampling – Signal recovery through holding – Time division Multiplexing of PAM – Channel bandwidth for PAM signal - Pulse width modulation: Generation and detection – Pulse position Modulation: Generation and detection – Bandwidth-noise trade-off. (7)

NOISE IN COMMUNICATION SYSTEMS

Classification of noise – Shot noise – Thermal noise – Noise calculations: Single noise source, Multiple noise sources – Equivalent noise bandwidth – Noise figure of an amplifier – Experimental determination of a noise figure – Power density and available power density – Effective noise temperature – Noise figure in terms of available gain – Cascaded stages – Cascode amplifier – Noise in amplitude modulated systems: AM with carrier – DSB-SC – SSB-SC – Noise in Frequency modulated and Phase modulated systems – Noise in PAM, PWM, PPM systems. (10)

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. John G. Proakis and Masoud Salehi, “Fundamentals of Communication Systems”, Pearson Education, LPE, 2008.

E-11 - INTRODUCTION TO COMPILER DESIGN

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To understand the basic concepts of language translation, the phases of a compiler and its design principles.

EXPECTED OUTCOME

At the end of the course, students should have learnt the importance of language translation, the parts of a compiler and their functions.

INTRODUCTION

Compilers and Interpreters - The structure of a Compiler - Lexical analysis-Syntax analysis-Intermediate code generation - Code optimization - Code generation -Error handling - Passes of a compiler- Interleaving phases- Preprocessors-Compiler construction tools. (4)

HIGH-LEVEL PROGRAMMING LANGUAGES

Definition of Programming languages -The Lexical and Syntax structure of a language - Data environment - Parameter transmission - Storage management. Finite Automata and Lexical Analysis: The role of Lexical Analyzers, Input Buffering - A simple approach to the design of Lexical analyzer - Regular expressions - Finite automata - Regular expression to Finite Automata - Minimizing the states of a DFA - A language for specifying lexical analyzers - Implementation of a lexical analyzer. (8)

SYNTACTIC SPECIFICATION OF PROGRAMMING LANGUAGES

Grammar: Definition, Context sensitive, Context free, Regular grammar- Regular form and Regular expression-Context Free Grammars - Derivations and Parse trees. (4)

REFERENCE BOOKS

1. Nils J Nilsson, "Artificial Intelligence – A New Synthesis", Morgan Kauffmann Publishers, First Edition, 1998.
2. Thomas Dean, "Artificial Intelligence: Theory and Practice", Addison Wesley Publishers, Fourth Edition, 1995.
3. Patrick Henry Winston, "Artificial Intelligence", Addison Wesley Publishers, Third Edition, 1992.
4. Elaine Rich, Kevin Knight & Shivashankar, "Artificial Intelligence", McGraw Hill, Third Edition, 2009.

2. Wayne Tomasi, "Electronic Communication Systems: Fundamentals Through Advanced", Pearson Education, Fifth Edition, 2004.

REFERENCES

1. Lathi.B.P. "Communication Systems", BS Publications, Fourth Edition, 2004.
2. Simon Haykin, "Communication Systems", John Wiley & Sons, Fifth Edition, 2008.
3. Taub and L. Schilling, "Principles of Communication", McGraw Hill International Student Edition, Third Edition, 2008.
4. Kennedy G, "Electronic Communication Systems", Tata Mc-GrawHill, Fourth Edition, 2002.

09IT43 - DATA STRUCTURES AND ALGORITHMS –II

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To study data structure concepts, related algorithms, their applications and algorithm design techniques.

EXPECTED OUTCOME

Student should have learnt algorithm concepts and design algorithms for applications.

FILES

External storage devices - Definitions and Concepts - Record organization - Sequential files - Indexed sequential files: Structure and Processing - Direct Files: Structure and Processing - Other method of file organizations: VSAM - Multiple Key Access: Multilist, Inverted list, Cellular partitions. **(9)**

SORTING

Introductory considerations – Internal Sorts : Selection sort, Bubble sort, Insertion sort, Merge sort, Shell sort, Heap sort, Quick sort, Radix sort, Address calculation sort – External sorts : Polyphase sort, Oscillating sort, Sorting on Discs-Extended run list- Time complexity for sorting algorithms. **(9)**

SEARCH STRATEGIES

Sequential Search - Binary search -Extended binary tree - Huffman coding- Search Trees: Height Balanced Trees, 2-3 trees, Weight Balanced Trees, B-tree, B+ trees, Tries, Red Black Trees – Hash table methods: Introduction, Hashing functions, Hashing methods, Collision resolution techniques - Time complexity for searching algorithms. **(10)**

Unification and Lifting – Forward Chaining – Backward Chaining – Resolution – Ontological Engineering – Categories and Objects – Actions, Situations, and Events – Mental Events and Mental Objects – Reasoning Systems for Categories – Reasoning with Default Information – Truth Maintenance Systems. **(8)**

PLANNING

Planning Problem – Planning with State-Space Search – Partial-Order Planning – Planning Graphs – Planning with Propositional Logic – Analysis of Planning Approaches – Time, Schedules, and Resources – Hierarchical Task Network Planning – Planning and Acting in Nondeterministic Domains – Conditional Planning – Execution Monitoring and Replanning – Continuous Planning – MultiAgent Planning – Representing Knowledge in an Uncertain Domain : Bayesian Networks – Basis of Utility Theory – Utility Functions – Multiattribute Utility Functions. **(9)**

LEARNING

Forms of Learning – Inductive Learning – Learning Decision Trees – Ensemble Learning – Computational Learning Theory – Logical Formulation of Learning – Knowledge in Learning – Explanation-Based Learning – Learning Using Relevance Information – Inductive Logic Programming – Statistical Learning – Learning with Complete Data – EM Algorithm – Instance-Based Learning – Neural Networks – Kernel Machines – Case Study – Passive Reinforcement Learning – Active Reinforcement Learning – Generalization in Reinforcement Learning – Policy Search. **(12)**

Total : 45

TEXT BOOK

1. Stuart J. Russell and Peter Norvig, “Artificial Intelligence – A Modern Approach”, Pearson Education Series, Third Edition, 2009.

E-10 - INTELLIGENT AGENTS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the basic concepts of artificial intelligence, problem solving techniques, planning, knowledge and reasoning pertaining to intelligent agents.

EXPECTED OUTCOME

At the end of the course students will understand the concepts of AI from the perspective of intelligent agents – its knowledge and reasoning, planning in real world and learning from observation.

INTRODUCTION

Foundation of AI – Agents and Environments – Concept of Rationality – Nature of Environments – Structure of Agents – Problem-Solving Agents and examples – Uninformed Search Strategies – Searching with Partial Information. (8)

SEARCH TECHNIQUES

Search Strategies: A* Search – Heuristic Functions – Local Search Algorithms and Optimization Problems – Local Search in Continuous Spaces – Online Search Agents and Unknown Environments – Constraint Satisfaction Problems – Backtracking Search for CSPs – Local Search for Constraint Satisfaction Problems – Structure of Problems – Games – Optimal Decisions in Games – Alpha-Beta Pruning. (8)

KNOWLEDGE AND REASONING

Knowledge- Based Agents – Logic – Propositional Logic – Reasoning Patterns – Effective propositional inference – Agents based on Propositional Logic – Syntax and Semantics of First - Order Logic – Using First- Order Logic – Knowledge Engineering in First - Order Logic – Propositional vs. First - Order Inference -

DYNAMIC STORAGE MANAGEMENT

First fit - Best fit - Storage release - Boundary tag method - Buddy system - Garbage collection - Compaction. (7)

ALGORITHMS DESIGN

Basic steps in complete development of an algorithm - Algorithms and Design methods: Sub goals , Hill climbing and working backward Heuristics , Back track programming , Branch and Bound, Simulated annealing - Knapsack Problem (Back Tracking) - Traveling Salesmen Problem (Branch and Bound). (10)

* **Note : Algorithms will be taught in Sparks notation.**

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Jean Paul Tremblay, Paul G. Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill, Second Edition, 2008.
2. Horowitz E., Sahni S., and Rajasekaran Sanguthevar, "Fundamental of Computer Algorithms", Universities Press (Computer Science), 2008.

REFERENCE BOOKS

1. Alfred V. Aho, John. E. Hopcroft, Jeffrey D, Ullman, "Data Structures and Algorithms", Pearson Education, 2002.
2. Satraj Sahani, "Data Structures, Algorithms and Application in C++", McGraw Hill, Second Edition, 2005.

09IT44 - SIGNALS AND SYSTEMS

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVES

To study about continuous time signals & systems, discrete time signals & systems, Fourier series, Fourier transform, Sampling and Laplace & Z transform.

EXPECTED OUTCOME

Upon completion of this syllabus, learners will be able to understand about continuous time Signals & Systems, discrete time Signals & Systems and to study about system analysis using Laplace transform & Z transform.

INTRODUCTION TO SIGNALS AND SYSTEMS

Basic continuous time signals - Basic discrete time signals - Representation of signals in terms of impulses - continuous time systems - Discrete time signals - Properties of systems - Linear time invariant systems : Discrete and continuous - Continuous time system representation by differential equations - Discrete time system representation by difference equation - Block diagram representation. (9)

FOURIER ANALYSIS OF CONTINUOUS TIME SIGNALS AND SYSTEMS

Fourier series representation of periodic signals - Approximation of periodic signals using Fourier series and convergence of Fourier series - Representation of aperiodic signals - The continuous time Fourier transform - Properties Fourier transform - The response of continuous time systems to complex exponentials - Frequency response of systems characterized by differential equations - Short Time Fourier Transform - Wavelet Transform. (9)

Area Networks: Fibre Channel overview - The SAN and its evolution - components of SAN-FC Connectivity - Fibre Channel Ports - Fibre Channel Architecture – Zoning - Fibre Channel Login Types - FC Topologies - Network-Attached Storage - General Purpose Servers vs NAS devices - Benefits of NAS-NAS file I/O - Components of NAS - NAS Implementation - NAS File - sharing protocols - NAS I/O operations - factors affecting NAS performance and availability. (10)

NETWORK STORAGE AND VIRTUALIZATION

IP-SAN – iSCSI – FCIP-Content - Addressed Storage - fixed content and archives - types of archives - features and benefits of CAS-CAS Architecture - Storage Virtualization overview - Forms of Virtualization - Storage Virtualization Challenges - Types of Virtualization. (9)

INFORMATION AVAILABILITY AND MONITORING

Introduction to Business Continuity - Information Availability - BC Terminology - Failure Analysis - Backup and Recovery - Backup Purpose - Backup Consideration - Backup – Granularity – Methods - Backup and Restore operations - Local Replication - source and target - uses of local replica - Data Consistency - Local Replication Technologies - Restore and Restart consideration - Creating Multiple replicas - Remote replication - Modes of remote Replication - Remote replication Technology - Network infrastructure. (10)

Total : 45

TEXT BOOK

1. EMC² Corporation- Information Storage and Management, Wiley, 2009.

REFERENCE BOOK

1. Robert Spalding, “Storage Network - The Complete Reference”, Tata McGraw Hill, Osborne, 2003.

E-9 - INFORMATION STORAGE AND MANAGEMENT

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the basic concepts, principles and current practices on storage technology architecture and storage management techniques.

EXPECTED OUTCOME

Upon the successful completion of this course students should be able to understand the various storage architectures (including DAS, SAN, NAS, CAS), define backup, recovery and business continuity methods, understand data center management components and storage virtualization technologies.

INTRODUCTION TO STORAGE TECHNOLOGY

Information Storage - Evolution of Storage Technology and Architecture - Data Centre Infrastructure - Key challenges in Managing Information - Information Lifecycle **Storage System Architecture:** Components of Storage System Environment - Disk Drive Components and Performance - Laws Governing Disk Performance - Logical Components of Host - Application Requirement and Disk performance. (8)

DATA PROTECTION

Implementation RAID - RAID Array Components - RAID levels - RAID Comparison - RAID impact on Disk Performance - Hot Spares - Component of an Intelligent Storage System - High - end Storage Systems - Midrange Storage System. (8)

STORAGE NETWORKING TECHNOLOGIES : SCSI -DAS AND NAS

Direct - Attached Storage and Introduction to SCSI : Types of DAS - DAS benefits and limitations - Disc Drive Interfaces - Introduction to parallel SCSI - SCSI Command Model - **Storage**

FOURIER ANALYSIS OF DISCRETE TIME SIGNALS AND SYSTEMS

Representation of periodic signals by discrete time Fourier series - Representation of periodic and aperiodic signals by discrete time Fourier transforms - Properties of discrete time Fourier transform - Parseval's relation - Convolution property - The response of discrete time systems to complex exponentials - Frequency response of systems characterized by difference equations. (9)

SAMPLING

Representation of a continuous time signals by samples - Sampling theorem - Reconstruction from samples using interpolation - Effect of under sampling - Aliasing error - Discrete time processing of continuous signals - Sampling of discrete time systems. (9)

LAPLACE TRANSFORM AND Z TRANSFORM

Laplace and inverse Laplace transform - Analysis and characterization of LTI system using Laplace transform - The Z transform and the inverse Z transform - Properties of Z transform - Analysis and characterization of LTI system using Z transform. (9)

Theory : 45

Tutorial : 15

Total : 60

TEXTBOOK

1. Oppenheim A.V, Willsky A.S and Nawab S.H, "Signals and Systems", Pearson Education Asia, Second Edition, 1997.

REFERENCE BOOKS

1. Ronald E.Ziemer, William H.Transter and Ronald.D.Fannin, "Signals and System – Continuous and Discrete", Pearson Education Asia, Fourth Edition, 2002.
2. Roberts.M.J, "Signals and Systems - Analysis Using Transform Methods and Matlab", McGraw Hill, 2004.
3. Haykin .S and Barry Van Veen, "Signals and Systems", John Wiley and Sons, 2002.
4. Lathi.B.P, "Linear Systems and Signals", Oxford University Press, 2004.

TEXT BOOKS

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Course Technology, New Delhi, Second Edition, 2009 Reprint. [Chapters 1 to 5, 7, 9 and 11]
2. Nina Godbole, "Information Systems Security-Security Management, Metrics, Frameworks and Best Practices", Wiley India Pvt. Ltd., New Delhi, First Edition, 2009. [Chapters 9, 17, 23 and 27]

REFERENCE BOOKS

1. Thomas R.Peltier, "Information Security Fundamentals", Auerbach Publications, Second Edition, 2010.
2. Micki Krause and Harold F.Tipton, "Information Security Management Handbook", Auerbach Publications, Second Edition, 2009.
3. Mark Merkow and Jim Breithaupt, " Information Security - Principles and Practices", Pearson Education, 2007.

POLICIES, STANDARDS, PRACTICES AND BUSINESS CONTINUITY

Introduction - Information Security Policy, Standards and Practices - The Information Security Blueprint: ISO 17799/BS 7799, ISO 27001 and its controls, NIST Security Models, VISA International Security Model, Design of Security Architecture - Security Education, Training and Awareness Program - Continuity Strategies. **(9)**

SECURITY TECHNOLOGY: INTRUSION DETECTION, ACCESS CONTROL, AND SECURITY TOOLS

Introduction - Intrusion Detection Systems: IDS Terminology, Why Use an IDS?, Strengths and Limitations of IDSs - Honey Pots, Honey Nets, and Padded Cell Systems - Scanning and Analysis Tools, Access Control Devices - Physical Security - Security and Personnel. **(11)**

BIOMETRIC CONTROLS

What is Biometrics? - Nature of Biometrics Identification/Authentication Techniques - Biometric Techniques - Matching and Enrollment Process in Biometrics - Benefits Over Traditional Authentication Methods. **(4)**

SECURITY OF WIRELESS NETWORKS

Attacks on Wireless Networks: Other Security Risks in Wireless Networks, Management and Mitigations for Wireless Networks Attacks. **(3)**

LAWS AND LEGAL FRAMEWORK

Introduction - Information Security and the Law: The Rising Need - Understanding the Laws for Information Security: A Conceptual Framework - The Indian IT Act - Laws for Intellectual Property Rights (IPR) - Health Insurance Portability and Accountability Act (HIPAA) - Gramm-Leach-Bliley Act (GLBA) - Overview of Sarbanes-Oxley (SOX) - Building Security into Software/System Development Life Cycle. **(5)**

Total : 45

09IT45 - MICROPROCESSORS & MICROCONTROLLERS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the internal architecture of the microprocessors, supporting IC's and microcontrollers and to write the assembly language programming.

EXPECTED OUTCOME

The students shall gain in-depth theoretical and practical knowledge of 8085 and 8086 and their interfacing with other peripheral devices. Students will write assembly language programs using x86 instruction set.

8085 MICROPROCESSOR

Architecture - Instruction set – Timing diagram - Programming examples: Looping – Counting – 16 bit arithmetic – Time delays – Stack and subroutines – Code conversion - BCD arithmetic.

(10)

SUPPORTING IC'S

Internal architecture, modes of operation and usage – 8255 PPI – 8259 PIC – 8253 PIT - 8251 USART.

(9)

INTERFACING

Basic interfacing concepts – Interfacing Memory – Memory mapped I/O – Isolated I/O – 8085 interrupts - Interfacing applications : ADC & DAC interface, Traffic light control, Temperature control, Stepper motor control using 8255 - Bus standards – RS 232c – USB.

(7)

PENTIUM MICROPROCESSOR

Real, Protected Mode and Virtual 8086 Mode of operation of the Pentium Processor– Registers – Interrupt Processing –RISC – Superscalar –

Pipelining – Branch Prediction – FPU – Paging – Multitasking Exception.
(10)

MICROCONTROLLERS

Basic principle – Advantages over microprocessors – 8051 architecture – Internal RAM – registers – I/O ports – Interrupt system – Memory map – Developing microprocessor based systems - Design process – Development systems – Logic analyzers – In circuit Emulators – Troubleshooting and Testing.

(9)

Total : 45

TEXT BOOK

1. Ramesh S. Gaonkar, “Microprocessor Architecture Programming and Applications with the 8085/8080A”, Penram International Publications, Fourth Edition, 2000.

REFERENCE BOOKS

1. Gilmore, “Microprocessors – Principles and Applications”, Tata McGraw-Hill, Second Edition, 2000.
2. Douglas V Hall, “Microprocessors and Interfacing”, McGraw-Hill, Revised Second Edition, 2006.
3. Barry B. Brey and C.R.Sharma “Intel Microprocessors 8086/88, 80186/80188, 80286,80386,80486 , Pentium and Pentium Pro Processor, PII, P4 – Architecture, Programming & Interfacing”, Prentice Hall of India, Seventh Edition, 2005.
4. James L. Antonakos “The Intel Microprocessor Family: Hardware and Software Principles and Applications”, Pearson Education, Third Edition, 2006.

E-8 - INFORMATION SECURITY

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the basic principles of Information Security, the Security Policies, Security Standards & Controls, Security Technologies and industry practices.

EXPECTED OUTCOME

At the end of the course, the students shall understand the importance of securing the information assets, the security threats, security laws & legal frameworks, policies and controls for ensuring security/business continuity and the current security standards.

INTRODUCTION, NEED, ETHICAL AND PROFESSIONAL ISSUES

Introduction to Information Security - The History of Information Security - What is Security - Critical Characteristics of Information - NSTISSC Security Model - Components of an Information System - Securing Components - Balancing Information Security and Access - The Systems Development Life Cycle - The Security Systems Development Life Cycle. The Need for Security : Introduction - Business Needs First - Threats - Attacks.

Ethics and Information Security - Codes of Ethics and Professional Organizations - Organizational Liability and the Need for Counsel. (7)

RISK MANAGEMENT AND INFORMATION SECURITY

Introduction - An Overview of Risk Management - Risk Identification - Risk Assessment - Risk Control Strategies - Selecting a Risk Control Strategy - Risk Management Discussion Points - Documenting Results - Recommended Practices in Controlling Risk. (6)

Choosing an evaluation method – Universal design principles – Multi-modal interaction (10)

COGNITIVE, COMMUNICATION AND COLLABORATION MODELS

Cognitive models: Goal and task hierarchies - Linguistic models - The challenge of display-based systems - Physical and device models - Cognitive architectures. Communication and collaboration models: Face-to-face communication – Conversation - Text-based communication - Group working

(10)

TASK ANALYSIS, DIALOG NOTATIONS AND SYSTEM MODELS

Task analysis: Differences between task analysis and other techniques - Task decomposition - Knowledge-based analysis – Entity relationship-based techniques - Sources of information and data collection - Uses of task analysis. Dialog notations and design : Models of the system - Standard formalisms - Interaction models - Continuous behavior – An introduction to ubiquitous computing

(9)

Total : 45

TEXT BOOK

1. Alan Dix, Janet E. Finlay, Gregory D. Abowd, Russell Beale, “Human-Computer Interaction”, Prentice Hall Publishers, Third Edition, 2006.

REFERENCE BOOKS

1. Jenny Preece, Yvonne Rogers, David Benyon, Simon Holland, Tom Carey “Human-Computer Interaction”, Addison-Wesley Publication, Second Edition, 2002.
2. Andrew Sears, Julie A. Jacko, “Human-Computer Interaction – Development Process”, CRC Press, First Edition, 2009.

09IT46 - PRINCIPLES OF ENVIRONMENTAL SCIENCE AND ENGINEERING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

This course is intended to provide a basic knowledge of the environment, threat to environment, social issues related to it, the necessity for environment legislation, sustainable development and the option of green chemistry.

EXPECTED OUTCOME

After successful completion of this course, the students shall have better understanding of the concept of environment, the causes for deterioration, the measure taken for its preservation and the need for sustainable development.

ENVIRONMENTAL CHEMISTRY

Chemistry and the Environment – Environmental segments – Composition and Characteristics of Atmosphere, Hydrosphere, Lithosphere, and Biosphere: Chemical species and particulates present in the environment - reactions in the atmosphere. Photochemical smog. Impact of man on the environment. Impact of Environment upon humans. (9)

ECOSYSTEMS AND BIODIVERSITY

Concepts of an ecosystem: types, structure and functions of the ecosystem. foodchains, food webs and ecological pyramids. Biodiversity: Definition – Genetic, species, ecosystem and landscape diversities – India as a mega diversity nation – Hot spots of biodiversity. Importance of biodiversity – loss of biodiversity – causes of reduction in biodiversity. Conservation of biodiversity – restoration of biodiversity. (9)

ENVIRONMENTAL POLLUTION

Sources, causes, effects and management of Air, Water, Soil, Marine, Noise and Radioactive pollution. Sources of Solid, Hazardous,

Biomedical and Chemical wastes. Solid Waste Disposal and treatment methods. (9)

ENERGY AND ENVIRONMENT

Energy resources – Growing energy needs - renewable and non-renewable energy sources - use of alternate energy sources – Solar, Wind, Tidal Geothermal and OTEC – (Principles only) merits and limitations. (3)

SOCIAL ISSUES AND THE ENVIRONMENT

Sustainable development – Urban Population - problems related to energy – Water Conservation. Rainwater harvesting – Environment Ethics – Green house effect, Global warming, climate change, Nuclear hazards and accidents. Issues involved in enforcement of environment legislation – precautionary principle – polluter pays principle – the Beneficiary pays principle – role of an Individual in Environment protection – Environment (Protection) Act - Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act and Forest (Conservation) Act. (9)

BIOTECHNOLOGY AND GREEN CHEMISTRY

Biotechnology and its applications in environmental protection – Bioinformatics – Bioremediation. Biological purification of contaminated air. Green chemistry for clean technology: Significance of green chemistry – Basic components of Green chemistry. Industrial applications of green chemistry. Green fuels – e-green propellants and biocatalysts. (6)

Total : 45

TEXT BOOKS

1. Dara, S.S. "A Text Book of Environmental Chemistry and Pollution Control", Eighth Revised Edition, S. Chand and Company Ltd, 2008.

E-7 - HUMAN COMPUTER INTERFACE

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To introduce the basics of interaction design and implementation for the models of HCI.

EXPECTED OUTCOME

Students will be able to understand the interaction design with various scenarios, basics of the navigation and universal designs and to monitor their behavior using various task analysis techniques.

INTRODUCTION

Introduction - Models of interaction - Frameworks and HCI – Ergonomics - Interaction styles: Navigation in 3D and 2D - Elements of the WIMP interface – Interactivity - The context of the interaction – Paradigms for interaction (7)

INTERACTION DESIGN BASICS, SOFTWARE PROCESS AND DESIGN RULES

Interaction design basics: The process of design - User focus – Scenarios - Navigation design - Modes - Screen design and layout – Iteration and prototyping - HCI in the software process: The software life cycle - Usability engineering - Iterative design and prototyping - Design rationale. Design rules: Principles to support usability – Standards – Guidelines - Golden rules and heuristics - HCI patterns (9)

IMPLEMENTATION AND EVALUATION TECHNIQUES

Elements of windowing systems - Programming the application - Using toolkits – Java and AWT - User interface management systems. Evaluation techniques: Goals of evaluation - Evaluation through expert analysis - Evaluation through user participation -

services: Common Management Model – Service domains – Policy architecture – Security architecture – Metering and accounting – Common distributed logging – Distributed data access and replication.

(9)

GRID COMPUTING TOOL KITS

GLOBUS GT3 Toolkit architecture – GT3 Programming model – Sample implementation – High level services – Information services – Index services – Resource Information Provider service – Resource Management services.

(9)

Total : 45

TEXT BOOK

1. Joshy Joseph and Graig Fellenstein, “Grid Computing”, Prentice Hall of India, First Edition, 2004.

REFERENCE BOOK

1. Ahmar Abbas, “Grid Computing: A Practical Guide to Technology and Applications”, Charles River Media, 2003.

2. Kaushik, A. and Kaushik, C.P. “Environmental Science and Engineering”, Second Edition, New Age International (P) Limited Publishers, 2006.

3. Dr. Raghavan Nambiar, K. “Text Book of Environmental Studies”, SciTech Publications (India) Pvt. Ltd, Chennai, 2007.

REFERENCE BOOKS

1. Benny Joseph, “Environmental Studies” Tata McGraw Hill Publishing Company Ltd, 2008
2. Surinder Deswal and Anupama Deswal, “A Basic Course in Environmental Studies” Dhanpat Rai and Co. (P) Ltd, 2006.

**09IT47 - ELECTRICAL & ELECTRONICS AND
MICROPROCESSOR
LABORATORY**

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

ELECTRICAL & ELECTRONICS LAB

- Verification of Network theorems
- Design of oscillators
- Design of voltage regulators
- Opamp applications
- Zero-crossing detectors
- Wave generation circuits
- Design of combinational circuits
- Adders and Subtractors
- Multiplexers and Demultiplexers
- Code converters
- Counters

MICROPROCESSOR LAB (8085, 8051, 8086)

- Swapping block of data in memory.
- Multi precision addition/subtraction.
- 8 bit multiplication/division.
- Number conversion from one base to another.
- 8 bit sorting of data.
- Digital Clock
- Arithmetic Expression Evaluation
- Kit-Kit Communication.
- Seven segment display interface
- ADC Interface
- Keyboard Interface

E-6 - GRID COMPUTING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the concept of grid computing, grid computing tools and its application.

EXPECTED OUTCOME

Students shall attain knowledge in the area of grid computing and its applications. They will have thorough understanding of the usage of grid computing tools.

INTRODUCTION

Early Grid activities – overview of grid business areas – Grid application – Grid Infrastructure – Grid computing organizations and their roles – Grid computing anatomy: Grid problem –Grid computing road map: Anatomic computing – Business on demand and infrastructure virtualization – Service oriented architecture and Grid - semantic grids. **(9)**

MERGING THE GRID SERVICES ARCHITECTURE WITH THE WEB SERVICE ARCHITECTURE

XML messages and enveloping – Service message description mechanisms – Relationship between grid services and web services – web services interoperability. **(9)**

OPEN GRID SERVICES ARCHITECTURE (OGSA)

Sample use cases – Commercial Data Center, National Fusion Collaboratory – Online Media and Entertainment – OGSA platform components. **(9)**

OPEN GRID SERVICES INFRASTRUCTURE (OGSI)

Technical specification – Introduction to service data concepts – Grid services Naming and Change Management – OGSA basic

REAL TIME APPLICATIONS

Intelligent Transportation Systems – Global Positioning System – Vehicle Tracking – Area Traffic Control – Automatic Toll Collection – Commercial Vehicle Operation – Traveller Information System. (10)

Total : 45

TEXT BOOK

1. Thomas. M. Lillesand and Ralph. W. Kiefer, "Remote Sensing and Image Interpretation", John Wiley and Sons Inc, Sixth Edition, 2008.

REFERENCE BOOKS

1. Peter A. Burrough , and Rachael A.McDonnell, "Principles of Geographical Information Systems", Oxford Publication, Second Edition, 2004.
2. CP. Lo, Albert K.W. Yeung, "Concepts and Techniques of Geographical Information System", Prentice Hall of India, Second Edition, 2006.

09IT48 - DATA STRUCTURES AND ALGORITHMS, OOP AND AUTOMATA LABORATORY

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

OOP (JAVA)

- Data Abstraction and Encapsulation.
- String Manipulation.
- Inheritance.
- Function Overloading.
- Exception Handling.
- Packages & Interface.
- Multithreading.
- File I/O.
- Applet and AWT Tools.

DATA STRUCTURES

- Operations on Stacks, Queues, Linked lists.
- Stack Applications.
- Polynomial operations using Linked List.
- Operations on Trees, Graphs.
- Applying searching and sorting algorithms for given applications.

AUTOMATA

- Well-formedness of parenthesis.
- Addition of unary numbers.
- Multiplication of unary numbers.
- Recognition of binary palindromes.
- Recognition of words of the form 0^n1^n .

09CE49 - SCIENCE OF CREATIVITY AND PROFESSIONAL ETHICS

L	T	P	C
2	0	0	2

ASSESSMENT : THEORY

OBJECTIVE

To inculcate among the students the importance of spirituality, yoga and procedures to manage stress and strain. To impart the knowledge of professional and management skills.

EXPECTED OUTCOME

The students will be able to manage stress and strain in their profession in future. They will have knowledge of introspection procedures, practical considerations and guidelines for their living.

INTRODUCTION

Science of creativity and personality development – objectives - evolution of the universe - creation theory – evolution theory – theory of permanence – theory of mithya – big-bang theory – static and dynamic States – etherial particles - panchabhudas – evolution of life - science and spiritualism – physical transformation of biomagnetism - harmony in life – self, family, society and nature - cause and effect system. **(9)**

LIFE FORCE, MIND AND CONCIOUSNESS

Life force – origin – potentiality of the life force – pathway to realize universal force - premordial state - almighty – mind – existence and purpose of mind – greatness and mystery - role of mind in shaping one’s personality - ten stages – totality – wisdom – consciousness - sixth sense – action, word and deed – six temperaments. **(9)**

TECHNIQUES FOR SELF EVALUTION

Blockades for personality development – six impurities - introspection – analysis of thought – moralization of desire – eradication of worries

E-5 - GEOGRAPHICAL INFORMATION SYSTEMS & REMOTE SENSING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the concepts of acquisition of remotely sensed data, its representation and to study the applications of GIS.

EXPECTED OUTCOME

At the end of the course, the students will acquire the basic knowledge of remote sensing and mapping of 3Dimensional representation to 2Dimensional representation of earth and the usage of GIS in real time applications.

INTRODUCTION

History and development of GIS, Hardware requirement, System concepts, Coordinate systems- Type of Data – Spatial and non- spatial data, Vector and raster, Files and data formats, Data compression. **(9)**

ANALYSIS

Spatial analysis, Data retrieval, Query, Overlay, Vector and Raster data analysis, Digital Elevation Model – Sources of errors, Types of errors – Elimination –Accuracy **(7)**

CONCEPTS AND FOUNDATION OF REMOTE SENSING

Electromagnetic spectrum, spectral signatures. Remote sensing systems- Remote sensing platforms and sensors- Satellite system parameters, sensor parameters- Visual Image Interpretation – Digital Image Processing. **(11)**

APPLICATIONS

Applications of GIS and remote sensing in survey, mapping, natural resources management. **(8)**

THE ERP MARKET

ERP Market Place – SAP AG – People soft – JD Edwards – Oracle – QAD – SSA. (9)

ERP – PRESENT AND FUTURE

Turbo Charge the ERP System – EAI – ERP and E-Business – ERP and Internet – Future Directions and Trends in ERP. (8)

Total : 45

TEXT BOOK

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, Second Edition, 2008.

REFERENCE BOOKS

1. Ellen F.Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Course Technology Cengage learning, Third Edition, 2009.
2. Vinod Kumar Garg and Venkitakrishnan N.K., “Enterprise Resource Planning – Concepts and Practice”, Prentice Hall of India, New Delhi, Second Edition, 2006.

– neutralization of anger – realization of self or actualization of the universe – understanding of morality, duty and charity – yoga - different types - kundalini yoga – nine centers – removal of six imprints – meditation and its benefits.

(9)

HUMAN BODY

Body structure – endocrine glands and six chakras – seven thadus – health and nature – medicines - understanding the need, habit, environmental conditions, society and evolutionary process of life – physical exercise and its importance – regulating food, work, rest, sex and thought. (9)

PROFESSIONAL ETHICS

Engineering Ethics – variety of moral issues – moral autonomy – professions and professionalism - professional ideals and virtues – engineers as responsible experiments – safety and risk – reducing risk – collegiability and loyalty – professional rights – intellectual property rights – multinational corporations – environmental ethics – engineering as managers. (9)

Total : 45

TEXT BOOKS

1. Yogiraj Vethathri Maharishi, “Karma Yoga – The Holistic Unity”, Vethathri Publications, Fourth Edition, 2004.
2. Mike Martin and Roland Schinzinger, IV Edition, 2004 ”Ethics in Engineering”, McGraw Hill, NewYork 1996.

REFERENCE BOOKS

1. Charles D. Fleddermann, “Engineering Ethics”, Prentice Hall, New Mexico, 1999.

2. Laura Schlesinger, "How Could You Do That: The Abdication of Character, Courage, and Conscience", Harper Collins, NewYork, 1996.
3. Stephen Carter, "Integrity", Basic Books, NewYork, 1996.
4. Tom Rusk, "The Power of Ethical Persuasion: From Conflict to Partnership at work and in Private Life", Viking, NewYork, 1993.
5. R. S. Naagarazan, " A Textbook on Professional Ethics and Humanvalues", New Age International Publishers, New Delhi, 2009.

E-4 - ENTERPRISE RESOURCE PLANNING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the basics features and components of Enterprise Resource Planning software, the major functions and modules of leading ERP packages and the key implementation issues.

EXPECTED OUTCOME

At the end of the course, the students shall understand the core functions of ERP modules and obtain the basic knowledge for the selection, implementation and operational aspects of an ERP system suiting the needs of an organization.

INTRODUCTION

Enterprise – An Overview – Introduction to ERP – Benefits Of ERP – ERP and Related Technologies – Business Process Reengineering (BPR) – Data Warehousing – Data Mining – OLAP – SCM. **(9)**

ERP IMPLEMENTATION

ERP Implementation Lifecycle – Implementation Methodologies – ERP Implementation Strategies – Package Selection – Process Definition – Vendors and Consultants – Contract with Vendors – Consultants and Employees – Project Management and Monitoring. **(10)**

THE BUSINESS MODULES

Business modules of an ERP Package – Finance – Manufacturing – Human Resources – Plant Maintenance – Materials Management – Quality Management – Sales and Distribution. **(9)**

Rights-Intellectual Property Rights-Governance-Public Safety and Welfare. (9)

RETAILING ON THE WEB

The Retail Sector- analyzing the viability of online firms- Online Service Industries: -Financial -Travel Services. B2B E-Commerce: Supply Chain Management And Collaborative Commerce: Procurement Process-Trends in Supply Chain. (9)

AUCTIONS

Growth Of Auctions And Dynamic Pricing. Portals: Types-Portal Business Models. Online Communities: Growth-Features-Limitations. Publishing Industry: Growth - Online Publishing Business Models. Entertainment Industry: Growth-Internet Music Business Models-Internet Video Distribution Business. E-Learning Industry: Corporate Training And Learning Online. (9)

Total : 45

TEXT BOOK

1. Kenneth C. Laudon, carol Guercio Traver "E-Commerce - Busines,Technology,Society", Fourth Edition, Prentice Hall 2008.

REFERENCE BOOK

1. Ravi Kalakota, Andrew Whinston, "Frontiers of Electronic Commerce", Dorling Kindersley(India) Pvt Ltd, 2008.

09IT51 - OPERATING SYSTEMS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To study the various functions of an operating system and the way resources are managed by operating system.

EXPECTED OUTCOME

Student shall be able to understand the role of an operating system, analyze various scheduling algorithms, semaphores, deadlocks and resource management routines and implementation aspects.

OPERATING SYSTEM OVERVIEW

Introduction to system software - Objectives and functions of OS - Evolution of OS - Distributed system - Real-Time systems - Operating system components - Interrupts - System call - Virtual machines - Symmetric Multiprocessing – Microkernel. (3)

PROCESS DESCRIPTION AND CONTROL

Process - Process states - Process description - Process control - Processes and Threads - Uniprocessor Scheduling: Types of Processor Scheduling - Scheduling Algorithms - Overview of Multiprocessor Scheduling and Real time scheduling. (10)

MUTUAL EXCLUSION AND SYNCHRONIZATION

Principles of concurrency - Mutual exclusion: Software and hardware approaches - Semaphores - Monitors - Message Passing - Readers/Writers problem. Deadlock and Starvation: Principles of deadlock - Deadlock Prevention - Deadlock Detection - Deadlock Avoidance.

(10)

MEMORY MANAGEMENT

Memory management requirements - Memory partitioning - Loading and Linking - Paging - Segmentation. Virtual Memory: Hardware and control structures - Operating Systems software: Fetch Policy, Placement policy, Replacement policy, Resident set management, Cleaning policy, Load control. (10)

I/O MANAGEMENT AND FILE MANAGEMENT

I/O devices - Organization of I/O function - OS design issues - I/O buffering - Disk scheduling. File management: Overview - File organization and access - File directories - File sharing - Record blocking - Secondary storage management. (8)

OTHER SYSTEM SOFTWARES

Macro processor - Features, Design – Linkers – Loaders: Loader schemes. (4)

Total : 45

TEXT BOOKS

1. William Stallings, "Operating Systems Internals and Design Principles", Prentice- Hall of India Private Ltd, Sixth Edition, 2009.
2. John J Donovan, "System Programming", McGraw Hill Publication, Reprint, 2009.

REFERENCE BOOKS

1. Leland L.Beck, D.Manjula, "System Software", Pearson Education, Third Edition, 2007.
2. Silberchatz, Galvin, Gagne, "Operating System Concepts", John Wiley, Eighth Edition, 2009.
3. Harvey M. Deitel, Paul J. Deitel, David R. Choffnes , "Operating Systems", Prentice Hall, Third Edition, 2004.

E-3 - E-COMMERCE

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the basic features and components of Electronic Commerce, the recent tools, Technologies and Implementation aspects.

EXPECTED OUTCOME

At the end of the course, the students shall obtain thorough knowledge on E-Commerce technology, its social issues and applications in payment systems, retailing and auction.

INTRODUCTION

E-Commerce: E-Commerce and E-Business-Features of E-Commerce Technology-Types of E-Commerce-Visions and Forces-Understanding E-Commerce: Technology, Business and Society. E-Commerce Business Models and Concepts: B2C-B2B-C2C-P2P- M-Commerce. Basic Business Concepts: Industry Value Chain-Firm Value Chain-Business Strategy. (9)

BUILDING AN E-COMMERCE WEBSITE

A Systematic Approach - Choosing Server Software - Choosing the Hardware - E-Commerce Site Tools- Security: E-Commerce Security Environment, Security Threats, Policies, Procedures and Laws. E-Commerce Payment Systems: Types of Payments-Credit Card Transactions. Digital Payments in B2C-B2B Payment Systems. (9)

E-COMMERCE MARKETING CONCEPTS

Basic Marketing Concepts- Internet Marketing Technologies-B2C and B2B Marketing and Branding Strategies-E-Commerce Marketing Communications: Online Marketing Communications- Understanding the Costs and Benefits. Ethical, Social and Political Issues: Understanding –Privacy and Information Rights- Intellectual Property

AUTOMOTIVE APPLICATION DEVELOPMENT: FUNCTIONAL DESIGN, AUTO-CODE GENERATION

Introduction to Modeling and Simulation - ASCET, Labcar, INCA (Setup 1 definition support by RBEI) or Matlab, Simulink, Labview (Setup 2), Autocode generation for a given automotive control application (e.g. Throttle valve control, PID simulation). **(8)**

Total : 47

REFERENCE BOOKS

1. Robert Bosch, "Bosch Automotive Handbook", Bentley Publishers, Sixth Edition, 2004.
2. Joerg Schaeuffele, Thomas Zurawka, "Automotive Software Engineering - Principles, Processes, Methods and Tools ", SAE International, 2005.
3. Jean J. Labrosse, "µC/OS-II Real Time Kernel", CMP Books, 2002.

09IT52 - PRINCIPLES OF COMMUNICATION - II

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVES

To study the principles of pulse digital communication, digital modulation and demodulation, data transmissions, data communication and to study about transmission media.

EXPECTED OUTCOME

Upon completion of this syllabus, learners will be able to understand the principles of digital communication.

PULSE DIGITAL MODULATION

Noisy channels – Quantization of signals – Quantization error – Companding – Pulse code modulation. PCM systems- SNR calculations – Differential Pulse code modulation (DPCM). Delta Modulation- Limitation – Adaptive Delta Modulation – Intelligibility comparison in PCM and Delta Modulation –SNR calculation –Effect of Thermal noise and output signal to noise ratio in delta modulation –Comparison of PCM and Delta Modulation. **(9)**

DIGITAL MODULATION

Binary Phase- Shift keying-Differential Phase Shift Keying – Differentially encoded PSK(DEPSK) – Quadrature Phase Shift Keying (QPSK) – M-ary PSK – Quadrature Amplitude Shift Keying(QASK). Binary Frequency Shift Keying – M-ary FSK. **(9)**

DATA TRANSMISSION

A base band signal receiver –Probability of error – The optimum filter – White noise: The matched filter –Probability of error of the matched filter –Coherent reception: correlation – Phase Shift Keying – Frequency Shift Keying- Non Coherent detection of FSK – Differential PSK – Four Phase PSK(QPSK).Use of signal space to calculate P_e – Calculation of error probability for BPSK and BFSK –Error probability for QPSK – Introduction to Spread Spectrum Modulation - DS spread spectrum –

Frequency hopping (FH) spread Spectrum – Generation and Characteristics of PN sequences. (9)

DATA COMMUNICATIONS

Data Communication modems, Serial and Parallel Interfaces, Data Link protocols – Asynchronous and Synchronous Data Link protocols - Hierarchical structure – Local loops – Trunks and multiplexing – Switching – Circuit, packet and message – Crossbar switches – Space division and time division switches – PSTN – ISDN – Services – ATM – Standard channel rates – ATM switches – SONET. (9)

TRANSMISSION MEDIA

Cables – Coaxial, twisted pair, fiber optic – Optic Fiber Communication Systems -Wireless transmission – Microwave Radio Communication – Microwave Radio Repeaters - Diversity - Cellular radio – Multiple Access techniques- AMPS, GSM, CDMA standards –Wireless LAN – WPAN – WMAN - Satellite communication – VSAT – Transmission path loss and EIRP. (9)

Total : 45

TEXT BOOKS

1. Taub and L. Schilling, “Principles of Communication”, McGraw Hill International Student Edition, Third Edition, 2008.
2. Wayne Tomasi, “Electronic Communication Systems: Fundamentals through Advanced”, Fifth Edition, Pearson Education, 2004.

REFERENCE BOOKS

1. Simon Haykin, “Communication Systems”, John Wiley, Singapore, Fourth Edition, 2004.

(based on performance), Microcontrollers, Memory, Peripherals. Introduction to an embedded board (TMS470 based / ARM9 based) for hands on lab sessions (RISC processor based with standard peripherals / interfaces and I/Os). (8)

OPERATING SYSTEM IN EMBEDDED ENVIRONMENT

Introduction to OS - General Purpose OS, RTOS - Kernel - Pre-emptive & Non pre-emptive, Scheduler, Interrupt - Interrupt latency and Context Switch Latency, Board Support package, Task - Multi-tasking, Task synchronization, Inter-task communication, Features of a typical embedded RTOS (μ C/OS-II). (6)

INTEGRATED DEVELOPMENT ENVIRONMENT IN EMBEDDED ENVIRONMENT

Integrated Development Environment (Introduction to IDE, Getting Started, Hardware / Software Configuration (Boot Service, Host – Target Interaction), Booting (IDE-Interaction, target-Agent), Reconfiguration, Managing IDE, Target Servers, Agents, Cross – Development, debugging), Introduction to an IDE for the lab board – RTOS, PC based debugger. (8)

EMBEDDED SYSTEM IN AUTOMOTIVE CONTEXT

Embedded systems in typical modern automobile - Distributed systems, Embedded components a) Engine Management system - Diesel / Gasoline system, Components, System architecture (H/W, S/W) b) Vehicle safety systems, c) Body electronics systems, d) Infotainment systems – Navigation, Car radio. (4)

EMBEDDED SYSTEM COMMUNICATION PROTOCOLS

Introduction to Control networking, Communication protocols in embedded systems - SPI, I²C, USB -Vehicle communication protocols – Introduction to CAN, LIN, FLEXRAY, MOST, KWP 2000- Details of CAN (4)

**E-2 - AUTOMOTIVE ELECTRONICS –
EMBEDDED SOFTWARE
DEVELOPER**

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To provide Automotive Electronics related domain exposure and to establish a learning platform for embedded system development environment with the application of engineering aspects in the development life cycle of projects for automobiles

EXPECTED OUTCOME

At the end of the course students shall acquire knowledge on basics of automotive electronics, embedded software development and embedded system communication protocols.

AUTOMOBILE ELECTRICALS AND ELECTRONICS

Basic Electrical Components in an automobile - Starting system (Battery, Ignition Switch, Solenoid, Starter, Neutral Safety Switch), Charging system (Alternator Drive Belt, Battery, Alternator, Voltage Regulator), Fuses

Overview of Vehicle Electronic system - Driver - Vehicle - Environment system (Control and monitoring systems, Electronic systems of the vehicle and the environment) ECUs and vehicle subsystems - Electronic systems of Power-train subsystem, Electronic systems of Chassis subsystem, Electronic systems of Body subsystems (Comfort and Passive safety), Multimedia subsystems

Automobile sensors and actuators, Engine management system, Vehicle safety systems, Environmental legislation (Pollution Norms - Euro / Bharat standards). **(9)**

**AUTOMOTIVE EMBEDDED SOFTWARE DEVELOPMENT
INTRODUCTION TO EMBEDDED SYSTEMS**

Embedded Systems definition, Components of Embedded systems, Micro processor, Classification of Microprocessors

2. Lathi B.P, "Modern Digital and Analog Communication Systems", Oxford University Press, New Delhi, Third Edition,2005.
3. Roy Blake, "Electronic Communication Systems", Thomson Delmar, Second Edition, 2002.
4. Sam K Shanmugam, "Digital and Analog Communication Systems", John Wiley, New York, Fourth Edition, 2002.

09IT53 - COMPUTER NETWORKS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To introduce the fundamental concepts, terminologies and technologies used in computer networks.

EXPECTED OUTCOME

Students shall understand the functions of different layers of computer networks and shall be able to write simple programs using sockets.

PHYSICAL AND DATA LINK LAYER

Network Hardware – Network Software – OSI reference model – TCP/IP model – Overview of transmission media – Data link layer: Framing & Flow control, Error control, Sliding window protocols – HDLC. (9)

MAC SUB LAYER

Multiple access protocols: ALOHA, CSMA, Collision free & Limited Contention Protocol – Ethernet – Token ring – Wireless LAN – Bluetooth – Data Link Layer Switching – Virtual LAN. (9)

NETWORK LAYER

Packet switching – Routing algorithms: Flooding, Distance Vector routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing – Congestion control & traffic management – Quality of Service (QoS) : ISA , RSVP, DS, Label switching & MPLS – Internetworking – Network layer in Internet :IP Protocol, IP Addresses. (9)

TRANSPORT LAYER

Addressing – Connection establishment and Termination – Flow control and buffering – Multiplexing – Internet Transport protocol: UDP – TCP – Application Layer: DNS – E-Mail – Multimedia: Streaming Audio, Voice over IP, Video on Demand, Mbone. (9)

MESH NETWORKS

Necessity for Mesh Networks - MAC enhancements - IEEE 802.11s Architecture - Opportunistic routing - Self configuration and Auto configuration - Capacity Models - Fairness - Heterogeneous Mesh Networks - Vehicular Mesh Networks. (9)

Total : 45

TEXT BOOKS

1. C.SivaRamMurthy and B.S Manoj, "Ad Hoc Wireless Networks - Architectures and Protocols", Pearson Education, 2004. (Unit - 1, 2 & 3 - Chapter 5, 6, 7, 8, 9, 12)
2. Tomas Krag and Sebastian Buettrich, "Wireless Mesh Networking", O'Reilly Publishers, 2007.

REFERENCE BOOKS

1. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Prentice Hall of India, 2002.
2. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan Kaufmann Publishers, 2004.

E-1 - AD-HOC AND SENSOR NETWORKS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the basics of Ad-hoc and Sensor Networks, routing mechanisms and their design and implementation issues.

EXPECTED OUTCOME

At the end of the course, student shall be able to understand the MAC protocols, routing issue and QoS in Ad-hoc and Sensor networks.

AD-HOC WIRELESS NETWORKS

Introduction - Issues in Ad-Hoc Wireless Networks - MAC Protocols: Issues - Classifications of MAC protocols - Multi channel MAC protocol - Power control MAC protocol. **(8)**

ROUTING PROTOCOLS

Issues - Classifications of routing protocols - Hierarchical routing protocols - Power-Aware routing protocols - Multicast routing protocols: Classifications - Tree based - Mesh based - Transport Layer: Issues - TCP over Ad Hoc wireless networks: Feedback-based TCP, TCP with Explicit link failure notification, TCP-Bus, Ad Hoc TCP, Split TCP. **(10)**

WIRELESS SENSOR NETWORKS

Introduction - Sensor Network Architecture - Data dissemination - Data gathering - MAC Protocols: self-organizing MAC, Hybrid TDMA/FDMA, CSMA based MAC protocols. **(9)**

WSN ROUTING, LOCALIZATION & QOS

Issues in WSN routing - OLSR, AODV - Localization: Indoor and Sensor Network Localization - QoS in WSN. **(9)**

ELEMENTARY SOCKETS

Socket address structure – Byte ordering functions – Elementary TCP socket functions – Concurrent servers – Elementary UDP socket functions – Elementary SCTP sockets – Name and address conversions – Day-time client/server, echo client/server.

(9)

Total : 45

TEXT BOOK

1. Andrew S. Tanenbaum, "Computer Networks", Pearson Education, Fourth Edition, 2007.

REFERENCE BOOKS

1. Richard Stevens, "UNIX Network Programming, The Sockets Networking API", vol I, Pearson Education Asia, Third Edition, 2004 (Chapter 3,4,8,9 – Unit 5).
2. William Stallings, "Data & Computer Communications", Pearson Education, Eighth Edition, 2007.
3. Behrouz. A. Forouzan, "Data Communication & Networks", McGraw Hill, Fourth Edition, 2006.

**09IT54 - RESOURCE MANAGEMENT
TECHNIQUES**

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To introduce the concepts of mathematical modeling of decision problems, optimization techniques and decision making based on obtained solutions.

EXPECTED OUTCOME

At the end of the course, the students shall be able to analyze the decision situations and offer solutions for optimum/best utilization of limited resources and to improve the efficiency and productivity of an organization.

LINEAR PROGRAMMING

Linear inequalities -Feasible solutions -Equality principles -Simplex algorithm and its variants: Artificial Variables Techniques, Duality in LPP, Dual simplex -transportation and assignment problems. Integer Programming: Gomory's cutting plane methods. **(11)**

INVENTORY

Functions of inventories -Costs associated with inventory -Elementary inventory models -Economic order quantities -Safety stocks. **(6)**

QUEUING THEORY AND SIMULATION

Poisson arrivals- Exponential service times -Basic equations -Single channel model. Simulation: Monte-Carlo technique, use of random numbers. **(7)**

PERT/CPM

Critical Path Methods (CPM) - Program evaluation and review techniques (PERT) -Resource scheduling and allocation. **(8)**

**09IT87 - NETWORKS, .NET AND SE
TOOLS LABORATORY**

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

NETWORK LAB

Socket Programming

- TCP Sockets
- UDP Sockets
- Iterative File Server
- Concurrent File Server
- Broadcasting
- Multicasting
- Raw Sockets
- Protocols Simulation (ARP/RARP/BOOTP/DHCP/IGMP)
- Case Studies using Network simulator (Qualnet/NS2)

.NET LAB

- Web application using ASP.NET
- Database access using ADO.NET
- XML and .NET
- Web Forms
- Windows Forms
- Building .NET components (ActiveX controls)

SOFTWARE TESTING

- Analyse & Design :UML diagrams
- Testing using Software testing Tools (QTP & Rational Suite)
- Manual & Automated Testing
- Functional & Performance Testing

SOFTWARE REQUIRED

Microsoft Visual Studio .NET, IIS, Linux, HP QTP 9.2, Rational Suite

**09IT86 - WEB PROGRAMMING AND
MULTIMEDIA LABORATORY**

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

WEB PROGRAMMING LAB

Web page designing using

- **Client Side Technologies**
 - HTML
 - Java Script
 - VB Script
 - Cascading Style Sheets
 - Dynamic HTML
 - XML
- **Server Side Technologies**
 - ASP
 - JSP
- Case Studies like On-line Book shop etc...

SOFTWARE REQUIRED

IIS, J2SE 5.0, Tomcat server

MULTIMEDIA LAB

- Text compression algorithms.
- Image compression algorithms.
- Study of multimedia tools like Photoshop, Flash, Maya, Adobe premier etc.
- Text editing, image editing, Modeling, Animation, Morphing, using multimedia tools.
- Case studies using multimedia tools.

TOOLS REQUIRED

Adobe Photoshop, Macromedia Flash, Maya, Adobe premier etc.

DYNAMIC PROGRAMMING

Characteristic features, functions, equations -Analysis -Computational procedures for solution. (6)

REPLACEMENT

Individual replacement Policy: Basic concept Money Value, Present worth factor (pwf) and Discount Rate. (7)

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOK

- 1 Dharani Venkatakrishnan, "Operations Research –Principles and Problems", Keerthi Publication, 2004.

REFERENCE BOOKS

1. Sasieni, Yaspan and Friedman, "Operation Research -Methods and Problems", John Wiley, 2004
2. Hamdy A. Taha, "Operations Research", Pearson Education, 2004.
3. Hillier & Liebermann, "Operations Research- An Introduction", Tata McGraw Hill, 2004.
4. Kalyanmoy Deb, "Optimization for Engineering Design-Algorithm and Examples", Prentice Hall of India, 2004.

09IT55 - SOFTWARE ENGINEERING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the software engineering principles and industry practices for planning, design, development and testing of quality software.

EXPECTED OUTCOME

The students shall obtain the necessary skills to prepare requirements specification, design documents and to develop and test the software. In addition, the students shall get the exposure to basic project planning and monitoring activities.

INTRODUCTION

The Problem Domain – Software Engineering Challenges – Software Engineering Approach, The Software Processes: Software Process – Desired Characteristics of Software Process – Software Development Process Models-Requirements Change Management Process (10)

SOFTWARE REQUIREMENTS AND ARCHITECTURE

Software Requirement Analysis and Specification: Software Requirements – Problem Analysis - Informal approach - Data flow modeling - Requirements Specification – Functional Specification with Use Cases - Basics - Examples - Developing use cases - Validation – Metrics.

Software Architecture: Role of Software Architecture – Architecture Views – Component and Connector View – Architecture Styles for C&C View-Pipe & Filter, Shared Data and Client Server styles. (9)

SOFTWARE DESIGN

Function Oriented Design: Design Principles – Module Level Concepts – Design Notation and Specification – Structured Design Methodology – verification - Metrics

Signatures – Authentication Protocols – Digital Signature Standard. (10)

AUTHENTICATION APPLICATIONS

Kerberos – X.509 Authentication Service – Public–Key Infrastructure. ELECTRONIC MAIL SECURITY: PGP – S/MIME. IP Security – Web Security. (8)

INTRUDERS

Intruders – Intrusion detection – Password Management. MALICIOUS SOFTWARE: Viruses and Related Threats – Virus Counter measures – Distributed DoS attacks. FIREWALLS: Firewall Design Principles – Trusted Systems. (8)

Total : 45

TEXT BOOK

1. William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, Fourth Edition, 2006.

REFERENCE BOOKS

1. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Pearson Education, Fourth Edition, 2007.
2. Atul Kahate, “Cryptography and Network Security”, Tata McGraw–Hill, Second Edition, 2008.
3. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001.
4. Chris Brenton, “Mastering Network Security”, BPB Publication, New Delhi, 2002.

09IT83 - CRYPTOGRAPHY AND NETWORK SECURITY

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the basics of network security, mechanisms, algorithms, cryptography standards, authentication mechanism and its applications, malicious software and firewalls.

EXPECTED OUTCOME

Upon completion of this course, students will be able to understand the generic security threats and vulnerabilities, the basic components of computer security, identify and analyze security issues, security protocols, usage of cryptography and implementation of security mechanisms.

INTRODUCTION

OSI Security Architecture – Security Attacks – Security Services – Security Mechanisms. CLASSICAL ENCRYPTION TECHNIQUES: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques. BLOCK CIPHER: Cipher Principles – Modes of Operation – Data Encryption Standard – Strength of DES – Triple DES – ADVANCED ENCRYPTION STANDARD: Evaluation criteria for AES – AES Cipher. **(10)**

PUBLIC KEY CRYPTOGRAPHY

Principles of Public-key Cryptosystem – RSA. KEY MANAGEMENT: Key Management – Diffie-Hellman Key Exchange. PUBLIC-KEY CRYPTOSYSTEMS: Elliptic Curve Arithmetic – Elliptic Curve Cryptography. **(9)**

AUTHENTICATION AND HASH FUNCTION

Authentication requirements – Authentication functions – Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs – Secure Hash Algorithm – Digital

Object Oriented Design: OO Analysis and OO Design – OO Concepts Design Concepts –Unified Modelling Language Detailed Design: Detailed Design and PDL– Verification–Metrics. **(11)**

CODING AND TESTING

Programming Principles and Guidelines – Coding Process – Verification: code inspections – static analysis – Metrics. Testing Fundamentals – Black-Box Testing: Equivalence class partitioning – Boundary value analysis – Cause Effect graphing – state based testing – White-Box Testing : control flow based criteria – data flow based testing–example – Mutation testing-Testing Process – Defect Analysis and Prevention **(10)**

PLANNING A SOFTWARE PROJECT

Process Planning - Effort Estimation –COCOMO and Function Points– Project Scheduling and Staffing – Software Configuration Management Plan – Quality Plan – Risk management-Project monitoring plan. **(8)**

Total : 48

TEXT BOOK

1. Pankaj Jalote, “An Integrated Approach to Software Engineering”, Narosa Publishing House, Third Edition, 2009, Reprint.

REFERENCE BOOKS

1. Roger.S.Pressman “Software Engineering A Practitioner’s Approach”, McGraw Hill International Edition, Seventh Edition, 2009.
2. Ian Sommerville, “Software Engineering”, Dorling Kindersley (India) Private Ltd., Eighth Edition, 2008.

09IT56 - DATABASE MANAGEMENT SYSTEMS

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To learn the basic concepts and importance of databases, E-R and relational modeling, Relational database design and querying, Storage systems and its structures, Transaction Processing and recovery.

EXPECTED OUTCOME

At the end of the course students shall obtain the fundamental knowledge on different data models, database design, Structured Query Language, storage and transaction management features.

INTRODUCTION

Purpose of DBMS - Applications – Views of data – Data Abstraction – Instances and Schemas - Data Models – Database Languages – Relational Databases – Database Architecture – Database users and administrators – History of Database systems . Entity – Relationship (E-R) Model: Basic concepts – Constraints – E-R Diagram –Weak Entity Sets – Reduction of Relational schemas. **(9)**

RELATIONAL MODEL

Structure of Relational Databases – Relational Algebra Fundamentals - Additional and extended relational algebra operations - Null values – Modification of Database.SQL: Basic Structure – Set operations – Aggregate functions - Nested Sub queries – Complex queries - Views – Modification of the database – Integrity constraints –Referential Integrity - Triggers – Assertions – Embedded SQL. **(12)**

DATABASE DESIGN

Features of good relational design –Atomic domains and First Normal Form - Decomposition using Functional Dependencies – Functional

Transportation-Transportation modes-design options- Routing and scheduling, Pricing and revenue management

COORDINATION IN SUPPLY CHAIN

Bullwhip effect-obstacles to coordination-building strategic partnerships and trust within supply chain **(9)**

TECHNOLOGY IN SUPPLY CHAIN

Role of Information Technology- supply chain IT framework- management of customer relationship - supplier relationship-Transaction management foundation-future of IT in supply chain- E-Business and supply chain : Role-E-Business framework-The B2BAddition, Supply chain and E-Commerce - RFID in SCM **(9)**

Total : 45

TEXT BOOK

1. Sunil Chopra & Peter Meindl, “Supply Chain Management Strategy, Planning and Operation”, Prentice Hall, Fourth Edition, 2009.

REFERENCE BOOK

1. Sahay B.S., “Emerging Issues in Supply Chain Management”, Macmillan India Ltd, I Edition, 2004.

09IT82 - SUPPLY CHAIN MANAGEMENT

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the concept of supply chain, planning & design of supply chain networks, recent technologies and implementation aspects.

EXPECTED OUTCOME

At the end of the course the students shall obtain practical insight in to the supply chain management technology and role of frameworks, managing the supply, sourcing and pricing aspects.

UNDERSTANDING SUPPLY CHAIN

Design phases-process view, Supply Chain performance: strategies-achieving strategic fit, Supply Chain Drivers and Obstacles: drivers-framework for structuring drivers-obstacles to achieving strategic fit
(9)

DESIGNING THE SUPPLY CHAIN NETWORK

Distribution Network-role-influencing factors-design options, Network Design-role-influencing factors-framework-models for facility location and capacity allocation.
(9)

PLANNING DEMAND AND SUPPLY IN A SUPPLY CHAIN

Demand Forecasting- characteristics-forecasting methods- forecast error measures, aggregate planning- planning problems- strategies, Managing Predictable Variability-managing supply and demand- implementing solutions.
(9)

SOURCING, TRANSPORTING AND PRICING PRODUCTS

Sourcing decisions-Sourcing related processes: supplier scoring and selection - procurement process- making sourcing decisions,

Dependency theory – Normalization using Functional Dependencies – Decomposition using Multi-valued Dependencies.
(7)

TRANSACTION MANAGEMENT

Transaction Concepts and States –Concurrent Executions – Serializability.Concurrency control: Lock Based Protocols: Locks, Granting of Locks, 2-phase locking protocol – Timestamp Based Protocols – Validation based protocols – Deadlock Handling.
(8)

STORAGE

RAID, Indexing and Hashing: Basic concepts – Ordered Indices – B+ tree Index Files: Structure of B+ Tree, Queries in B+ Tree, and Updates on B+ Tree. Recovery Systems: Failure classification - Log based Recovery - Recovery with concurrent Transactions.
(9)

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOK

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Tata McGraw Hill, Sixth Edition, 2010.

REFERENCE BOOKS

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Pearson Education, Sixth Edition, 2008.
2. Raghu Ramakrishnan, "Database Management Systems", McGraw Hill, Third Edition, 2009.
3. Peter Rob and Corlos Coronel, "Database Systems: Design, Implementation and Management, "Thompson Learning Course Technology, Fifth Edition, 2008.

09IT61 - HIGH SPEED NETWORKS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To provide an understanding of the architecture, protocols and applications of high speed networking technologies.

EXPECTED OUTCOME

At the end of the course, students will understand the protocols and layered architecture of ISDN, BISDN, ATM and Wireless LAN.

HIGH SPEED LANS

Fast Ethernet, Gigabit Ethernet – FDDI, SONET / SDH: Frame Structure, Architecture Layers – Frame Relay: Protocols and Services, Congestion Control. (8)

ISDN

Overview, Standards, Interfaces and functions, ISDN Layers: Physical, Data link, Network - Services, SS23- Architecture – B-ISDN Architecture and Protocols. (10)

ATM NETWORKS

Protocol Architecture, ATM Layer, Cell Structure, Cell Header, ATM Adaptation Layer, Various types, Segmentation and Reassembly, Convergence sub-layers. (9)

ATM TRAFFIC AND CONGESTION CONTROL

Service Categories, Traffic Related Attributes, Traffic Management Framework, Traffic Management, ABR Traffic Management, Signaling, Protocol Signaling, Meta Signaling, TCP/IP over ATM. (9)

MOBILE OPERATING SYSTEMS & APPLICATION LANGUAGES

Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices.XML, Java, J2ME and Java Card. (9)

MOBILE INTERNET

The WAP Architecture, Wireless Application Environment, Wireless Markup Language, WAP Binary XML Content Format, WAP Gateway, Wireless Gateway, Transcoding, Info Pyramid Framework, ProxiNet Transcoding Gateway. (9)

Total : 45

TEXT BOOK

1. Raj Kamal, "Mobile Computing", Oxford University Press, New Delhi, 2008.

REFERENCE BOOKS

1. Stojmenovic and Cacute, "HandBook of Wireless Networks and Mobile Computing", Wiley, 2006.
2. Reza Behravanfon, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML & XML", Cambridge University Press, 2004.

09IT81 - MOBILE COMPUTING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the fundamental principles of mobile computing, mobile networks and to develop mobile applications.

EXPECTED OUTCOME

At the end of the course, students shall learn the architecture of mobile network, cellular systems, mobile operating systems and application languages.

INTRODUCTION

Mobile Communication, Mobile Computing, Mobile Computing Architecture, Mobile Devices, Mobile System Networks, Data Dissemination, Mobility Management, Security. Introduction to Cellular Systems, Global System for Mobile Communication (GSM), General Packet Radio Services (GPRS) and their architectures. (9)

MOBILE IP NETWORK LAYER

Mobile IP Protocol Overview, Route Optimization, Mobility support for IPV6, Connectivity with 3G Networks, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, Dynamic Host Control protocol. (9)

DATA SYNCHRONIZATION

Synchronization, Synchronization software, Synchronization Protocols, SyncML – Synchronization Language for Mobile Computing, Synchronized Multimedia markup Language. (9)

WIRELESS LAN

IEEE 802.11 Wireless LAN Standards: Architecture and Services –MAC Physical Layer. IEEE 802.16 Architecture – MAC Layer – Physical Layer. (9)

Total : 45

TEXT BOOKS

1. William Stallings, "ISDN and Broadband ISDN with Frame Relay and ATM", Pearson Education, Fourth Edition, 2000.
2. William Stallings, "Wireless Communications and Networking", Prentice Hall of India, Second Edition, 2009.

REFERENCE BOOKS

1. Jochen Schiller, "Mobile Communication", Pearson Education Asia Ltd, Second Edition, 2008.
2. William Stallings, "High Speed Networks and Internet", Pearson Education, Second Edition, 2002.
3. Warland and Pravin Varaiya, "High Performance Communication Networks", Jean Harcount Asia Pvt. Ltd., Second Edition, 2001.

**09IT62 - SOFTWARE TESTING AND PROJECT
MANAGEMENT**

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the importance of software testing as a process and to learn the various testing strategies and techniques, to understand the best practices in managing software projects for ensuring quality and customer satisfaction.

EXPECTED OUTCOME

At the end of the course, students shall learn to design effective test cases, understand the importance of test coverage criteria and know how to control the testing process. Students shall also learn to apply the best practices in project planning, Effort/Schedule estimations and in performing Quality Assurance activities.

TESTING AND DEFECTS

Introduction to Testing as an Engineering Activity, Testing Fundamentals, Defects, Hypothesis and Tests. **(4)**

BASIC TEST DESIGN STRATEGIES

Strategies and Methods for Test Case Design I: Introduction - smart tester - Test case design strategies - black box approach - random - equivalence class partitioning - boundary value analysis - other black box test design approaches –COTS - Black box methods and TMM level 2 goals. **(6)**

ADVANCED TEST DESIGN STRATEGIES

Strategies and methods for test case design II - Using White Box Approach to Test Design: Test Adequacy Criteria - Coverage and Control Flow Graphs - Covering Code Logic, Paths, Additional White Box Approaches, White box testing and TMM. **(7)**

WEB BASED APPLICATIONS & ITS TECHNOLOGIES

Rails: Overview of Rails – Document request- Processing forms - Rails application with databases – Layouts-Ajax: Overview of Ajax Rails with Ajax- e-Business Models- e-Marketing-Online payments-Security.**(10)**

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Deitel & Deitel, "Internet & World Wide Web- How to Program", Pearson Education, Fourth Edition, 2007.
2. Rashim Mogha, Preetham.V.V. "Java Web Services Programming", Wiley Dreamtech, New Delhi, Paperback (Series) 2003.

REFERENCE BOOKS

1. Robert W.Sebesta, "Programming with World Wide Web", Pearson Education, Fifth Edition, 2009.
2. Scot Johnson, Keith Ballinger, Davis Howard Chapman, "Special Edition Using Active Server pages", Prentice Hall of India, Paperback 1999.
3. Ravi Kalakota and Andrew B Whinston, "Frontiers of E-Commerce", Addison Wesley, Paperback 1999.

09IT73 - WEB TECHNOLOGY

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To understand the basics of internet, scripting languages, data exchange using XML, web services, deployment of applications in J2EE servers and emerging technologies.

EXPECTED OUTCOME

At the end of the course, students will gain in-depth knowledge in web services, Java enabled web services and web based applications.

INTRODUCTION

Internet Principles- Basic Web Concepts- Client/Server model- Retrieving data from Internet-HTML and Scripting Languages-PERL-DHTML-Standard Generalized Markup Language-HTML forms- Introduction to CGI concepts. (14)

INTRODUCTION WEB SERVICES

Web Services Architecture-Overview of Web Services-Service oriented roles and architecture-Architectural process-Three tier web based architecture. (12)

XML

Introduction to XML-XML fundamentals-well-formed XML documents-components of XML document-XML tools-XML Namespaces-XML Vocabularies- Document Object Model (DOM) –Simple API for XML (SAX)- Extensible Style Sheet Language (XSL). (12)

JAVA WEBSERVICES ARCHITECTURE

Introduction to JSP and Java Servlets-System Architecture-Servlets- Overview of JavaServer pages-JSP lifecycle - JSP components – Implicit objects - J2EE and Web Services. (12)

LEVELS OF TESTING

Levels of Testing, Testing Goals, policies, plans & documentation - Introductory concepts - Testing/debugging goals and policies - test planning - Reporting test results -Role of three critical groups.

(5)

CONTROLLING, MONITORING AND REVIEWS

Controlling and Monitoring the Testing Process: Defining terms - Measurements and Milestones for controlling and monitoring - Criteria for Test Completion - Three critical views. Review as a Testing Activity: Expanding the testing activity umbrella, types of Reviews - Inspection and walkthroughs, Review Metrics. (8)

PROJECT PLANNING AND CONTROLLING

Managing the Software Projects, Project Planning Infrastructure, Process Planning, Effort Estimation & Scheduling, Quality Planning, Measurement & tracking Planning, Risk Management, Project Management Plan and Configuration Management. (11)

PROJECT EXECUTION AND CLOSURE

Reviews, Project Monitoring and Control, Project Closure. (7)

Total : 48

TEXT BOOKS

1. I lene Burnstein, "Practical Software Testing", Springer International Edition, 2009, Reprint.
2. Pankaj Jalote, "Software Project Management in Practice", Pearson Education Inc, 2002, Eighth Impression, 2009.

REFERENCE BOOKS

1. Kathy Schwalbe, "Information Technology Project Management", Thomson Learning Series, Fifth Edition, 2007.
2. Hughes and Cottrell, "Software Project Management", Tata McGraw Hill, Third Edition, 2004.

**09IT63 - DATAMINING AND DATA
WAREHOUSING**

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the basic concepts of data warehousing, data mining and the various data mining functionalities and related algorithms.

EXPECTED OUTCOME

At the end of the course, the students should have learnt the different data mining tasks, data warehousing and application oriented data mining concepts.

DATA MINING

Importance of data mining – Definition of data mining – Kinds of data – Data mining functionalities – Classification of data mining systems – Data mining task primitives – Integration of data mining system with a database/data warehouse system Major issues. **(8)**

DATA WAREHOUSE

Definition – A multidimensional data model – Data warehouse architecture – Data warehouse implementation – From data warehousing to data mining. **(9)**

ASSOCIATION RULES

Definition – Apriori algorithm – Partitioning algorithm – Pincer search – Dynamic item set counting Algorithm– FP tree algorithm – Discussion on different algorithms – Incremental algorithm – Border algorithm. **(10)**

CLUSTERING AND CLASSIFICATION

Cluster analysis – Types of data – Categorization of major clustering methods – Partitioning – K-Means and K-Medoid algorithm – CLARA – CLARANS – Hierarchical clustering – BIRCH – Density based clustering – DBSCAN – Decision tree – Issues regarding classification and

REFERENCE BOOKS

1. Simon Haykins, "Digital Communications", John Wiley & Sons, 2003.
2. Ranjan Bose, "Information Theory Coding and Cryptography", Tata McGraw Hill, Second Edition, 2008.
3. Fazlollah M.Reza, "An Introduction to Information Theory", Tata McGraw Hill, 2002.
4. Thomas M. Cover and Joy A. Thomas, "Elements of Information Theory", John Wiley & Sons, Second Edition, 2006.

SPEECH CODING

Coding of speech signals at low bit rates - Adaptive Differential Pulse Code modulation – Adaptive Sub band coding - Delta Modulation – Adaptive Delta modulation - Application of speech coding - G.722. **(7)**

TEXT AND IMAGE COMPRESSION TECHNIQUES

Compression principles – *Text Compression*: Static and Dynamic Huffman coding – Arithmetic coding – Lempel-Ziv coding - Lempel-Ziv-Welsh coding. *Image Compression*: Graphics Interchange format – Tagged Image file format – Digitized documents – Digitized pictures – Introduction to Joint Photographic Experts Group standards. **(9)**

AUDIO AND VIDEO COMPRESSION TECHNIQUES

Audio Compression: Linear Predictive coding - Code excited LPC - Perceptual coding – MPEG audio coders – Dolby audio coders. *Video Compression*: Video Compression principles – Introduction to MPEG and H.261 – Introduction to DVI Technology – Introduction to Motion video compression and DVI real time compression. **(10)**

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Roberto Togneri and Christopher J.S. DeSilva, "Fundamentals of Information Theory and Coding design", CRC Press, 2003.
2. Fred Halsall, "Multimedia Communications", Pearson Education, 2002.

prediction – Classification by decision tree induction. **(10)**

ADVANCED CONCEPTS

Introduction to complex data objects – Spatial data mining – Multimedia data mining – Text mining – Web mining. **(8)**

Total : 45

TEXT BOOKS

1. Jiawei han, Micheline Kamber, "Data Mining: Concepts and Techniques", Motgan Kaufmann Publishers, Second Edition, 2006
2. Arun K Pujari, "Data Mining Techniques", Universities Press India Ltd., 2001. (Association Rule Mining)

REFERENCE BOOKS

1. Dunham, "Data Mining- Introductory and Advanced Topics", Pearson Education, New Delhi, First Edition, 2008.
2. George M. Marakas , " Modern Data Warehousing, Mining, & Visualization Core Concepts" , Pearson Education, First Edition, 2003
3. Paulraj Ponnaiah, "Data Warehousing Fundamentals", Wiley Publishers, Singapore, First Edition, 2001.

09IT64 - MULTIMEDIA SYSTEMS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the basics of multimedia concepts, multimedia tools, various compression techniques, multimedia operating systems, communication system and applications.

EXPECTED OUTCOME

The students shall be able to apply the different compression techniques in various multimedia applications and learn to use different multimedia tools.

INTRODUCTION

Elements of multimedia system – Need and aspects of multimedia - Information units- Sound - Audio file formats – MIDI – Images - Computer Image Processing - Principles of animation - Animation techniques - Creating animated scenes – Video - Basic concepts - Video Capture - Recording format - Storage for multimedia - CD Technologies - Multimedia Workstations. (12)

MULTIMEDIA TOOLS

Basic tools - Image-editing tool - Painting and drawing tools –Sound editing programs - Video formats - Linking multimedia objects – OLE – Presentation tools - authoring tools. (7)

COMPRESSION AND DECOMPRESSION

The need for Data Compression – Types – Binary image compression schemes – Color, Gray scale, Still video Image Compression – Video Image Compression – Audio Compression. (9)

MULTIMEDIA OPERATING SYSTEMS

Introduction - Real Time - Resource Management - Process Management - File Systems. Database Systems : Multimedia Database

09IT72 - INFORMATION CODING TECHNIQUES

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To introduce the fundamental concepts of information theory: data compaction, data compression, data transmission, error detection and correction.

EXPECTED OUTCOME

Upon successful completion of the course the students should have understood the fundamentals of information entropy and should be able to encode and decode digital data streams with the methods learnt along with error-control coding techniques. The students should have acquired knowledge on compression, decompression techniques and multimedia communication.

INFORMATION THEORY FUNDAMENTALS

Source Coding: Uncertainty, Information and Entropy – Mutual Information – Source Coding Theorem - Entropy Coding: Huffman Coding – Shannon-Fano Coding. (9)

Channel Coding: Channel models – Channel capacity – Channel Coding Theorem – Channel Capacity Theorem. (9)

ERROR CONTROL CODING TECHNIQUES

Rationale for coding – Types of codes. Linear block codes for error correction: Matrix description of linear block codes – Syndrome decoding - Minimum distance consideration. Cyclic codes: Generator polynomial - Parity check polynomial - Encoder of cyclic codes - Calculation of syndrome - Important cyclic codes: BCH, RS and Golay codes. Convolutional codes: Tree codes - Trellis codes – Viterbi decoding of convolutional codes – Sequential decoding. (10)

HUMAN RESOURCE MANAGEMENT

Principles of Management, Evolution of Management, Development of Managerial Skills – Human Resource Management – Importance – Objectives – Job Analysis – Recruitment – Selection and Placement and Training Development. (9)

MARKETING AND INSURANCE

Marketing – Definition , Aims, Need for Marketing – Marketing function - Marketing management and its functions – Marketing versus Selling - Concept of Insurance – Life Insurance, Fire Insurance, Marine Insurance. (9)

Total : 45

TEXT BOOK

1. Mehta P.L., 'Managerial Economics', S.Chand & Co, 2007.

REFERENCE BOOKS

1. Varshney, R.L and Maheswari, K.L, 'Managerial Economics', S.Chand & Co, 2007.
2. Khanna O.P., 'Industrial Engineering and Management', Dhanpat Rai Publication (P) Ltd-2006.

Management System - Characteristics of an MDBMS - Data Analysis - Data Structure - Operations on Data - Integration in a Database Model.

(8)

MULTIMEDIA COMMUNICATION SYSTEMS AND APPLICATION

Application Subsystem - Transport Subsystem. Synchronization: Introduction - Notion of Synchronization - Presentation Requirements - A Reference Model for Multimedia Synchronization: Synchronization in distributed environment. Video conferencing - Tele conferencing. (9)

Total : 45

TEXT BOOKS

1. Ralf Steinmetz, Klara Nahrstedt, "Multimedia: Computing, Communications and Applications", Pearson Education Limited, 2007.
2. Prabhat K Andleigh and Kiran Thakrar, "Multimedia Systems Design", Prentice Hall of India, Reprint, 2004.

REFERENCE BOOKS

1. Tay Vaughan, "Multimedia: Making it Work", McGraw-Hill Osborne Media, Seventh Edition, 2006.
2. Fred Halsall, "Multimedia Communication, Application Networks, Protocols and Standard", Pearson Education Limited, Fourth Edition, 2001.
3. John F.Koegal Buford, "Multimedia Systems", Pearson Education Limited, 2001.
4. Ron, Goldberg, "Multimedia Producer's Bible", Comdex Computer Publishing, New Delhi, Fifth Edition, 1996.

09IT65 - DIGITAL SIGNAL PROCESSING

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVES

To study in detail about the properties and analysis of Discrete Time Systems, Fourier Transform, design of Digital Filters, Effect of finite register length in Digital filters and multirate signal processing

EXPECTED OUTCOME

Upon complete learning of the subject, the students will be able to know the basic concepts of discrete time systems, design of digital filters and about the multirate signal processing and its applications.

DISCRETE TIME SYSTEMS

Properties of Discrete Time systems – Linearity – Shift Invariance – Causality & Stability Analysis of Linear time invariant systems - Difference Equations, Implementation of Discrete Time Systems, z-transform and inverse z-transform – Analysis of Linear Time Invariant Systems in z Domain, Frequency domain Response Discrete Time Systems. (9)

DISCRETE FOURIER TRANSFORM

Discrete Fourier Transform - Properties of the DFT – Digital filtering method using DFT – Linear and Circular Convolution, Overlap add and Overlap Save method- Fast Fourier Transform - Radix-2 FFT – properties – decimation in time – decimation in frequency – data shuffling and bit reversal – computation of IDFT using direct DFT. (9)

DIGITAL FILTERS

Approximation of analog filters – Design of Butterworth and Chebyshev filters– frequency transformation – properties of IIR filters – IIR filter design – Bilinear transformation and Impulse variation method – digital

09IT71 - INDUSTRIAL ECONOMICS AND MANAGEMENT

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

Industrial economics is a study of the basic economic principles governing individual and business decisions. It examines the firm specific supply and individual consumer demand, cost-benefit analysis, the theory of competitive equilibrium and price determination in various alternative market structures.

EXPECTED OUTCOME

The learners have a sound understanding of the determinants of market supply and demand, the process of obtaining market equilibrium in competitive market and how prices are determined in various other market structures which in turn comprehend the basic pricing strategies and principles.

ECONOMICS

Definition – Relationship between Economics and Engineering – Demand Analysis and Supply Analysis, Elasticity of Demand and Supply – Cost of Production – Break-even Analysis – Pricing under perfect competition, monopoly and monopolistic market. (9)

INDUSTRIAL FINANCE AND ACCOUNTING

The need for Finance, Types of Finance – Sources of Finance – Contribution of various sources of Finance in Indian Situation-stock exchange. (9)

MONEY AND EMPLOYMENT

Estimation of National Income, Methods and Problems – Inflation and Deflation –Unemployment – Money and Changes in Value of Money, Commercial Banks, Central Banking – New Economic Environment – Privatisation, Liberalisation and Globalisation – Importance of Patent Rights. (9)

- Creating simple SDI and MDI applications
- Adding Menus and Tool bars in the application
- Working with MFC
- Creating DLLs and Active X controls
- Data access through ODBC

transformation – characteristics of FIR filters – frequency response of Linear phase FIR filters – Design of FIR filters – Fourier series method – Window functions. Recursive, Non recursive filters – Digital filter realization – Direct, canonic, cascade, parallel and ladder realizations.

(10)

EFFECTS OF FINITE REGISTER LENGTH

Effect of number representation of Quantization – Product Quantization – Coefficient Quantization - Limit cycle Oscillations – Signal scaling – Finite Register length effects in FIR, IIR filters and in DFT computations.

(8)

MULTIRATE DIGITAL SIGNAL PROCESSING

Decimation - Interpolation – Sampling rate Conversion by a Rational factor - Filter design and Implementation for Sampling rate conversion – Multistage Implementation of sampling rate conversion - Application to sub band coding - Quadrature Mirror filter banks.

(9)

Theory : 45

Tutorial : 15

Total : 60

TEXTBOOKS

1. Ludeman L C, "Fundamentals of Digital Signal Processing", John Wiley, Singapore, 1992.
2. Sanjit. K. Mitra, "Digital Signal Processing – a Computer Based Approach", Tata McGraw Hill, Second Edition, 2005.

REFERENCE BOOKS

1. Ifeacher E.C. & Jervis B.W., Digital Signal Processing, A Practical Approach, Pearson Education, Second Edition, 2002.

2. Oppenheim A.V., Schafer R.W. & Buck J.R., "Discrete - Time Signal Processing", Prentice Hall Signal Processing Series, Second Edition, 1999.
3. J.G. Proakis, D.G Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", Prentice Hall of India, Third Edition, 1996.
4. Vinay K Ingle & John Proakis, Digital Signal Processing using Matlab", Brooks / Cole, Second Edition, 2006.

09IT68 - DBMS AND VISUAL PROGRAMMING LABORATORY

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

DBMS LAB

- Database creation, insertion and select queries
- Aggregate functions
- Sub queries and joins
- Group by clause and DATE functions
- Views and Triggers
- PL/SQL Procedures
- Exception handling in PL/SQL blocks
- Using Cursors and functions in PL/SQL blocks
- VB form design
- Database connectivity(ODBC)
- Mini project

VISUAL PROGRAMMING LAB

VISUAL BASIC

- Designing forms using basic tools
- Adding menus to forms and Creating dialog boxes
- Database connectivity (ODBC , ADO, DAO)
- Designing forms using Active X controls and Active X EXE
- Case study

VISUAL C++

- Creating applications with App wizard.
- Writing code for keyboard and mouse events.
- Dialog Based applications

4. Simulating UNIX commands like ls, grep, comp,diff etc
5. Process Scheduling - FCFS , SJF, Priority and Round robin.
6. Implementation of Inter-process Communication
7. Synchronization using semaphores.
8. Implement some memory management schemes – first fit, Best fit, worst fit

09IT66 - DISTRIBUTED SYSTEMS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the distributed system architecture and concepts like communication, naming, consistency, replication and Fault tolerance.

EXPECTED OUTCOME

At the end of the course, students will gain knowledge on architecture of Distributed system, processes, communication mechanisms, naming, synchronization, consistency, replication and Fault tolerance.

INTRODUCTION

Definition - Goals: Making Resources Accessible - Distribution Transparency-Openness - Scalability - Pitfalls. Types of a Distributed Systems: Distributed Computing Systems - Distributed Information Systems - Distributed Pervasive Systems. Architectures: Centralized Architecture - Decentralized Architectures - Hybrid Architectures, Architectures versus middleware. **(10)**

PROCESSES & COMMUNICATION

Threads - Virtualization - Clients - Servers - Code migration. Communication: Remote procedure call - Message-oriented communication - Stream-oriented communication - Multicast communication. **(8)**

NAMING & SYNCHRONIZATION

Names, Identifiers and Addresses - Flat Naming - Structured Naming: Name spaces - Name resolution - The implementation of a name space, Attribute-Based Naming. Synchronization: Clock Synchronization - Logical clocks - Mutual exclusion - Election algorithms. **(10)**

CONSISTENCY & REPLICATION

Data-centric consistency models: Continuous consistency - Consistent ordering of operations. Client-centric consistency models: Eventual consistency - Monotonic Reads - Monotonic Writes - Read your writes - Writes Follow Reads. Replica Management: Replica-Server Placement - Content Replication and Placement - Content Distribution. Consistency protocols: Continuous Consistency - Primary-Based Protocols - Replicated-Write Protocols - Cache-Coherence Protocols - Implementing Client - Centric Consistency. (8)

FAULT TOLERANCE

Process resilience: Design issues – Failure masking and replication – Agreement in Faulty systems – Failure detection. Reliable client-server communication: Point-to-point communication – RPC semantics in the presence of failures. Reliable group communication: Basic reliable multicasting schemes – Scalability in reliable multicasting – Atomic multicast. Distributed commit: Two-phase commit – Three-phase commit. Recovery: Introduction – Checkpointing – Message logging – Recovery-orienting computing. Introduction to Security. (9)

Total : 45

TEXT BOOK

1. Andrew S. Tanenbaum & Maarten Van Steen, "Distributed Systems: Principles and Paradigms", Prentice Hall of India, Second Edition, 2008.

REFERENCE BOOKS

1. George Coulouris, et al, "Distributed Systems: Concepts and Design", Addison Wesley, Fourth Edition, 2009.
2. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, New Delhi, 2004.
3. Mukesh Singhal and Shivratri, "Advanced Concepts in Operating Systems", Mc Graw Hill Publishing Company, New Delhi, 2000.

09IT67 - COMMUNICATION AND SYSTEMS LABORATORY

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

COMMUNICATION LAB

- Amplitude modulator and demodulator
- FM and FSK modulator
- Pulse Amplitude modulation and demodulation
- PWM, PPM Modulation and demodulation
- Time Division Multiplexing and demultiplexing
- Delta modulator and demodulator
- Adaptive Delta modulation and demodulation
- Binary Phase Shift Keying modulator and demodulator
- Amplitude Shift Keying modulator and demodulator
- VCO and Frequency Divider

SYSTEMS LAB

1. Shell programming
 - command syntax
 - write simple functions
 - basic tests
 - loops
 - patterns
 - expansions
 - substitutions
2. System calls - fork, exec, getpid, exit, wait, close, stat, opendir, readdir
3. I/O system calls -open, read, write, etc