COMPUTER SCIENCE

[SPECILISATION CODE: 06]

PAPER-I

(Choose Any ONE Subject)

SL.NO	SUBJECT NAME	SUBJECTCODE
1.	ADVANCED COMPUTER ARCHITECTURE	R50601
2.	ADVANCED DATABASES	R50602
3.	ADVANCED OPERTAING SYSTEMS	R50603
4.	ADVANCED UNIX PROGRAMMING	R50604
5.	COMPUTER COMMUNICATIONS	R50605
6.	DATA STRUCTURES AND ALGORITHM ANALYSIS	R50606
7.	DATABASE MANAGEMENT SYSTEMS	R50607
8.	DIGITAL DATA COMMUNICATIONS	R50608
9	DISTRIBUTED DATABASES	R50609
10	DISTRIBUTED OPERATING SYSTEMS	R50610
11	LANGUAGE PROCESSORS	R50611
12	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	R50612
13	OBJECT ORIENTED ANALYSIS AND DESIGN USING UML	R50613
14	OPERATING SYSTEMS	R50614
15	SOFTWARE ENGINEERING	R50615

COMPUTER SCIENCE

[SPECILISATION CODE: 06]

PAPER-II

(Choose Any ONE Subject)

SL.NO	SUBJECT NAME	SUBJECTCODE
1.	ADVANCED JAVA FOR WEB TECHNOLOGIES	R50651
2.	ADVANCED NETWORKING AND NETWORK PROGRAMMING	R50652
3.	ARTIFICIAL INTELLIGENCE	R50653
4.	ARTIFICIAL NEURAL NETWORKS	R50654
5.	CRYPTOGRAPHY	R50655
6.	DATA MINING AND DATA WAREHOUSING	R50656
7.	DESIGN OF FAULT TOLERANT SYSTEMS	R50657
8.	DIGITAL IMAGE ANALYSIS AND MACHINE VISION	R50658
9.	DIGITAL IMAGE PROCESSING	R50659
10.	INTERNET PROTOCOLS	R50660
11.	MICRO COMPUTER SYSTEM DESIGN	R50661
12.	NETWORK SECURITY	R50662
13.	NEURAL NETWORKS AND FUZZY SYSTEMS	R50663
14.	SPEECH RECOGINITION	R50664
15.	VHDL PROGRAMMING	R50665

Subject Code : R 50601

ADVANCED COMPUTER ARCHITECTURE

Section – A

Overview: Register and bus organized computers and instruction execution. Output and Input memory and control Organisation. Hard – Wired and Micro programmed control.

Processor Organisation: General Structure of CPU-registers, Stacks, ALU and Control units, Instruction types, Formats Sets and Addressing modes. Basic mathematical operations, Fixed- point addition, subtraction, multiplication and division. Implementation of fixed-point operations and ALU design F.P. operations and their implementation. H.W. fast addition multiplication and division. Principles of array and pipeline processors.

Section – B

Design of Controller: Principles of instruction decoding and implementation, Hard-wired and micro instruction based control units. Horizontal and Vertical classes of micro instructions, Nano-program control. Identifying micro instructions, minimizing micro instruction, encoding control instructions, timing cycles and clock generations. Organisation of micro-program based control unit. Concepts of RISC and comparison with CISC processors.

Memory Organization: Types of memories – serial, random and semi-random access, core semiconductor and bubble memories, memory device characteristic density, speed, access time, costs, destructive, non destructive read out, static memories, dynamic memories and memory refresh. Word length and size of memory hierarchy, memory references, address mapping, relocation mechanism, concepts of memory compaction, principles of virtual memory, segmentation and paging.

Interleaved memories and principles of address interleaving. Associative memories word organized associative memory, masking. Hardware protection features in multi-programmed systems.

Seciton – C

System Organization :

Communication : Introduction, Bus control, computer Networks.

Input-Output systems : programmed I/O, DMA, Interrupt control, I/O processors. Operating Systems: Introduction, concurrency control, system management.

Parallel processing: Introduction – types of parallel processors, performance considerations, pipelined, vector and multiprocessor systems.

References:

1. John.P.Hayes computer architecture & Organisation, McGrawHill, Publisher.
2. M.Morris Mano, Computer System Architecture, Prentice Hall of India.
3. Tanenbaum, Computer Organization & Architecture, Prentic Hall of India.
4. Rafiqquzzman – clandra, Modern Computer Architecture.
5. William Stalings, "Computer Organization & Architecture", Addison Wesley.
6. Vincent P. Hevling, "Computer Organization & Architecture", Addison Wesley.
7. Hwang, K & F.A. Briggs, " Computer Architecture and Parallel Processing", Mhill.
8. Patterson D.A & J.L. Hennessy, " Computer Architecture" A Quantative Approach "Morgan Kanfmann Publishers.

✷✷✷✷✷

Subject Code : R 50602

ADVANCED DATABASES

UNIT I

Introduction: Distrubuted Data Processing, Distributed Databases System, promises of DDBS, Problem areas.
Overview of Relational DBMS: Relational Databases Concepts, Normalization, Integrity rules, Relational data languages.

UNIT II

Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture.
Distrubuted Database Design: Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

UNIT III

Query Processing and Decomposition: Query processing Objectives, Characterization of query processors, layers of query of query processing, query decomposition, Localization of distributed data.

UNIT IV

Distributed query Optimization: Query optimization, centralized query optimization, Distributed query optimization algorithms.

UNIT V

Transaction Management: Definition, properties of transaction, types of transactions. Distributed concurrency control. Serialization, concurrency control Mechanism & Algorithms. Time stamped and Optimistic concurrency control Algorithms, Dead lock Management.

UNIT VI

Distributed DBMS Reliability: Reliability concepts and Measures, fault-tolerance in Distributed systems, failures in Distributed DBMS, local & Distributed Reliability Protocols, site failures and Network partitioning.
Parallel Database Systems: Database Series, Parallel Architecture, Parallel DBMS Techniques, Parallel exception problems, Parallel Execution for Hierarchical architecture.

UNIT VII

Distributed object Database Management Systems: Fundamental object concepts and Models, Object Distributed Design, Architectural Issues, Object Management, Distributed Object storage, Object query Processing.

UNIT VIII

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparing ODDBMS and ORDBMS.

Text Books:

1. M.Texter OZSU and Patuck Valduries Principles of Distributed Database Systems,
Pearson Additions, 2001.

2. Stefan Cari and Willipse Peiagatti Distributed Databases, McGraw Hill.
3. Heary P Korth, A.Silberchatz and Sudershan : Database System Concepts, MGH
4. Raghuramakrishnan and Johhanes Geheke: Database Management Systems, MGH.

✷✷✷✷✷

ADVANCED OPERTING SYSTEMS

1. **Introduction to Operating Systems**, Type of operating systems.

2. **UNIX –I** :Overview of UNIX system, Structure, file systems, type of file, ordinary & Special files, file permissions, Introduction to shell.

3. **UNIX – II** :UNIX basic commands & command arguments, Standard input / output Input / output redirection, filters and editors.

4. **UNIX SYSTEMS CALLS :** System calls related file structures, input / output process creation & termination.

5. **INTERPROCESS COMMUNICATION IN UNIX :** Introduction, file and record locking, Client – Server example, pipes, FIFOs, Streams & Messages, Name Speces, Systems V IPC,Message queues,Semaphores, Shared Memory, Sockets & TLI Socket and IPC Programming.

6. **INTRODUCTION TO NETWORKS AND NETWORK PROGRAMMING IN UNIX :** Network Primer, TCP/IP – Internet Protocols, Socket Programming – Introduction & overview, UNIX domain protocols, Socket Addresses, Elementary Socket system calls, Simple examples – Client-Server Programming.

7. **LINUX:** Introduction to LINUX System, editors and utilities, type of shells.

8. **LINUX OPERATIONS:** Shell operations, file structure, file management, Operations.

Books:

1. The design of the UNIX Operating Systems – Maurice J.Bach (PHI)
2. The UNIX Programming Environment (PHI) – Kernighan & Pike.
3. UNIX Network Programming - W.Richard Stevens (PHI) – 1998.
4. The Complete reference LINUX – Richard Peterson (TMH)
5. UNIX User Guide – Ritchie & Yates.

✷✷✷✷✷

ADVANCED UNIX PROGRAMMING

1. Unix Utilities – 1
   Introduction to Unix file system, Vi editor, File handling utilities, security by file permissions, process utilities, disk utilities, Networking commands, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, umask, ulimit, ps, who, w, finger, arp, telnet, rlogin.

2. Unix Utilities – 2
   Text processing utilities and backup utilities detailed commands to be covered are: cat, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, more, pg, comm., cmp, diff, tr, awk, tar, cpio.

3. What is a shell, shell responsibilities, pipes and input redirection, Output redirection and here documents, the shell as programming Language shell variables, conditions, history and control structures and shell programming.

4. Unix Internals – 1
   Unix file structure, directories, files and devices, system calls and device drivers, library functions, low-level file access (write, read, open, close, ioctl, lseek, fstat, stat, dup and dup2), the standard I/O (fopen, fread, fclose, flush, fseek, fgetc, getc getchar, fputc, putc,putchar, fgets, gets), formatted, I/O stream errors, streams, and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd).

5. Unix internals –2
   Process – What is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, fork function, vfork, exit, wait, exec, system, functions, user identification, process times.

6. Signals – Signal functions, reliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, system, sleep functions.

7. Unix internals – 3
   Data Management – Management Memory (simple memory allocation, freeing memory) file locking (creating lock files, locking regions, use of read/ write locking, competing locks, other commands, deadlocks).

8. Unix Internals – 4
   Inter-process – Pipe, process pipes, the pipe call, parent-child process, named pipes: FIFOs), Semaphores, message queues and shared memory applications of IPC.

Text Books:

1. Advanced programming in Unix Environment (W. Richard Stevens)
2. Unix Network Programming (W. Richard Stevens).

✷✷✷✷✷

COMPUTER COMMUNICATIONS

Unit I: Network Hardware reference model – Transmission media – Narrowband ISDN – Broad band ISDN – ATM.

Unit II: The data Link layer – Design Issues – Error detection and correction – Elementary Data Link Protocols – Sliding window protocols – Data link layer in HDLC, Internet and ATM.

Unit III: Channel allocation methods – TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision Free protocols – IEEE standard BO2 for LANS – Ethernet, Token Bus, Token ring – Bridges.

Unit IV: NETWORK LYER Routing Algorithms – Shortest path, Flooding, Flow based Distance vector, Link state, Hierarchical, Broadcast routing, Congestion Control algorithms-General principles of congestion control, Congestion prevention polices, Choke packets and Load shedding.

Unit V: INTERNET WORKING – Tunneling, internetworking, Fragmentation, network layer in the internet – IP protocols, IP address, Subnets, Internet control protocols, DSPF, BOP, Internet multicasting, Mobile IP. Network layer in the ATM Networks – cell formats, connection setup, routing and switching, service categories, and quality of service, ATM LANs.

Unit VI: The Transport Layer Elements of transport protocols – addressing, establishing a connection, releasing connection, flow control and buffering and crash recovery, END TO END PROTOCOLS – UDP, reliable Byte Stream (TCP) end to end format, segment format, connection establishment and termination, sliding window revisited, adaptive retransmission, TCP extension, Remote Procedure Call – BLAST, CHAN, SELECT, DCE.

Unit VII: Application Layer – Network Security – Cryptographic Algorithms – DES, RSA. Security Mechanisms – Authentication Protocols, Firewalls.

Unit VIII: Application Layer – Name service (DNS) Domains Hierarchy, Name servers. Traditional Applications – SMTP, MIME, World Wide Web – HTTP, Network Management – SNMP.

TEXT BOOKS:

COMPUTER NETWORKSANDREW TANEN BAUM, Prentice Hall of India New Delhi - Third edition.

COMPUTER NETWORKS – A SYSTEM APPROACH –0 Larry L. Peterson & Bruce S. Davie – Second Edition – Harcourt Asia PTE LTD.

✷✷✷✷✷

Subject Code : R50606

DATA STRUCTURES AND ALGORITHM ANALYSIS

1. **Arrays**: Storage structures for arrays. **Strings**: String operations.
   Stacks : Definition, representation of stacks, operations on stacks, Application of stacks: Infix, Prefix and Postfix notation, Recursion.
   Queue: Definition, Sequential representation, operations on queues, Applications of queues.
2. **Linked Lists**: Singly linked lists, Doubly linked lists, Insertion and deletion operations, simple applications of linked lists.
3. **Sorting**: Bubble sort, Selection sort, Insertion sort, Merge sort, Radix sort, Heap sort, Quick sort.
4. **Searching**: Linear search, Binary search, Hashing techniques.
5. **Trees**: Definition, Binary tree, **Tree traversal techniques**: Inorder, Postorder, Preorder. Threaded binary trees, Binary Search tree.
6. **Algorithms:** Introduction, pseudo code for expressing algorithms, analysis, time complexity and space complexity, O-notation, Omega notation and Theta notation, sets and disjoint set, union and find algorithms.
7. **Divide and conquer:** General method, Merge sort, Quick sort, Strassen's matrix Multiplication.
   Greedy method: General method, Optimal storage on tapes, Knapsack problem, Job sequencing with deadlines, Minimum spanning tree, Single source shortest paths.
8. **Dynamic Programming**: General method, Multistage Graphs, Optimal binary search trees,0/1 knapsack problem, Reliability design problem, Traveling sales person problem, Flow shop scheduling.
   Searching and Traversal techniques: Efficient non recursive binary tree traversal algorithms(available in text (4)), Breadth first search and traversal, Depth first search and traversal, AND/OR graphs, Game trees.
9. **Back tracking:** General method, n-queen problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.
   Branch and Bound: LC search, bounding, LC branch and bound, FIFO branch and bound, Traveling sales person problem.
   NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP-HARD and NP-COMPLETE classes, COOKS theorem.

Text books:

1. Data Structures using C and C++ - A.M. Tenenbaum Y. Langsam and M. J. Augenstein.
2. Data Structures – Seymour Lipschutz, Schaum Series.
3. Fundamentals of computer algorithms – E. Horowitz, Sartaj Sahani & Rajasekaran. Galgotia publications. ISBN: 81-7515-257-5
4. Fundamentals of computer algorithms – E. Horpwitz & Sartaj Sahani. Galgotia publications.

Reference books:

1. Design and analysis of algorithms, Aho , Ullman. Addison Wesley-1994. ISBN: 981-405-319-8

✷✷✷✷✷

Subject Code : R50607

DATABASE MANAGEMENT SYSTEMS

1. Introduction to Database Systems, Data models, instances and schemas, Database models, Relational Hierarchical and network- data independence- DDL and DM, Database manager, Data Administrator, Database users, Overall System Architecture.

2. Relational Model- Structure of relational databases, the relational algebra, Tuple relational calculus, & Domain relational calculus, SQL, Domain constraints, Referential integrity, Functional dependencies, Assertions and Triggers.

3. Database Design: Introduction to E-R concepts, Details of E-R modeling, Additional E-R concepts, Normalization- Functional dependencies, Lossless and use of decompositions, Normal Forms, Schema refinement, Multivalued dependencies.

4. File Organization, Storage media, Buffer management, Organization of records in file, Sequential files, Record and Page formats, Indexing, B & B+ tree indices files, Static and Dynamic Hash functions, various other kinds of indexes and external sorting.

5. Query optimization and evaluation: Introduction to Query Processing, Selection operation, Projection operation, Join operation, Set operation and Aggregate operation, Relation Query Optimization, Translating SQL queries, Estimating the cost, Relational algebra Equivalence.

6. Crash Recovery: Failure classification, Log based recovery, Shadow – paging, Check - pointing, Media recovery.

7. Concurrency control: Concepts of transaction, Transactions and Schedules, Lock based concurrency control, Lock Management, Specialized locking techniques, Concurrency control without locking, Crash recovery, Schedules testing for serializability, Time-stamp based protocols, Validation techniques, Multiversion schemes.

8. Integrity constraints, Creating views, Security- Grant statement in SQL, System catalogs and Schemas. Introduction to distributed databases and object oriented Databases.

Text Books:

1. Data Base Management Systems, Raghu Rama Krishna, TMH,1998.
2. Database System Concepts- Henfry F Korth and Abraham Silberschatz Edition MGH.
3. Database System Concepts -- Silberschatz , Henfry F Korth, 4th Edition, MGH.

Reference:

1. Database Management and Design, G. W. Hansen and J.V. Hansen, PHI, 1999.
2. Database Management Systems, Alexis Leon, Mathews Leon, Leon, Vikas.

✷✷✷✷✷

Subject Code : R50608

DIGITAL DATA COMMUNICATIONS

1. Digital Modulation Techniques: FSK, MSK, BPSK, QPSK, 8PSK, 16PSK, 6QAM, 16QAM, DPSK Methods. Bandwidth efficiency. Carrier recovery, Clock recovery –PCM-Quantization.

2. Data communication methods: Data communication circuit, point to point, multi point configurations and topologies, transmission models, 2-wire and 4-wire operations, codes, error detection methods, error correction methods, character synchronization, LCU, UART, USRT, RS-232 Interface, terminal types, simple, sophisticated, intelligent, scroll-mode, page-mode and frame-mode, modems, multistream and intelligent modems, modem operation on 2-wire line, dial-up line and 4-wire line.

3. Data communication protocols: Asynchronous protocols, synchronous protocols, Bisync protocol, SDLC, HDLC, Circuit switching techniques, circuit switching, message switching and packet switching, CCITT X.1 public network transmission modes, virtual circuit and datagram techniques.

4. Line protocols: Basic mode, half-duplex point-to-point protocol, half-duplex multi-point protocol, full-duplex protocols, polling, roll call and hub polling, HDLC data transfer.

5. Digital multiplexing: TDM, T1 carrier system, CCITT-TDM carrier system, CODEC, COMBO chips, digital hierarchy, line encoding, frame synchronization, Multiplexers, statistical multiplexer, concentrator, front-end communication processor, Digital PBX, Long haul communication with FDM, hybrid data.

6. Optical fiber communication: Introduction, comparison, fiber-optic communication system, fiber types, light propagation configurations, interface, losses in fiber cable, light sources, light detectors.

REFERENCE:

1. W.TOMASI : Advanced Electronic Communications systems, (PHI (Ch.1,2,3,5,partly 6,10.)
2. T. Housely, Data Communications and Teleprocessing Systems,(PHI (Ch.4,6,7,9-11,14,15,17-19).

✷✷✷✷✷

Subject Code : R50609

DISTRIBUTED DATABASES

1. Features of distributed databases, features of Centralized databases, level of distributed transparency - Reference Architecture, types of Data Fragmentation, distribution Transparency, Access primitives, Integrity constraints.

2. Distributed Database design – A frame work, the design of database fragmentation, the allocation of fragments.

3. Translation of global queries into fragment queries, query optimization.

4. Distributed Transaction Management – A framework, transaction atomicity, 2-phase commit.

5. Concurrency control**:** foundations, distributed deadlocks, timestamps.

6. Reliability: Basic concepts, commit protocols, consistent view of Network, Detection and Resolution of Inconsistencies, check points and cold restart.

7. Commercial Systems: Tranclem's ENCOMPASS
   Distributed database systems, IBM's Inter system communication, feature of distributed ingress and Oracle.

8. Heterogeneous databases: General problems – brief study of multibase.

Text Book:

1. Distributed Database systems Principles and Systems, Ceri s. Pelagatti. G, Mc Graw Hill.

✷✷✷✷✷

Subject Code: R50610

DISTRIBUTED OPERATING SYSTEMS

UNIT I

Introduction to distributed system: goals of distributed system, hardware and software concepts, design issues.

Communication in distributed systems: Layered protocols, ATM networks, the client-server model, remote procedure call and group communication.

UNIT II

Synchronization in distributed systems: Clock Synchronization, mutual exclusion, Election Algorithms, the Bully algorithm, a ring algorithm, atomic tractions, dead lock in distributed systems, distributed dead lock prevention, and distributed dead lock detection.

UNIT III

Processes and processors in distributed systems: Threads, system, models, Processor allocation, scheduling in distributed system, fault tolerance and real time distributed systems.

UNIT IV

Distributed file systems: Distributed file systems design, distributed file system implementation, trends in distributed file systems.

Distributed shared memory: What is shared memory, consistency model, page based distributed shared memory, shared variable, distributed shared memory, object based DSM.

UNIT V

Case study MACH: Introduction to MACH, process management, in MACH, Memory management in MACH, communication in MACH, UNIX emulation in MACH.

Case study DCE: Introduction to DCE threads, RPC's, Time service, directory service, security service, distributed file system.

Text books:

1. Distributed operating system: Principles and Paradigms – A.S.Tanebaum and Marten Vanstein.
2. Operating systems – internal and design principles, 4th Ed., - W.Stallings.

✷ ✷ ✷ ✷ ✷

Subject Code : R50611

LANGUAGE PROCESSORS

1. Lexical Analysis, scanning process, regular grammars and regular expressions, state transition diagrams, minimization of number of states, scanning algorithm, LEX program.

2. Top down parsing, parse tree representation, brute force approach, recursive descent parsing, predicted parsers, LL(1) grammars.

3. Bottom up parsing, operator precedence, grammar and corresponding parsing algorithm, simple precedence grammars, precedence functions, LR grammars, LR parsers, LALR(1) parsers, YACC program.

4. Syntax – directed definitions, construction of syntax trees, Bottom – up evaluation of S – attributed definitions, L – attributed definitions, Top – down translation, Bottom – up evaluation of inherited attributes, Type systems, specification of a simple type checker, Equivalence of type expressions, Type conversions, Overloading of functions and operators, polymorphic functions.

5. Symbol tables – data in symbol tables, symbol table organization hashing, tree structured; symbol table organization for block structured languages, representation PASCAL datatypes in symbol table storage allocation storage for arrays, strings, records etc. Run time storage Organization.

6. Semantic Analysis and code generation, Intermediate forms of source programs polish notation, N tuples, abstract syntax trees, transformation from infix to internal forms, semantic stacks, attributed translation grammars.

7. Code Optimization folding, redundant sub expression elimination, loop optimization unrolling, frequency reduction, strength reduction, global optimization using flow graph analysis.

8. Object code generation problems in object code generation, register allocation algorithms, object modules.

Text Books:

1. The theory and practice of compiler writing, J. P. Tremblay & P. G. Sorenson, MC Graw 1985.

2. Principles of Compiler Design, A. V. Aho & J. D. Ullman, Addison Wesley/ Narosa 1985.

✷✷✷✷✷

MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

UNIT-I
Mathematical logic : Statements and notation, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implementation, Normal torms.

UNIT-II
Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT-III
Set Theory: Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram, Functions: Inverse Function Comports of functions, recursive Functions, Lattice and its Properties, Pigeon hole principles and its application.

UNIT-IV:
Algebraic structure: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

UNIT-V:
Elementary Combinatorics: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of inclusion-Exclusion.

UNIT-VI:
Recurrence Relation: Generating Functions, Function of sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating funds. Characteristics roots solution of inhomogeneous Recurrence Relation.

UNIT-VII:
Graph theory: Representation of Graph, DFS,BFS, Spanning Trees, planer Graphs.

UNIT-VIII:
Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs Multi graphs and Euler circuits, Hamiltonian graphs, Chromatics Numbers.

Text Books:
1. Discrete and Combionational Mathematics – An Applied Introduction-5th edition- Ralph. P.Grimadi. Pearson Education
2. Discrete Mathematical Structures with applications to computer science Trembly J.P.& Manohar.P.TMH

Reference:
1. Discrete Mathematical Structures, Bernard Kolman, Roberty C. Busby, Sharn Cutter Ross, Pearson education/PHI.
2. Mathematical Foundations of computer science Dr D.S.Chandrashekheraiaha Prism books Pvt Ltd.
3. Discrete Mathematics, Lovasz, Springer.
4. Discrete Mathematics for Computer science, Garry Haggard and others Thomson
5. Discrete Mathematics for Computer Scientists & Mathematicians, J.L.Mott, A.Kandel, T.P.Baker Prentice Hall.

✷✷✷✷✷

Subject Code : R50613

OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

1. **Introduction to UML:** The meaning of Object-Orientation, object identity, encapsulation, information hiding, polymorphism, genericity, importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture.

2. **Basic structural Modeling**: Classes, relationships, common mechanisms, diagrams, Advanced structural modeling: advanced relationships, interfaces, types & roles, packages, instances.

3. **Class & object diagrams**: Terms, concepts, examples, modeling techniques, class & Object diagrams.

4. **Collaboration diagrams**: Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.

5. **Sequence diagrams**: Terms, concepts, differences between collaboration and sequence diagrams, depicting synchronous messages with/without priority call back mechanism broadcast message.

5. **Behavioral Modeling**: Interactions, use cases, use case diagrams, activity diagrams.

7. **Advanced Behavioral Modeling**: Events and signals, state machines, processes & threads, time and space, state chart diagrams.

8. **Architectural Modeling:** Terms, concepts, examples, modeling techniques for component diagrams and deployment diagrams.

Text books:

1. The Unified Modeling Language User Guide, Grady Booch, James Rambaugh, Ivar Jacobson , Pearson Education. ISBN : 81-7808-169-5.

2. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones, Addison Wesley, 2000. ISBN : 981-4053-83-X.

✷✷✷✷✷

Subject Code : R50614

OPERATING SYSTEMS

1. Introduction to Operating Systems and its Structures- Simple Batch Processing, Multiprogrammed, Time-shared, Personal computer, Parallel and Distributed Systems, System components, OS Services, System calls, Virtual machines, System design and implementation.

2. Introduction to Distributed Systems- Goals, Hardware and Software concepts, Design issues, ATM networks, Client-Server model, Remote Procedure Call and Group Communication.

3. Process and CPU Scheduling – Process concepts and Scheduling, Operation on processes, Co-operating process, Threads and Interprocess Communication, Scheduling criteria, Scheduling algorithm, Multiple-processor Scheduling, Real-Time Scheduling.

4. Processes and processors in Distributed Systems- Threads System models, Processor allocation, Scheduling in Distributed Systems, Fault tolerance and Real-Time Distributed Systems.

5. Memory Management and Virtual Memory- Logical Vs Physical address space, Swapping, Contiguous allocation, Paging, Segmentation, Segmentation with paging, Demand paging, Performance of demand paging, Page Replacement, Page Replacement algorithm, Allocation of frames, Thrashing. Distributed Shared Memory- What is shared memory, Consistency models, Page based Distributed Shared Memory, shared variable, Distributed Shared Memory.

6. Process management and Synchronization – The Critical Section problem, Synchronization Hardware, Semaphores and Classical problem of Synchronization, Critical regions, Monitors.
   Synchronization in Distributed Systems- Clock Synchronization, Mutual Exclusion, Election algorithm, Bully algorithm, Ring algorithm, Atomic transactions.

7. File System Interface and Implementation – Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-Space Management, Directory Management, Directory implementation, Efficiency and performance.

8. Distributed File Systems - Distributed File Systems design, Distributed File System implementation, Trends in Distributed File Systems.

TEXT BOOKS:

1. Operating Systems Concepts – Abraham Silberschatz and Peter Baer Galvin – John Wiley & Sons, Inc. 5th Edition.
2. Distributed Operating Systems – Andrew S. Tennenbaum, PHI.

✷✷✷✷✷

Subject Code : R50615

SOFTWARE ENGINEERING

1. The product – Evolving Role of Software, software characteristics, Application, software Myths, The process – Layered technologies, software process, Process Models.

2. Software process and project Metrics – Measures, Metrics and indicators, Metrics in the process and project domains software measurement, Metrics for software quality, software project planning – objectives, scope, resources, Project estimation, Decomposition Techniques, Empircal estimation Models.

3. risk analysis and Management – Software risks, risk identification, projection, refinement – RMMM plan, software quality Assurance – quality concepts, quality assurance, SQA, formal technical reviews, software reliability.

4. Analysis concepts and principles – Requirement analysis, Requirements Elicitation for software, software prototyping specification. Analysis modeling – Elements of analysis model, Data modeling, Functional Modeling and information flow, Mechanics of structured analysis, Data dictionary.

5. Design concepts and principles – Introduction, Design process, Design principles, Design concepts. Effective modular Design, Design heuristics of effective modularity, Design Model, Documentation.
   Architectual Design – Data design, Mapping requirements into a software architecture, Transform Mapping, Transaction Mapping.
   User Interface Design.

6. Software Testing Techniques – Testing fundamentals, Test case Design, white box testing, basis path testing, black box testing. Software Testing – Verification and validation strategic issues.

7. Object oriented Analysis, object oriented Design – System design process, object oriented Design process, object oriented Testing – object oriented strategies.

8. Clean Room approach, software reengineering, reverse Engineering , restructuring, Case tools.

Text Books:

1. Software Engineering – Roger S.Pressman , fifth edition, Mc Graw hill.

✷✷✷✷✷

Subject Code : R50651

ADVANCED JAVA FOR WEB TECHNOLOGIES

1. Review of HTML 4 – Common tags – HTML Tables and formatting internal linking – Complex HTML forms.

2. Introduction to Scripting Languages – Java Scripts – Control structures – functions arrays & objects - DHTML – CSS – event model – filters & transitions.

3. Review of Applets, Class, Event Handling, AWT Programming.
   Introduction to Swing: Japplet, Handling Swing Controls like Icons – Buttons – Text Boxes – Combo Boxes – Tabbed Pains – Scroll Pains – Trees – Tables, Differences between AWT Controls & Swing Controls, Developing a Home page using Applets & Swing. Malti Threading and RMI.

4. **Java Beans:** Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties, persistence, Customizers, Java Beans API

5. **Introduction to Servelets:** Life Cycle of a Servelet, JSDK, The Servelet API, The javax servelet Package, Reading Servelet parameters, Reading Initialization Parameters, The javax servelet HTTP package, Handling, Http Request & responses, Using Cookies – Sessions Tracking, Security Issues.

6. **Introduction to JSP:** The Problem with Servelets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC.
   Setting Up the JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

7. **JSP Application Development:** Generating Dynamic Content, Using Scripting Elements,
   Implicit JSP Objects, Conditional Processing – Displaying Values, Using an Expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Passing Control and Data between Pages – Sharing Session and Application Data Memory Usage Considerations.

8. Database Access, Database Programming using JDBC, Studying Javax sql* package. Accessing a Database form a JSP Page, Application – Specific Database Actions Deploying JAVA Beans in a JSP Page.

Text Books:

1. Internet and World Wide Web – How to program by Dietel, and Nieto Pearson Education Asia. (Chapters: 3,4,8,9,10,11,12-18).
2. The Complete Reference Java 2 third Edition by Patrick Naughton and Herbert Schildt. (Chapters: 19,20,,21,22,25,27).
3. Java Server Pages by Hans Bergstan. (Chapters: 1-9).

✷✷✷✷✷

ADVANCED NETWORKING AND NETWORK PROGRAMMING

1. Network Tools and Techniques: Protocol layering, system design, multiple access, switching, scheduling, naming, addressing, routing, error control; flow control, traffic management – data link layer protocols.

2. Internet: concept, history, network layer, transport protocol UDP, TCP, Ipv4, Ipv6,

3. Local Area Networks: topologies , access techniques, LAN, 802.11G wireless LANs.

4. Application layer: DNS, Email, WWW, multimedia.

5. Socket introduction, TCP sockets, TCP client server, socket options, UDP sockets name and address conversion, IPv4 / Ipv6 interoperability - Socket programming.

6. Routing sockets, broadcasting, multicasting, threads, IP options, raw sockets.

7. Interprocess communication, posix IPC, system V IPC, Pipes, FIFO, Posix message queen, system V semaphore, RPC in Sun systems. Unix programming using IPe.

References:

1. Computer Networks, A.S. Tanenbaum, PHI, 4th ed, ISBN 81-7808-785-5

2. Computer Networking A top down approach featuring the Internet, J.F.Kurose, K.W Rose, Pearson, ISBN 81-7808-247-0.

3. An Engineering Approach to Computer Networks, S.Keshav, Addison Wesley, ISBN 981-235-986-9.

4. Local Area Networks, G.E. Keiser, McGrew Hill, ISBN 0-07-033561-3.

5. UNIX network programming, Vol I (Networking APIs: Sockets and XTI), W.Richord Stevens, PHI, ISBN 81-203-2061-1.

6. UNIX network Programming, Vol II, (Interprocess Communication) Richards Slenens, PHI, ISBN 81-203-2062-X.

✷✷✷✷✷

Subject Code : R50653

ARTIFICIAL INTELLIGENCE

1. ARIFICIAL INTELLIGENCE:
Definition, Study of AI Technique, problem & Problem spaces, Heuristic search problem characteristics.

2. SEARCH METHODS
Breadth – first search, Depth – first search, Generate & Test Hill climbing, Best - first search, problem reduction, constraint satisfaction, means-ends analysis.

3. BASIC PROBLEM SOLVING METHODS:
Forward versus Backward reasoning, Problem Trees, Graphs, Matching, Game playing, minimax algorithms, Aphabeta Heuristics.

4. KNOWLEDGE REPRESENTAION USING PREDICATE LOGIC:
Prepositional Logic, Representing simple facts in logic Resolution Unification question Answering. Introduction to prolog and LISP.

5. STRUCTURED KNOWLEDGE REPRESENTAION:
Declarative representation semantic nets, Frames scripts procedural representation

6. NATURAL LANGUAGE UNDERSTANDING:
Introduction Syntactic Analysis Augmented transition networks semantic Analysis Semantic Grammars

7. COMPUTER VISION:
Perception processing representation and recognition of scents, understating as constraint satisfaction Determining to constrains, Waltz Algorithms.

8. EXPERT SYSTEMS:
Representing and using domain knowledge, Expert System Shells, Explanation knowledge acquisition, Case Studies.

Books

1. ELAINE RICH : Artificial Intelligence.
2. ELEAINE RICH & KNIGHT : Artificial Intelligence MGH,1985
3. Nilsson : Principles of AI.
4. D.A.WATERMAN : Expert Systems.

✷✷✷✷✷

Subject Code : R50654

ARTIFICIAL NEURAL NETWORKS

INTRODUCTION: History of Neural Networks, Structure and functions of biological and artificial neuron, Neural network architectures, learning methods, evaluation of neural networks. .

SUPERVISED LEARNING - I: McCulloch – Pitts neuron model, perception learning, Delta learning, Windrow – Hoff learning rules, linear seperability, Adeline modification.

SUPERVISED LEARNING –II Multi layer networks: Architectures, Madalines, Back propagation algorithm, importance of learning parameter and momentum term, radial basis functions, polynomial networks.

UNSUPERVISED LEARNING : Winner – Take – all learning, out star learning, learning vector quantizers, Counter propagation networks, Kohonen self – organizing networks, Grossberg layer, adaptive resonance theory, Hamming net.

ASSOCIATIVE MEMORIES : Hebbian learning rule, continuos and discrete Hopfield networks, recurrent and associative memory, Boltzman machines, Bi-directional associative memory

APPLICATIONS OF NEURAL NETWORKS : Optimization, Travelling Salesman problem, solving simultaneous linear equations, application in pattern recognition and image processing.

TEXT BOOKS

1. J.M. Zurada : Introduction to Artificial Neural Systems, Jaico Publishers.
2. Kishan Mehrotra , Chelkuri. K. Mohan, Sanjay Ranka : Elements of Artificial Neural Networks, Penram International
3. B.Yagnanarayana : Artificial Neural Networks, PHI, New Delhi.
4. Waserman : Neural Computing - Theory & Practice.

✷✷✷✷✷

Subject Code : R50655

CRYPTOGRAPHY

1. **Overview:**
   Services, Mechanisms and Attacks, The OSI Security Architecture, A Model for Network Security.

2. **Classical Encryption Techniques:**
   Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Rotor Machines, Steganography.

3. **Block Ciphers and the Data Encryption Standard**
   Simplified DES, Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operation.

4. **Advanced Encryption Standard**
   Evaluation Criteria for AES, The AES Cipher.

5. **Contemporary Symmetric Ciphers**
   Triple DES, Blowfish, RC5, Characteristics of Advanced Symmetric Blick Ciphers RC4 Stream Cipher.

6. **Confidentiality using Symmetric Encryption**
   Placement of Encryption function, Traffic Confidentiality, Key Distribution, Random Number generation.

7. **Introduction to Number Theory**
   Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chainese Remainder Theorem, Discrete Logarithms.

8. **Key Management, Other Public key Cryptosystems**
   Key Management, Diffe-Hellman Key Exchange, Ellipric Curve Arithmetic, Elliptic Curve Cryptography.

REFERENCE TEXT BOOKS:

1. Cryptography and Network Security Third Edition William Stallings
2. Computer Netwoeks by Andrew S. Tennenbaum
3. Cryptography and Daa Security Demming, D, Addission Wesley, 1982.

✷✷✷✷✷

Subject Code : R50656

DATA MINING AND DATA WAREHOUSING

1. **Introduction:** Fundamentals of data mining, Data mining Functionalities, Classification of Data Mining Systems, Major issues in Data Mining, Data Warehouse and OLAP Technology for Data mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.
2. **Data Preprocessing:** Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.
3. **Data Mining Primitives, Languages, and System Architectures:** Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems.
4. **Concepts Description: Characterization and Comparison:** Data Generation and Summarization – Bases characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.
5. **Mining Association Rules in Large Databases:** Association Rule Mining, Mining single-dimensional Boolean association rules from transactional databases, Mining Multilevel Association Rules from Transaction Databases, Mining multidimensional Association Rules from Relational Databases and Data Warehouses, From Association mining to correlation Analysis, Constraint – Bases Association Mining.
6. **Classification and Prediction:** Issues Regarding Classification and Prediction, Classification by Decision Tree : Induction, Bayesian Classification, Classification by Backpropagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction Classifier Accuracy.
7. **Cluster Analysis Introduction:** Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density – Based Methods, Grid – Based Methods, Model – Based Clustering Methods, outlier analysis.
8. **Mining Complex Types of Data:** Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time – Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

Text Books:

1. Data Mining - Concepts and Techniques - JIAWEIHAN & MICHELINE KAMBER Morgan Kaufamann publishers.
2. Data Ming Techniques – ARJUN K PUJARI, Universities Press.
3. Data Warehousing in the Real world SAM ANAHORY & DENNIS MURRA Y. Pearson Edn Asia.

✷✷✷✷✷

Subject Code : R50657

DESIGN OF FAULT TOLERANT SYSTEMS

1. Basic Concepts : Reliability Concept, Failures and faults, Reliability and failure rate, Relation Between reliability & mean time between failure, maintainability & Availability Reliability of Series and parallel Systems.

2. Test Generation : Fault diagnosis of digital Systems, Test generations for combinational logic circuits – conventional methods, Random testing, transition count testing and signature analysis.

3. Fault Tolerant Design – I : Basic concepts – static, dynamic, hybrid, and self – purging redundancy, Sift – out Modular redundancy (SMR) ,triple modular redundancy, 5MR reconfiguration, use of error correcting codes.

4. Fault Tolerant Design – II : Time redundancy, software redundancy, fail – soft operation , examples of practical fault tolerant systems, introduction to fault tolerant design of VLSI chips.

5. Self Checking Circuits : Design of totally self checking checkers , checkers using m-out of n codes, Berger codes and low cost residue code, self – checking sequential machines, partially self – checking circuits.

6. Fail safe Design : Strongly fault secure circuits, fail – safe design of sequential circuits using partition theory and Berger codes, totally self – checking PLA design.

7. Design for testable combination logic circuits : Basic concepts of testability, controllability and observability. The Read – Muller expansion technique, level OR-AND-OR design, use of control and syndrome – testable design.

8. Testable Design of sequential Circuits : The scan – path technique, level – sensitive scan design (LSSD) and random Accers scan technique, built – in – test, built – in – test of VLSI chips, design for autonomous self – test, design in testability into logic boards.

Books:

1. Parag K.Lala : Fault Tolerant & Fault Testable Hardware design, (PHI) 1985.
2. Parag K LaLA : Digital Systems design using PLD's (PHI) 1990.
3. N.N. Biswas : Logoc Design Theory (PHI) 1990.

✷✷✷✷✷

Subject Code : R50658

DIGITAL IMAGE ANALYSIS AND MACHINE VISION

1. **Digitized Image and its properties:** Basic concepts, Image Functions, the dirac distribution and convolution, the Fourier transform, Images as a Stochastic process, Images as linear systems.
   Image Digitization: Sampling, Quantization, Colour Images.

2. **Digital Image Properties:** Metric and topological properties of Digital Images, Histograms, Visual perception of the Image, Image quality, Noise in Images.

3. **Data Structures for Image Analysis:** Levels of Image Data representation, traditional Image Data Structures- Matrices, Chains, Topological Data Structures, Relational Structures.

4. **Image Pre-processing:** Pixel brightness transfomation – Position dependent brightness correction, Gray scale transformation. Geometric Transformations -- Pixel co-ordinate transformation, Brightness interpolation. Local Pre-processing – Image smoothing, Edge-detectors, Zero crossings of the second deritives, scale in Image processing, canny edge detection, parametric edge models, edges in multi spectral images, other local pre-processing operators, adaptive neighborhood pre-processing.

5. **Image Restoration:** Degradations that are easy to restore, Inverse Filteration, Weiner Filteration.
   Segmentation: Thresholding – Threshold detection methods, optimal thresholding, multi- spectral thresholding, thresholding in hierarchical data structures.

6. **Edge Based Segmentation:** Edge image thresholding, Edge relaxation, border tracing, border detection as graph searching, border detection as dynamic programming, Hough transformation, border detection using border location information, region construction from borders.
   Region Based Segmentation: Region merging, region splitting, splitting and merging, Watershed segmentation, region growing post processing.

7. **Shape Representation and Description:** Region identification, Computer Based representation and description – Chain codes, simple geometric border representation, Fourier transforms of boundaries, boundary description using segment sequences, B-Spline representation, other contour based shape description approaches, Shape Invariants.

8. **Region Based Shape representation and description:** Simple scalar region descriptors, moments, convex hull, graph representation based on region skeleton, region decomposition, region neighborhood graphs, Shape classes.

Text Books:

1. Image Processing, Analysis and Machine Vision – Milan Sonka, Vaclav
2. Hlavac, Roger Boyle, Second Edition – Vikas Publishing House.

Reference:

Digital Image Processing And Analysis – Chanda & Majumder

✷✷✷✷✷

Subject Code : R50659

DIGITAL IMAGE PROCESSING

1. Digital Image fundaments: Introduction, An image model, sampling & quantization, basic relation ships between Pixels, imaging geometry.

2. Image Transforms: Properties of 2 – D Fourier transform, FFT algorithm and other separable image transforms. Walsh transforms. Hadamard, Cosine, Haar, Slant transforms, KL transforms and their properties.
3. Image Enhancement: Background, enhancement by point processing, histogram processing, spatial filtering and enhancement in frequency domain, color image processing.
4. Image filtering and restoration – degradation model, diagnolisation of circulant and block circulate matrices, Algebraic approach to restoration, inverse filtering, least mean squares and interactive restoration, geometric transformations.
5. Image compression: Fundamentals, image compression modes, error free compression, lossy compression, image compression standards.
6. Image segmentation: Detection of discontinuities, edge linking and boundary detection thresholding, region – oriented segmentation, use of motion in segmentation.
7. Representation and description: Various schemes for representation, boundary descriptors, and regional descriptors.
8. Image reconstruction from Projections, Radon Transforms; Convolution/Filter back – Project Algorithms.

BOOKS:

1. A.K.JAIN, " Fundamental of Digital Image Processing" PHI
2. C.GONZALEX & R.E WOODS " Digital Image Processing " Addison Wesley

✷✷✷✷✷

Subject Code : R50660

INTERNET PROTOCOLS

Unit – 1 **Introduction**

Internet administration and standards. The OSI model and TCP/IP protocol, TCP/IP Versions.

Unit – 2 **Internet Protocol – Part 1.**

IP addressing, different classes, subnetting, supernetting, delivery and routing of IP packets, IP design, ARP and RARP.

Unit – 3 **Internet Protocol – Part2.**

Internet control message protocol, message format, error reporting and query, ICMP design, Internet group message protocol and its design, user datagram protocol, operation and design.

Unit – 4 **Transmission Control Protocol.**

TCP services, flow control, error control, connection, congestion control, TCP design and operation, routing protocol, RIP, OSPF and BGP.

Unit – 5

BOOTP and DHCP, DNS name space, distribution of name space, DNS resolution, types of records, Telnet and remote login.

Unit – 6

File Transfer Protocol, connection, communication and command processing, TFTP, simple mail transfer protocol, addresses, mail delivery, multipurpose Internet mail extensions. Post office protocol.

Unit – 7

Simple Network Management Protocol, Hypertext Transfer Protocol, Next Generation IP Protocols, IPv6 and ICMPv6.

Text Books:

1. TCP/IP Protocol Suite – By Behrouz A. Porouzan, TMH, ed.-2000.
2. Internet Working with TCP/IP Vol.I: Principles, Protocols and Architecture – by Douglas E. Comes. (PHI)-1997.

✷✷✷✷✷

Subject Code : R50661

MICRO COMPUTER SYSTEM DESIGN

Architectural advances of Intel XX86 Microprocessors series from 8086 to Pentium and Pentium Pro – Addressing Modes, Instruction Sets, Interrupt Processing.

Software model of XX86 processors, Data organization, Memory Organisation, Programming with DOS and BIOS function calls.

Introduction to Operating Systems & Virtual Memory Management.

RISC & CISC Concepts, Super scalar architecture, Pipelining, Branch Prediction, Instruction and data caches, Floating point Unit.

Books

1. James L.Antonakos: The Pentium Microprocessor (PHI) 1997.
2. Barry B.Brey: The Intel Microprocessors 8086/8088, 80188,80386,80486, Pentium-Pro Processor Architecture, Programming & Interfacing (PHI)4th End.1997.
3. John Uffenbeck : The 8086/8088 family design, Programming & interfacing, (PHI)1994

✷✷✷✷✷

NETWORK SECURITY

1. Introduction to Network Security At tacks, services, Security. A model of Inter network Security, Steganography, One time PADS.

2. Basic and ESOTERIC Cryptographic Protocols Key Exchange, Authentication, Formal Analysis of Authentication and key Exchange Protocols, Multiple & Public Key Cryptography, Secret Splitting & Sharing Secure elections, Secure multiparty Communication, Digital Cash.

3. Crypto Graphic Algorithms (Block Cipher) RC2, GOST, CAST, BLOW FISH, SAFEER, RC5, NEWDES, CRAB, Theory of Block Cipher design.

4. Key Management, Key lengths, Generating Keys, Transferring, Verification, Updating, Storing, Backup, Compromised, Lifetime of, Destroying Keys, Public key Management.

5. Digital Signature Algorithms, Digital Signature, DSA, DSA variants, Gost, Discrete Lagorithm, One – Schnorr – Shamir digital Signatures, Esign, Cellular Automata.

6. Electronic Mail & IO Security good Privacy, SIMIME, IP Security Architecture, Authentication Header, Encapsulating Security, Pay load Key Management Issues.

7. Web Security Web Security requirements, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

8. Intruders, Viruses, Worms and Firewalls Intruders, Viruses and Related Threads, Firewall Design Principles, Trusted Systems.

Text Books:

1. Applied Crypto Graphy – Bruce SCHNEIER Johnwiley & Sonc Inc – Second Ed.
2. Cryptography and Network Security William Stallings Prentice Hall

✷✷✷✷✷

Subject Code: R50663

NEURAL NETWORKS AND FUZZY SYSTEMS

1. Introduction and fundamentals of Artificial Neural Networks, Biological prototype, Artificial neuron, Single layer artificial, neural networks, multilayer artificial neural networks, training of artificial neural networks.

2. Perceptions: Perceptron Representation, perceptron learning, perceptron Training algorithm. Back propagation: Introduction to back propagations and Back propagation training algorithm, counter propagation networks.

3. Kohonen self-organizing networks: Introduction, the Kohonen algorithm, weight training, Grossberg layer, Training the Grossberg Layer.

4. Hopfiled Networks: Introduction, The Hopfiled model, Hopfiled network algorithm, Boltzmann's machine applications of Hopfiled Networks, Associative Memories, Bi- directional Associative Memories.

5. Adaptive Resonance Theory: Architecture of Adaptive Resonance Theory, Algorithm, Applicability of Artificial neural Networks to pattern Recognition and Image Processing, Dimensionality of neural Networks for pattern Recognition.

6. From classical (CRISP) sets to fuzzy sets: Crisp sets, fuzzy sets types and basic concepts. Characteristics and significance of paradigm shift. Fuzzy sets Vs Crisp Sets: Additional properties of α-cuts, representation of fuzzy sets, operations on fuzzy sets: types, fuzzy complements, fuzzy intersections, unions, combinations, aggregations.

7. Fuzzy arithmetic: fuzzy numbers, linguistic variables, arithmetic operations on intervals, fuzzy numbers, and lattice of fuzzy numbers, equations.
   Fuzzy Relations: Crisp Vs Fuzzy relations, binary fuzzy relations, fuzzy Equivalence, compatibility, ordering relations, fuzzy morphisms, Sup-i, inf-ω_i compositions of fuzzy relations. Fuzzy relation equations: problem partitioning, solution method, basing on Sup-i, inf-ω_i compositions.

8. Possibility theory**:** fuzzy measures, evidence theory, fuzzy sets and possibility theory, possibility Vs probability theory, Fuzzy logic: Multivalued logics, propositions, quantifiers, linguistic hedges, inferences. Uncertainty based information, Fuzzy systems: fuzzy controllers, fuzzy systems and neural networks, fuzzy neural networks, fuzzy automata, dynamic systems.

TEXT BOOKS:

1. Neural computing: Theory and practice – Waserman
2. Sets and Fuzzy logic theory and applications—George J. Klir/Bo Yuan

REFERENCES : An introduction to Neural Computing – I. Alexander and Helen Mart – William Jackson.

✷✷✷✷✷

Subject Code: R50664

SPEECH RECOGNITION

This course covers the following main topics.

The object of this course is to teach theory, algorithm and system development of a state-of-art speech recognition system using dynamic programming models and Hidden Markov Models. This course is intended to provide hands on experience on aspects of building a state –of –art speech recognition system and it follows learning by doing methodology.

TOPICS

Introduction to Speech Production System

Classification of speech Sounds

Feature Extraction from Speech Signal

Dynamic Programming Models for Speech Recognition

A brief introduction to Hidden Markov Models

TEXT BOOKS

Spoken Language Processing: A Guide to Theory, Algorithm and System Development by Xuedong Huang, Alex Acero, Hsiao-Wuen Hon, Prentice-Hall.

✷✷✷✷✷

VHDL PROGRAMMING

1. Hardware design Environment, H/w Description Language, VHDL background, Capabilities and H/W abstraction.

2. **Basic Concepts of VHDL**: Basic Terminology, Entity declaration, Architecture body,
Configuration declaration, Digital Hardware modeling in FHDL, Libraries and Packages in VHDL modeling lib & package declaration, package body predefined Data types and operators in standard package.

3. **Behavioural Modeling**: Entity, architecture models concurrent process statements, variable assignment statements, signal assignment statement, wait, if, case, null, loop, exit ,next, assertion, report statements, sequential statements, multi processes, postponed processes.

4. **Data flow modeling:** Concurrent statements, concurrent versus sequential signal assignment, Delta delay revisited, multiple drivers, conditional signal assignment statement, selected signal assignment statement, block statement, concurrent assertion
statement, test bench for an entity testing.

5. **Structural Modeling**: Component declaration, component instantiation, examples, resolving signal values.

6. **Generics and configuration**: Generics, configuration specification, declaration, default rules, conversion function, direct instantiation, incremental binding.

7. **Subprograms and overloading**: Subprograms, H/W modeling using sub programming, sub program overloading (with & without Operators), signatures, default values for parameters. Objects in VHDL, constant class object declaration, Data types classification in VHDL.

8. **Packages & Libraries**: Package declaration, package body, design features, library,
order of analysis, implicit & explicit visibility.

9. **Hardware Modeling examples**: Modeling Sync, logic, state machine modeling, Modeling a Moore FSM, Mealy FSM.

BOOKS :

1. Jayaram Bhasker : A.VHDL Primer PTR PH 3rd edn. 2000.
2. Douglas perry : VDHL, 3rd Edn. Mc. Graw Hill, 1999.
3. Navabi : VHDL Analysis & Modeling of Digital Systems McGraw Hill 2nd Edn.1998.

✷✷✷✷✷