

B.E. COMPUTER SCIENCE AND ENGINEERING

THIRD TO EIGHT 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.

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, Second Edition, New Delhi 2000.

E-23 - 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 FPGAs

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)

COIMBATORE INSTITUTE OF TECHNOLOGY

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

COIMBATORE – 641 014.

B.E. COMPUTER SCIENCE AND ENGINEERING

SUBJECTS OF STUDY

III Semester

Subject Code	Subject	L	T	P	C
	THEORY				
09CE31	Mathematics - III	3	1	0	4
09CS32	Automata Theory and Discrete Mathematics	3	1	0	4
09CS33	Data Structures and Algorithms - I	3	1	0	4
09CS34	Electrical Machines and Circuit Theory	3	0	0	3
09CS35	Computer Architecture	3	1	0	4
09CS36	Object Oriented Programming using C++ and Java	3	0	0	3
	PRACTICALS				
09CS47	Electrical and Digital Electronics Laboratory	0	0	3	-
09CS48	Data Structures and Algorithms, OOP and Automata Laboratory	0	0	3	-
09CE49	Science of Creativity and Professional Ethics	2	-	-	-
	Total				22

IV Semester

Subject Code	Subject	L	T	P	C
	THEORY				
09CS41	Mathematics - IV	3	1	0	4
09CS42	Engineering Mechanics and Strength of Materials	3	1	0	4
09CS43	Data Structures and Algorithms - II	3	1	0	4
09CS44	Electronic Circuits	3	0	0	3
09CS45	Control Systems	3	1	0	4
09CS46	Principles of Environmental Science and Engineering	3	0	0	3
	PRACTICALS				
09CS47	Electrical and Digital Electronics Laboratory	0	0	3	4
09CS48	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

Subject Code	Subject	L	T	P	C
	THEORY				
09CS51	Operating Systems	3	0	0	3
09CS52	Analog and Digital Communication	3	0	0	3
09CS53	Computer Networks	3	0	0	3
09CS54	Microprocessors and Microcontrollers	3	0	0	3
09CS55	Software Engineering	3	0	0	3
09CS56	Database Management Systems	3	1	0	4
	PRACTICALS				
09CS67	Microprocessor and Embedded Systems laboratory	0	0	3	-
09CS68	DBMS and Systems Laboratory	0	0	3	-
09CS69	Mini Project	0	0	3	-
	Total				19

communication function models structure of SNMP management information-standards. **(10)**

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.

E-22 - 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

VI Semester

Subject Code	Subject	L	T	P	C
	THEORY				
09CS61	High Speed Networks	3	0	0	3
09CS62	Intelligent Agents	3	0	0	3
09CS63	Resource Management Techniques	3	1	0	4
09CS64	UNIX Internals	3	0	0	3
09CS65	Embedded and Real Time Systems	3	0	0	3
09CS66	Distributed Systems	3	0	0	3
	PRACTICALS				
09CS67	Microprocessor and Embedded Systems laboratory	0	0	3	4
09CS68	DBMS and Systems Laboratory	0	0	3	4
09CS69	Mini Project	0	0	3	2
	Total				29

VII Semester

Subject Code	Subject	L	T	P	C
	THEORY				
09CS71	Mobile Computing	3	0	0	3
09CS72	Introduction to Compiler Design	3	1	0	4
09CS73	Web Technology	3	1	0	4
09CS74	Elective - I	3	0	0	3
09CS75	Elective - II	3	0	0	3
	PRACTICALS				
09CS86	Compiler, Web Programming and Multimedia Laboratory	0	0	3	-
09CS87	Networks, Distributed systems and Software Engineering Tools Laboratory	0	0	3	-
09CS88	Project and Viva - Voce	0	0	6	-
	Total				17

VIII Semester

Subject Code	Subject	L	T	P	C
	THEORY				
09EE81	Industrial Economics and Management	3	0	0	3
09CS82	Data Mining and Data Warehousing	3	0	0	3
09CS83	Cryptography and Network Security	3	0	0	3
09CS84	Elective - III	3	0	0	3
09CS85	Elective - IV	3	0	0	3
	PRACTICALS				
09CS86	Compiler, Web Programming and Multimedia Laboratory	0	0	3	4
09CS87	Networks, Distributed systems and Software Engineering Tools Laboratory	0	0	3	4
09CS88	Project and Viva - Voce	0	0	6	6
	Total				29

COMPARISON AND EVALUATION OF ALTERNATIVE SYSTEM DESIGN

Comparison of System Designs – Metamodeling – Optimization via Simulation – Simulation Language: Simgscript – Management of Sets in Simgscript. **(9)**

CASE STUDY

Simulation of Manufacturing and Material Handling Systems: Goals and Performance Measures – Issues – Simulations – Simulation of Computer Systems: Simulation Tools – Model Input – High-level Computer-System Simulation – CPU simulation – Memory Simulation. **(9)**

Total : 45

TEXT BOOK

1. Banks J., Carson J. S., Nelson B. L., and Nicol D. M., "Discrete Event System Simulation", Pearson Education India , Fifth Edition, 2009.

REFERENCE BOOKS

1. Geoffrey Gordon, "System Simulation", Pearson Education India, Second Edition, 2007. (Simgscript)
2. Averill M. Law and W. D. Kelton, "Simulation Modeling and Analysis", McGraw Hill International, Fourth Edition, 2007.

E-21 - SYSTEM MODELING AND SIMULATION

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the concepts of modeling and simulation of systems, its characteristics and limitations and to evaluate the model output, compare alternatives and make appropriate suggestions for the system.

EXPECTED OUTCOME

The students would be able to model and simulate a system and identify its limitations and strengths.

INTRODUCTION TO SIMULATION

Area of application – Systems and Environment – Components of a system – Discrete and Continuous Systems – Models of a system – Discrete–Event System Simulation – Simulation of Inventory System – Advantage and disadvantage of simulation. (6)

RANDOM- NUMBER

Properties – Generation of Pseudo-Random Numbers – Techniques for Generating Random Numbers – Test for Random Numbers – Inverse Transform Technique – Direct Transformation – Convolution Method – Acceptance-Rejection Technique. (12)

ANALYSIS OF SIMULATION DATA

Input Modeling: Data Collection – Identifying the Distribution – Parameter Estimation – Goodness-of-Fit Tests – Selecting Input Models without Data – Multivariate and Time Series Input Models – Verification and Validation of Simulation Models – Output analysis for a Single Model. (9)

LIST OF ELECTIVES

Subject Code	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	Bioinformatics	3	0	0	3
E-4	Customer Relationship Management	3	0	0	3
E-5	Digital Image Processing	3	0	0	3
E-6	Digital Signal Processing	3	0	0	3
E-7	Enterprise Resource Planning	3	0	0	3
E-8	Graphics and Multimedia	3	0	0	3
E-9	Grid Computing	3	0	0	3
E-10	Information Security	3	0	0	3
E-11	Information Storage and Management	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	Software Testing and Project management	3	0	0	3
E-20	Speech and Language Processing	3	0	0	3
E-21	System Modeling and Simulation	3	0	0	3
E-22	TCP/IP and Network Management	3	0	0	3
E-23	VLSI Design	3	0	0	3

Note :

L - Lecture
T - Tutorial

P - Practical
C - Credit

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.

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 Semantic: Word Senses - Relations Between Senses - WordNet:A Database of Lexical Relations - Event Participants - Primitive Decomposition - Advanced:Metaphor. (9)

Total : 45

TEXT BOOK

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

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 variable 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- Parse-val'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 , Third 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.

E-20 - 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)

PHONETICS, SPEECH SYNTHESIS AND AUTOMATIC SPEECH RECOGNITION

Phonetics: Speech Sounds and Phonetic Transcription - Articulatory Phonetics - Phonological Categories and Pronunciation Variation -

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. Ilene 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.

09CS32 - 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 E-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. J.P.Tremblay, R.Manohar, "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.

E-19 - 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)

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.

REFERENCE BOOKS

1. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics : An Applied Introduction", Addison Wesley Publishing Company, Fourth Edition, 2002.
2. Kenneth H. Rosen," Discrete Mathematics and its Applications", Tata McGraw-Hill, Sixth Edition, 2006.
3. J.Martin, "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.

09CS33 - 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 Dequeues - 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)

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

Mobile agent with java: Agent characteristics of java – Aglet model – Aglet package – Anatomy of an Agent – Agent Design Pattern: classification – Master Slave Pattern – Itinerary pattern (9)

Total : 45

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 – Terminology's – 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", Wiley, Second Edition, 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 Rajshekar, "Neral Networks, Fuzzy Logic and Genetic Algorithms-Synthesis and Applications", Prentice Hall of India, 2006

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 - Spanning Trees - Shortest path - 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. Ellis Horowitz, Sartaj Sahni, "Fundamentals of Data Structures in C", Galgotia Publications, 2008.
2. Jean-Paul Tremblay and Paul G. Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill, second edition, 2008.

REFERENCE BOOK

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

09CS34 - ELECTRICAL MACHINES AND CIRCUIT THEORY

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the working principle, characteristics and applications of DC generator, DC motor, alternator, single phase induction motor three phase induction motor and transformer. Electric circuit theory concepts like network theorems, resonance, coupled circuits and transients are also given.

EXPECTED OUTCOME

The students will acquire knowledge in working principles and characteristics of various machines. They will also get a thorough knowledge of electric circuit theory concepts.

DC MACHINES AND TRANSFORMERS

D.C Generator- Constructional details – EMF Equation – Types and Characteristics – D.C. Motors-Principle of Operation – Torque Equation - Types and Characteristics – Applications.

Transformers- Construction and Principle of Operation – EMF Equation – Equivalent circuit – O.C and S.C. tests – Regulation and Efficiency – Autotransformer. (9)

AC MACHINES

Alternator-Types of construction – Operation – EMF Equation – Regulation by load Test – Synchronous Motor- Principle of Operation – Starting – Applications. Three phase Induction Motor- Types of Construction – Principle of Operation – Torque - Slip Characteristics – Applications. Single Phase Induction Motor- Capacitor start and run, Shaded Pole Induction motor- Universal motor. (9)

NETWORK THEOREMS

Superposition theorem – Thevenin's theorem – Norton's theorem - Maximum power transfer theorem – Reciprocity theorem – Compensationtheorem – statement and applications in D.C. Circuits. (8)

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)

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.

RESONANCE AND COUPLED CIRCUITS

Resonance – Series resonance – Resonant frequency – Variation of resistance, inductive and capacitive reactance with frequency – Quality factor – Selectivity – Half power frequencies – Band width. Parallel Resonance – Two branch circuits – Variation of capacitive susceptance, and Inductive susceptance, impedance and current with frequency – Quality factor – Selectivity. Self and mutual Inductance – Co-efficient of coupling – Natural current – Dot rule – Series and Parallel connection of Coupled circuits – Tuned coupled circuits. **(10)**

TRANSIENT ANALYSIS

Transient concepts - Transient response of simple RL, RC and RLC series circuits to step and sinusoidal inputs using Lapalce transform method – Natural frequency and Damping factor. **(9)**

Total : 45

TEXT BOOKS

1. Ashfaq Husain, "Electrical Machines", Dhanpat Rai and Co.(pvt.) Ltd, II edition,2002.
2. Chakrabharthi, "Circuit Theory (Analysis and Synthesis)," Dhanpat Rai and Sons, New Delhi, 2005.

REFERENCE BOOKS

1. Nagrath, I.J., and Kothari, D.P, "Electrical Machines", Tata Mc Graw Hill, 1997.
2. Roy Choudhury, D., "Networks and Systems", Wiley Eastern, New Delhi, 1995.
3. Soni.M.L., Gupta,J.C., and Gupta,P.V., "A Course in Electrical Circuits and Fields", Dhanpat Rai and Sons, New Delhi, 1980.
4. Murthy, K.V., and Kamath, M.S., "Basic Circuit Analysis", Tata McGraw Hill, 1989.

09CS35 - COMPUTER ARCHITECTURE

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To learn the architecture, functions and characteristics of computer systems and to understand the design of various functional units.

EXPECTED OUTCOME

The learners will understand the basic structure and operations of computers and will be able to design the functional units of a basic computer system.

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 Branches and Branch Prediction. Influence on Instruction sets: Addressing modes-

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)

considerations – Robot programming – Path planning – The Robots computer system. **(10)**

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.

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, 2004 (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.

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

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 BOOKS

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.

09CS36 - 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.

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-Naive Bayes classifier-Bayesian Belief networks-EM algorithm. (9)

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 McgrawHill, 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.

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.

09CS41 - MATHEMATICS - IV

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

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 in 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 $y = cz + d$, **(9)**

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)**

$$f = cz^4 + dz + e$$

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 Request Strings-

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.

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, Foutyth Edition, 2007.
3. Kapoor .J.N and Saxena, H.C., “Mathematical Statistics” , S Chand and Company, Twelth Edition, 2003.
4. Grewal, B.S., “Numerical Methods in Science and Engineering”, Khanna Publishers, Foutyth Edition, 2007.
5. Stephen, H and Friedberg, “Linear Algebra”, Prentice Hall of India (PHI), 2003.
6. Trivedi, K.S., “Probability and Statistics with Reliability, Queueing and Computer Science Applications, Prentice-Hall, Inc., Englewood Cliffs, New Jercey, 2003.

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)**

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.

09CS42 - ENGINEERING MECHANICS AND STRENGTH OF MATERIALS

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To introduce the fundamentals of load, application of load, different types of beam and truss and motion of particles.

EXPECTED OUTCOME

The students will understand the basics of stress, strain, bending of beams, kinematics of particles and analysis of plane trusses.

CABLES AND TRUSSES

Analysis of statically determinate plane trusses – method of joints, method of sections – tension coefficient method – analysis of parabolic cables. **(7)**

CONCEPT OF STRESS AND STRAIN

Simple stresses and strains at a point – normal and shear stresses – Hook’s law – Young’s modulus – bars subjected to axial forces – simple problems. Thermal stresses – simple problems. Poisson’s ratio – modulus of rigidity – surface and volume strains – bulk modulus – relation between elastic constants. Simple tension test on mild steel rod - stress – strain diagram – concept of factor of safety and permissible stresses. **(12)**

BEAMS AND BENDING

Types of beams – types of loads and loading diagrams – shear force and bending moment – relationship between loading intensity, shear force and bending moment – shear force and bending moment diagrams for statically determinate beams. **(11)**

TORSION

Torsion of solid and hollow circular shafts – power transmitted through shafts. **(5)**

KINEMATICS AND KINETICS

Kinematics of particles – rectilinear motion – uniform and non-uniform acceleration –projectile motion – kinetics- Newton’s second law – equations of motion – motion of connected bodies (simple problems only). (7)

MECHANISMS

Four bar chain, slider crank. chain and their mechanisms. (3)

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Khurmi, R.S. “Applied Mechanics and Strength of Materials”, S.Chand & Co. New Delhi, 2006.
2. Beer F.P. and Johnson Jr.E.R.”Vector Mechanics for Engineers – Statics and Dynamics”, McGraw Hill, International Edition, 2006.
3. Khurmi, R.S and Gupta J.K. “Theory of Machines” Eurasia Publishing House (Pvt.) Ltd., New Delhi, 2007.

REFERENCE BOOKS

1. Rajasekaran, S., Sankarasubramaniam, G.”Fundamentals of Engineering Mechanics”, Vikas publishing House Private Ltd., 2007.
2. Palanichamy, M.S. Nagan, S. “Engineering Mechanics – Statics and Dynamics’, Tata McGraw Hill, 2006.
3. Ramamrutham, S. and Narayan, R. “Strength of Materials”, Dhanpat Rai Publishing & Co., New Delhi, 2007.46

E-11 - 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:** Component 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 Area Networks:**

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 Breithanpt," Information Security - Principles & Practices", Pearson Education, 2007.

09CS43 - DATA STRUCTURES AND ALGORITHMS - II

ASSESSMENT : THEORY

L	T	P	C
3	1	0	4

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 Tries – Hash table methods: Introduction, Hashing functions, Hashing methods, Collision resolution techniques - Red Black trees - Time complexity for searching algorithms. **(10)**

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, 2nd 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.

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

E-10 - 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)**

09CS44 - ELECTRONIC CIRCUITS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To have a detailed study of semiconductor diodes, junction transistors, field effect transistors, transistor amplifiers, oscillators and special semiconductor devices.

EXPECTED OUTCOME

Upon completion of this syllabus, learners will be able to understand the basics of semi conductor devices, transistors and electronic circuits.

SEMICONDUCTOR DIODES

Open circuited PN Junction – Voltage current relation of PN Diode – Transition and diffusion capacitance – Diode characteristics – Junction diode switching times – Zener diode – Half Wave and full wave rectifiers – Peak, rms and average values of current and voltages – Ripple factor – Transformer utilization factor – Transformer requirements – Filters – Clipping and comparator circuits **(10)**

JUNCTION TRANSISTORS

Operation and internal behavior of bipolar transistors , transistor current components – Emitter injection efficiency – Base transport factor – Collector efficiency -Large signal current gain – Continuity equation – Eber's Moll equation – Transistor alpha – Static characteristics of transistor – CE,CB & CC operation & characteristics of JFET , Enhancement MOSFET ,Depletion MOSFET, UJT & SCR **(10)**

TRANSISTOR BIASING & STABILISATION

Operating point – Stability factor – Collector to base bias – Self bias – Need for bias stabilisation – Stability against variation in I_{co} , β and V_{be} –

Stability factor S – General remarks on biasing circuits – Bias compensation – Biasing FET & MOSFET **(8)**

SMALL SIGNAL AMPLIFIERS

Hybrid parameters – Transistor hybrid equivalent circuit – Approximate model at low frequencies – High frequency effects and hybrid model – Small signal amplifiers – Generalised analysis of transistor and FET Amplifiers – Cascaded amplifiers – Direct coupled and differential amplifiers – Operational amplifiers – Characteristics – Simple applications like scale changer, sign changer, summer, integrator, differentiator, voltage follower. **(10)**

OSCILLATORS

Effect of feedback on input impedance, output impedance, gain, noise and stability – Series and shunt feedback – Voltage feedback and current feedback – Hartley, Colpitts, RC phase shift, crystal, UJT oscillators – Collector coupled monostable, bistable and astable multivibrators – Schmitt trigger. **(10)**

Total : 48

TEXT BOOK

1. Allen Mottershed, "Electronic Devices and Circuits – An Introduction", Prentice Hall of India, 2007.

REFERENCE BOOKS

1. Jacob Millman & Christos C. Halkias, "Electron Devices and Circuits", Tata McGraw Hill, Thirtyth Reprint, 2004.
2. Millman & Taub, "Pulse Digital & Switching waveforms", Tata McGraw Hill, Twenty Seventh Reprint, 2007.
3. David A. Bell, "Electronic Devices and Circuits", Prentice Hall of India, Fifth Edition, 2007.
4. Dharma Raj Cheruku & Battula Tirumal Krishna, "Electronic Devices and Circuits", Pearson Education India, First Indian Print, 2005.

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.

E-9 - 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 services: Common Management Model – Service domains – Policy architecture–

09CS45 - CONTROL SYSTEMS

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To study the basic concepts in modeling of physical systems, their controls in time and frequency domain and introduction to few transducers.

EXPECTED OUTCOME

Student should have learnt the techniques in the control system theory and apply the same for physical systems.

OPEN LOOP AND CLOSED LOOP SYSTEMS

Linear systems - Mathematical model of physical systems -Electrical analogous of physical systems - Transfer function - Block diagram methods - Signal flow graph method - Basic control actions - Classification of industrial controllers - On-Off and PID controllers (block diagram only) - Proportional band - Reset rate - Derivative time. (12)

TIME RESPONSE

Impulse, Step , Ramp and Acceleration inputs - Response of a general system -Transient and steady state response of 1st and 2nd order system - Natural frequency damping ratio. (9)

STEADY STATE ERROR

Type number of systems - Static error coefficients - Error series - Stability Analysis - Routh's Criteria. State space representation of linear systems - State transition matrix and its properties. (9)

FREQUENCY RESPONSE METHODS

Frequency domain transfer function - Polar and Bode plots - Resonant peak, resonant frequency bandwidth and cutoff frequency -Nyquist stability criteria - Stability from bode and polar pots – Gain margin – Phase margin. (9)

TRANSDUCERS

Seismic- mass pickup for measurement of velocity, acceleration and displacement, LVDT, Strain gauges - Piezo electric transducer.

(6)

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOK

1. Nagrath I.J., and Gopal M., "Control System Engineering", Wiley Eastern Limited, Fifth Edition, 2008.

REFERENCE BOOKS

1. Kasuhiko Ogata, "Modern Control Engineering", Prentice Hall of India , Fifth Edition, 2009.
2. Kuo B.C, "Automatic Control System", Prentice Hall of India, Ninth Edition, 2009.
3. Cooper W.D., Helfrick A.D., "Modern Electronic Instrumentation and Measurement Techniques", Prentice Hall of India, Fifth Edition, 2007.
4. Nakra B.C., Choudry K.K., "Instrumentation Measurements and Analysis", Tata McGraw Hill, Third Edition, 2009.

MULTIMEDIA SYSTEM DESIGN

Elements –Applications-Multimedia system architecture –Evolving technologies for Multimedia system - Defining objects –Multimedia Data interface standards –Multimedia databases **(9)**

DATA AND FILE FORMAT STANDARDS

Rich Text format – TIFF-RIFF: MIDI– JPEG DIB– AVI indeo file format- MPEG standards – TWAIN: Objectives – Architecture – New WAVE RIFF file format **(9)**

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)

Total : 45

TEXT BOOKS

1. Donald Hearn and Pauline Baker M., "Computer Graphics ", Prentice Hall of India, Second Edition, 2008.
2. Prabhat K Andleigh and Kiran Thakrar, "Multimedia Systems Design", Prentice Hall of India, Reprint 2007.

REFERENCE BOOKS

1. Stevan Harrington, "Computer Graphics - A Programming Approach ", McGraw Hill Book Co., Second Edition, 2007.
2. John F.Koegal Buford, "Multimedia System", Pearson Education Limited, 2008.

E-8 - GRAPHICS AND MULTIMEDIA

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To impart the fundamental concepts of 2D & 3D computer graphics, its techniques, algorithms and various multimedia compression techniques to multimedia building blocks.

EXPECTED OUTCOME

The students would be able to understand 2D & 3D concepts, its algorithms, transformations in computer graphics and apply the different compression techniques to various multimedia applications.

GRAPHICS PRIMITIVES, 2D TRANSFORMATION AND VIEWING

Output primitives: points and lines – line drawing algorithms – circle – ellipse generating algorithms – polygon generating and filling algorithms. 2D Transformations: Basic Transformations – matrix representation – translation - rotation- scaling- general pivot point rotation- general fixed point scaling- general scaling directions - reflection – shear. Viewing: window to view port co-ordinate transformation - point clipping - Cohen and Sutherland line clipping algorithm- Sutherland and Hodgeman polygon clipping algorithm. (9)

3D CONCEPTS, TRANSFORMATION AND VIEWING

3D display methods. 3D object representation: polygon surfaces – curved lines and surfaces – Quadric surfaces – Introduction to Spline Representations-Bezier curves and surfaces. 3D Transformations: Translation - Rotation – Scaling. 3D viewing: view plane – projections – clipping. (9)

09CS46 - 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. Food chains, 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.
2. Kaushik, A. and Kaushik, C.P. 'Environmental Science and Engineering' Second Edition, New Age International (P) Limited Publishers, 2006.

THE ERP MARKET

ERP Market Place – SAP AG – Peoplesoft – 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.

E-7 - 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)**

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.

**09CS47 - ELECTRICAL AND DIGITAL
ELECTRONICS LABORATORY**

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

LIST OF EXPERIMENTS

1. Open circuit characteristics of DC shunt generator.
2. Critical speed of DC shunt generator
3. Load test on DC shunt generator
4. Load test on DC shunt motor.
5. No load speed control of DC shunt motor
6. Swinburne's Test
7. Astable multivibrator
8. Monostable multivibrator
9. Applications of operational amplifier
10. Study of logic gates and design of combinational logic circuits
11. Open circuit and short circuit tests on a single phase transformer
12. Load test on single phase transformer
13. Load test on a single phase capacitor start induction motor.
14. Load test on three phase squirrel cage induction motor.
15. Load test on a single phase alternator
16. Design of synchronous and asynchronous counters
17. Multiplexer & Demultiplexer
18. Encoder and Decoder
19. Digital IC applications
20. Design of IC voltage regulators

3. Proakis J.G., Manolakis D.G, " 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.

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)

Total :45

TEXT BOOKS

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. Ifeather 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.

09CS48 - 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

ASSESSMENT : THEORY

L	T	P	C
2	0	0	2

OBJECTIVE

To inculcate among the students the importance of spirituality, yoga and procedures to manage stress and strain and 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 – neutralization of anger – realization of self or actualization of the universe – understanding of morality, duty and charity – yoga - different types

E-6 - DIGITAL SIGNAL PROCESSING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

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 application.

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 Invariance method – digital

IMAGE RESTORATION AND COMPRESSION TECHNIQUES

Image Restoration: Noise models: spatial frequency properties of noise
- Important noise probability Density Functions. Periodic Noise
Reduction: Band pass filters. Image Compression: fundamentals –
image compression models – elements of information theory – error
free compression – lossy compression - image compression standards.
Introduction to color image processing. (9)

IMAGE ANALYSIS

Image segmentation: Detection of Discontinuities - Edge linking and
boundary detection – Thresholding - Region-based segmentation - use
of motion in segmentation. Image representation and description:
Representation schemes - Boundary descriptors, Regional descriptors.
(9)

Total : 45

TEXT BOOK

1. Rafael C.Gonzalez, Richard E.Woods, “Digital Image Processing”,
Prentice Hall of India, Second Edition, 2008.

REFERENCE BOOKS

1. Jahne Bernd, “Digital Image Processing”, Springer-Verlag Berlin
Heidelberg, Netherland, Sixth Revised & Extended Edition, 2005.
2. Anil K. Jain, “Fundamentals of Digital Image Processing”, Pearson
Education, New Delhi, Paperback Series, 2003.
3. William. K.Pratt, “Digital Image Processing”, John Wiley, New
York, Fourth Edition, 2006.

- 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 –
profession and professionalism - professional ideals and virtues –
engineers as responsible experimenters – 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, IV Edition, 2004.
2. Mike Martin and Roland Schinzinger, “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 Human Values", New Age International Publishers, NewDelhi, 2009.

E-5 - DIGITAL IMAGE PROCESSING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the fundamentals of digital image representation, image acquisition, image restoration, image enhancement and analysis of digital image.

EXPECTED OUTCOME

Students shall understand the basic concepts of digital image processing system and gain the knowledge to apply them. They can visualize how digital images are represented, stored and reproduced.

IMAGE FUNDAMENTALS

Digital image Processing - Fundamental steps in Image processing – components of Digital Image processing systems. Elements of Visual perception - Sampling and Quantization - Basic relationships between pixels. (9)

IMAGE ENHANCEMENT IN THE SPATIAL DOMIAN

Gray level transformation - Histogram processing – enhancement using arithmetic/logic operations - smoothing spatial filters – sharpening spatial filters – use of first and second derivatives for enhancement. (9)

IMAGE ENHANCEMENT IN THE FREQUENCY DOMIAN

Fourier transforms and frequency domain: one dimensional Fourier transforms and its inverse - two dimensional DFT and its inverse – filtering in the frequency domain – correspondence between filtering in the spatial and frequency domain - fast Fourier transform. Smoothing frequency domain filters: Gaussian low pass filters. Sharpening frequency domain filters: Gaussian high pass filters. (9)

SCORING YOUR CUSTOMER

Introduction - Process - Scoring architectures and configurations -
Preparing the data - Integrating scoring with other applications -
Optimizing the CRM process: Introduction - Improved customer
profitability through optimization - Optimized CRM - Complete loop -
Optimal CRM process - Optimization techniques. **(8)**

OVERVIEW OF DATA MINING AND CRM TOOL MARKETS

Introduction - Data mining market place - Taxonomy of data mining
tools - Tool assessment attributes and methodology - Tool evaluation -
Other data mining tools - CRM tools - Next generation for CRM. **(10)**

Total : 45

TEXT BOOK

1. Alex Berson, Stephen Smith, Kurt Thearling, "Building Data mining Applications for CRM", Tata McGraw Hill, Fourteenth Reprint, 2008.

REFERNCE BOOK

1. Francis Buttle, "Customer Relationship Management: Concepts and Technologies", Butterworth-Heinemann, Second Edition, 2009.

09CS51 - 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-4 - CUSTOMER RELATIONSHIP MANAGEMENT

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To learn the basic concepts of CRM, CRM tools and its applications for establishing and maintaining effective customer relationship.

EXPECTED OUTCOME

Student shall learn the basic knowledge on CRM Architectures, CRM process, use of data mining to build the business case and to score the customer value. Acquire the knowledge about optimized CRM process and the usage of different CRM tools in the market.

INTRODUCTION

Most profitable Customer - CRM: Custom centered database, Managing campaigns, Evolution of marketing, Closed loop marketing, CRM architecture - Customer profitability - Customer acquisition – Cross selling - Customer retention - Customer segmentation. **(9)**

BUILDING THE BUSINESS CASE

Introduction - Uncovering the needs for data mining - Defining the business value - The costs - Deploying Data mining for CRM: Introduction - Define the problem - Define the user - Define the data - Scope the project - Trial - Quality assurance - Education - Launch - Continuation. **(10)**

COLLECTING CUSTOMER DATA

Introduction - Three types of customer data - Collecting customer data - Connecting customer - Customer data and privacy - Privacy and data mining - Guidelines for privacy - Legal issues associated with data mining. **(8)**

Signature of alignments – Multiple sequence alignment – Applications
– Phylogeny – Phylogenetic trees. (10)

PROTEIN STRUCTURE AND DRUG DISCOVERY

Protein Stability and Folding – Applications of Hydrophobicity –
Superposition of structures – DALI – Evolution of Protein Structures –
Classification of Protein Structures – Protein Structure prediction and
modeling – Assignment of protein structures to genomes – Prediction
of protein function – Drug discovery and development. (10)

Total : 45

TEXT BOOK

1. Arthur M Lesk, "Introduction to Bioinformatics", Oxford University Press, India, Third Edition, 2008.

REFERENCE BOOKS

1. Affward T.K., Parry Smith D.J., "Introduction to Bioinformatics:", Pearson Education, Reprint, 2007.
2. Dr. Zhumur Ghosh, Dr. Bibekanand Mallick, "Bioinformatics. Principles and Application", Oxford University Press, India, Reprint, 2008.

05CS52 - ANALOG AND DIGITAL COMMUNICATION

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To study the principles of analog and digital modulation schemes & their demodulations, data transmissions, coding theory, data communication and to study about the transmission media.

EXPECTED OUTCOME

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

MODULATION

Need for modulation - Analog modulation systems – Basics of AM, FM & PM – Modulation and demodulation schemes – Sampling theorem – Basics of PAM, PDM & PPM – Generation and recovery – PCM – Encoder – Decoder – Eye pattern – DPCM – Delta modulation – Adaptive delta modulation – Time Division Multiplexing – T1 Digital carrier – frequency division Multiplexing. (9)

DATA TRANSMISSION

Information Capacity – Keying methods – ASK, PSK, DPSK, FSK, QPSK, QASK, QAM, M-array keying – Bandwidth efficiency – carrier recovery – Clock Recovery – Trellis code Modulation – Probability of error and Bit error rate – Error performance - Introduction to Basic concepts of Spread spectrum system – Direct Sequence and frequency Hopping spread Spectrum Systems - Generation and Characteristics of PN sequences. (10)

CODING THEORY

Data compaction – Huffman coding – Channel capacity – Shannon's equation – Error control coding – Linear block codes – Cyclic codes –

Convolutional codes – Trellis codes – Burst error detecting and correcting codes – Interlaced codes. (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. Lathi B.P, “Modern Digital and Analog Communication Systems”, Third Edition, Oxford University Press, New Delhi, 2005.
2. Wayne Tomasi, “Electronic Communication Systems: Fundamentals through Advanced”, Pearson Education, Fifth Edition, 2004.

REFERENCE BOOKS

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

E-3 - BIOINFORMATICS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the basics of bioinformatics, processing and the various computational techniques.

EXPECTED OUTCOME

At the end of the course, students shall learn the basic aspects of the biological patterns, information retrieval strategies, sequence alignments and the issues in proteins & drug discovery.

INTRODUCTION

Life in Space and Time – Dogmas – Data Archives – WWW – Biological Classification – Use of Sequences to determine phylogenetic relationships – Searching for similar sequences in databases – Introduction to protein structure – Protein Structure prediction and engineering – Clinical Implications. (9)

GENOME ORGANIZATION AND EVOLUTION

Genomics and Proteomics – Eavesdropping on transmission of genetic information – Picking out genes in genomes – Genomes of prokaryotes – Genomes of Eukaryotes – Human Genome – Evolution of Genomes. (9)

ARCHIVES AND INFORMATION RETRIEVAL

Data base indexing and specification of search terms – Follow –up questions, analysis of retrieved data – archives – Gateways to Archives: Access to database in molecular biology – ENTREZ – SRS – PIR – ExpASy, Ensembl. (7)

ALIGNMENTS AND PHYLOGENETIC TREES

Introduction to Sequence Alignment – The dotplot – Dotplots and Sequence Alignments – Measures of Sequence similarity – Computing the Alignment of two sequences – The dynamic programming algorithm

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, 6th 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.

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

09CS53 - 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)

architecture, 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 Powertrain 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, Microprocessor, Classification of Microprocessors (based on

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.

09CS54 - MICROPROCESSORS AND 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 –

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. SivaRamMurthy C. and Manoj B.S, "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.Toth, "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)**

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.

09CS55 - 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.

09CS87 - NETWORKS, DISTRIBUTED SYSTEMS AND SOFTWARE ENGINEERING TOOLS LABORATORY

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

- TCP/UDP socket programming
- Concurrent server
- IPv4 and IPv6 Interoperability
- Checksum computation
- Sliding window Protocol
- Address Mapping
- Multicasting
- Security Algorithm
- Design and analyze a network using Qualnet network simulator
- Communication using RPC/RMI
- Clock Synchronization
- Consistency Models
- Election algorithms
- Multi-tier architecture
- SRS Preparation
- Analysis & Design :UML diagrams
- Testing using Software testing Tools (QTP and Rational Suite)
 - Manual & Automated Testing
 - Functional & Performance Testing

09CS86 - COMPILER, WEB PROGRAMMING AND MULTIMEDIA LABORATORY

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

COMPILER

Programs using the following concepts on UNIX platform.

1. Lexical Analysis.
2. YACC
3. Design of a simple compiler for a given grammar.

WEB PROGRAMMING

1. Simple web page designing.
2. Case studies like a trading system, a portal system, a reservation system etc.,

Tools : Perl, HTML, Flash, Dreamweaver.

MULTIMEDIA

1. Programs for compression algorithms for text.
2. Programs for video effects like zooming etc.
3. Study and use of the basic tools in multimedia software.
4. Study of authorizing tools.
5. Case studies using simple animation.

Tools : Maya, 3D-Studio Max, Adobe Primeire, Adobe Photoshop, Macromedia Director

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

09CS56 - 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)

RELATIONAL DATABASE DESIGN

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

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.

09CS83 - 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 Signatures – Authentication Protocols – Digital Signature Standard. (10)

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, Fifth 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.

09CS61 - 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)

– DBSCAN – Decision tree – Issues regarding classification and 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, Reprint 2003.
3. Paulraj Ponnaiah, "Data Warehousing Fundamentals", Wiley Publishers, Singapore, First Edition, 2001.

09CS82 - 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

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.

09CS62 - 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 – Unification and Lifting – Forward Chaining – Backward Chaining – Resolution – Ontological Engineering

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 (Pvt) Ltd, 2006.

09EE81 - INDUSTRIAL ECONOMICS AND MANAGEMENT

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To introduce the students the basic principles governing the industrial management and corporate management.

EXPECTED OUTCOME

The Learners will 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 Market. (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)

HUMAN RESOURCE MANAGEMENT

Principles of Management, Evolution of Management, Development of Managerial Skills – Human Resource Management – Importance –

– 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.

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.

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.

09CS73 - 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)

09CS63 - 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)

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.

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.

09CS64 - 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 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.

09CS72 - 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)

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.

09CS65 - EMBEDDED AND REAL TIME SYSTEMS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To understand the basic principles and issues involved in the development of real-time embedded system.

EXPECTED OUTCOME

Student will have an understanding of the concepts involved in design and development of an embedded system application with integration of real-time operating system.

INTRODUCTION

Characteristics of Embedded system – Challenges in Embedded System – Embedded System Design Process - ARM Processor – CPU Power Consumption. (7)

DESIGN AND ANALYSIS

Design Patterns for Embedded Systems – Analysis and optimization of Execution Time – Analysis and Optimization of Energy and Power – Analysis and Optimization of Program Size - Power Optimization Strategies for Processes. (7)

REAL-TIME OPERATING SYSTEM

Characteristics of Real-Time Systems – Safety and Reliability – Types of Real-Time Tasks – Timing Constraints – Modeling Timing Constraints – Real Time Task Scheduling: Characteristics – Classification - Clock driven scheduling - Event driven scheduling - Hybrid schedulers - Earliest deadline first scheduling - Rate Monotonic Algorithm – Deadline Monotonic Algorithm - Self suspension with Context switching overhead – Handling Resource sharing and Dependencies among Real-time tasks. (12)

REAL-TIME DATABASES & NETWORKS

Characteristics of Temporal data – Concurrency Control: Locking Based Protocols , Optimistic Concurrency Control protocols - Real-Time Communications: Soft and Hard Real-Time Communication in a LAN – Bounded Access Protocol - Inter-Integrated Circuit bus - Field bus – CAN bus – Systems-on-Silicon. (9)

DEVELOPMENT AND DEBUGGING EMBEDDED SYSTEM

Development Environment: Host and target machines – Cross-Compiler – Test bench – Debugging Techniques: In-Circuit Emulator - Logic analyzer – Hardware/Software Co-verification – Simulators – Manufacturing Testing: Fault models - Scan Design Approaches - Built-in Self-Test - Applications: Alarm Clock - Ink Jet Printer – Personal Digital Assistants – Set-Top Boxes - CASE STUDY: VxWorks – RT Linux. (10)

Total : 45

TEXT BOOKS

1. Wayne Wolf, “Computers as Components: Principles of Embedded Computing System Design”, Morgan Kaufman, Second Edition, 2008.
2. Rajib Mall, “Real-Time Systems: Theory and Practice”, Pearson Education, 2007.

REFERENCE BOOKS

1. David E. Simon, “An Embedded Software Primer “, Pearson Education, 2004.
2. Prasad K.V.K.K, “Embedded / Real –Time Systems: Concepts, Design and Programming, DreamTech Press, 2005.

09CS71 - 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)

09CS68 - DBMS AND SYSTEMS LABORATORY

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

DBMS LAB

1. Database creation, insertion and deletion.
2. Queries based on DML commands.
3. Aggregate functions.
4. Subqueries and joins.
5. Group by clause and DATE functions.
6. Views and Triggers.
7. PL/SQL Procedures.
8. Using Cursors and functions in PL/SQL blocks.
9. VB front-end form design.
10. Database connectivity (ODBC).

SYSTEMS LAB

1. Shell programming.
 - 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 and similar system calls.
4. Process Scheduling- FCFS , SJF, Priority and Round robin.
5. Implementation of Interprocess Communication.
6. Synchronization using semaphores.
7. Implementation of memory management schemes –first fit, Best fit, worst fit.

09CS66 - 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.

09CS67 - MICROPROCESSOR AND EMBEDDED SYSTEMS LABORATORY

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

ASSEMBLY LANGUAGE PROGRAMMING

- Swapping block of data in memory
- 8/16 bit sorting of data
- Code conversion from one base to another
- Multi precision addition/ subtraction
- 8 bit multiplication / division
- Use of monitor routines to access keyboard and display
- Simulation of digital clock
- Arithmetic expression evaluation
- String operation
- Scan and ASCII code of a key pressed

INTERFACING

- Keyboard interface
- Seven segment display interface
- Digital to analog interface
- Musical tone generator interface
- Kit to kit communication

EMBEDDED SYSTEMS

- Programming 8031/ PIC / ARM
- HDL programming
- Watch dog timer
- Real- Time Task Scheduling (Clock, EDF, RMA)
- Resource sharing & Priority (PIP, PCP)
- Simple Embedded system design and development