B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-201C

SUBJECT NAME: DATA STRUCTURES USING C

NO OF CREDITS: 4

B.TECH SEMESTER III	SESSIONAL: 25
L P T	THEORY EXAM: 75
3 0 1	TOTAL: 100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To give exposure of basic data structures and related algorithms to prepare a sound base of the students.
2. Assess how the choice of data structures and algorithm design methods impacts the performance of programs.
3. To make the students familiar with concepts of data structure such as stack, queue, linked list, trees, hash tables, binary trees, heaps, binary search trees graphs etc. and Solve problems using these data structures.
4. To enable the students to understand and analyze elementary algorithms: sorting, searching and hashing.

Unit I

Overview of 'C': Introduction, Flow of Control, Input output functions, Arrays and Structures, Functions.

Data structures and Algorithms: an overview: concept of data structure, choice of right data structures, types of data structures, basic terminology, Algorithms, how to design and develop an algorithm: stepwise refinement, use of accumulators and counters; algorithm analysis, complexity of algorithms Big-oh notation.

Arrays: Searching Sorting: Introduction, One Dimensional Arrays, Operations Defined: traversal, selection, searching, insertion, deletion, and sorting. Multidimensional arrays, address calculation of a location in arrays.

Searching: Linear search, Recursive and Non recursive binary Search.

Sorting: Selection sort, Bubble sort, Insertion sort, Merge sort, Quick sort, Shell sort, Heap sort

Stacks and queues: Stacks, array representation of stack, Applications of stacks. Queues, Circular queues, array representation of Queues, Deque, priority queues, Applications of Queues.

Unit II- Pointers and Linked Lists

Pointers: Pointer variables, Pointer and arrays, array of pointers, pointers and structures, Dynamic allocation.

Linked Lists: Concept of a linked list,. Circular linked list, doubly linked list, operations on linked lists. Concepts of header linked lists. Applications of linked lists, linked stacks linked Queues.

Unit III-Trees and Graphs

Trees: Introduction to trees, binary trees, representation and traversal of trees, operations on binary trees, types of binary trees, threaded binary trees, B Trees, Application of trees.

Graphs: Introduction, terminology, 'set, linked and matrix' representation, Graph traversal techniques: BFS, DFS, operations on graphs, Minimum spanning trees, Applications of graphs.

Unit IV-File Handling and Advanced data Structure

Introduction to file handling, Data and Information, File concepts, File organization, files and streams, working with files.AVL trees, Sets, list representation of sets, applications of sets, skip lists.

Course Outcomes:

After completing this course satisfactorily, a student will be able to:

1. Analyse, evaluate and choose the appropriate data structure and algorithm to solve a given problem and will also be able to compare algorithms with respect to time and space complexity.
2. To design and implement the data structures such as linked list, stack, queue tree and graphs by using C as the programming language using static or dynamic implementations.
3. To understand and analyze elementary algorithms: sorting, searching and hashing.
4. To apply advance C programming techniques such as pointers, dynamic memory allocation, structures to develop solutions for particular problems.

REFERENCES

1. Data Structures using C by **A. M. Tenenbaum, Langsam**, **Moshe J. Augentem**, PHI Pub.
2. Data Structures using C by **A. K. Sharma**, Pearson
3. Data Structures and Algorithms by **A.V. Aho**, **J.E. Hopcroft and T.D. Ullman**, Original edition, Addison-Wesley, 1999, Low Priced Edition.
4. Fundamentals of Data structures by **Ellis Horowitz &Sartaj Sahni**, Pub, 1983,AW
5. Fundamentals of computer algorithms by **Horowitz Sahni and Rajasekaran**.
6. Data Structures and Program Design in C By **Robert Kruse**, PHI,
7. Theory & Problems of Data Structures by **Jr. Symour Lipschetz**, Schaum's outline by TMH
8. Introduction to Computers Science -An algorithms approach , **Jean Paul Tremblay**, Richard B. Bunt, 2002, T.M.H.
9. Data Structure and the Standard Template library – **Willam J. Collins**, 20

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-203C

SUBJECT NAME: DISCRETE STRUCTURES

NO OF CREDITS: 4

B.TECH	SEMESTER III	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To make the students familiar with Set theory, functions and Relations.
2. To discuss Partial Order relations and Lattice.
3. To give knowledge about various counting principles, Propositions and normal forms like CNF, DNF, PCNF and PDNF.
4. To make the student familiar with Recursion and various Recurrence Relation.
5. To discuss the concept of Algebraic Structures.
6. To make the students understand Graphs, different algorithms based on Graph Theory, Tress and their traversals.

Unit-1: Set Theory: Introduction to set theory, Set operations, Algebra of sets, Finite and Infinite sets, Classes of sets, Power Sets, Multi sets, Cartesian Product, Representation of relations, Types of relation, Equivalence relations and partitions , Partial ordering relations and lattices.

Unit-2: Propositional Calculus: Basic operations: AND (^), OR (v), NOT (~), Implication and bi-implication, Truth value of a compound statement, propositions, tautologies, contradictions, Universal and Existential quantifiers, methods of proof, Mathematical Induction, Propositional logic, Hypothesis and Inference, CNF, DNF, PCNF, PDNF.

Unit–3: Techniques of Counting: Permutations with and without repetition, Combination.

Unit-4: Recursion And Recurrence Relation: Linear recurrence relation with constant coefficients, Homogeneous solutions, Particular solutions, Total solution of a recurrence relation using generating functions.

Unit-5: Algebric Structures: Definition and examples of a monoid, Semigroup, Groups and rings, Homomorphism, Isomorphism and Automorphism, Subgroups and Normal subgroups, Cyclic groups, Integral domain and fields, Cosets, Lagrange's theorem

Unit-6: Graphs And Trees: Introduction to graphs, Directed and Undirected graphs, Homomorphic and Isomorphic graphs, Subgraphs, Cut points and Bridges, Multigraph and Weighted graph, Paths and circuits, Shortest path in weighted graphs, Eurelian path and circuits, Hamilton paths and circuits, Planar graphs, Euler's formula, Trees, Spanning trees, Binary trees and its traversals, Coloring graph problem, bipartite graphs, Travelling salesman problem,

Course Outcomes:

After completion of the course the student will be able

1. To understand and solve basic problems of set theory, Functions and Relations.
2. To understand core ideas in combinatorial mathematics including prepositions and will be able to apply combinatorial ideas to practical problems.
3. To understand the fundamentals of Algebraic structures and Recurrence Relations. Also students will be able to solve problems based on recurrence relations.
4. To understand core ideas in graph theory and trees and will be able to solve problems based on the same.

REFERENCES

1. Elements of Discrete Mathematics C.L Liu, 1985, McGraw Hill
2. Discrete Mathematical Structures, B. Kolman and R.C. Busby, 1996, PHI
3. Discrete Mathematical Structures with Applications to Computers by Tembley & Manohar, 1995, Mc Graw Hill.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-205C

SUBJECT NAME: COMPUTER NETWORKS

NO OF CREDITS: 4

B.TECH	SEMESTER III	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. The students will be able to understand basic computer network technology, different types of network topologies and protocols.
2. The students will be able to enumerate the layers of the OSI model and TCP/IP and analyze the services and features of the various layers of data networks.
3. The students will be able to learn services and protocols of physical and data loink layer and understand IEEE 802 standards.
4. The students will be able to understand and building the skills of subnetting and routing mechanisms. Design, calculate, and apply subnet masks and addresses to fulfill networking requirements.
5. The students will be able to understand routing and congestion in network layer with routing algorithms and will understand unicast routing, multicast routing and their protocols and transport layer protocols, services and congestion control.
6. The students will be able to analyze the features and operations of session, presentation and application layer and protocols such as Http, FTP, DNSs and also will be able to understand the need of security in networks with basics of encryption and cryptography.

Unit-1: OSI Reference Model and Network Architecture: Introduction to Computer Networks, Overview of Data Communication and Networking - Analog / Digital transmission, Internet, Private Networks, Network Topologies: Bus-, Star-, Ring-, Hybrid -, Tree -, Complete - , Irregular –Topology; Types of Networks: Local Area Networks, Metropolitan Area Networks, Wide Area Networks; Layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer.

Unit-2: Data Link Layer: Error detection and correction, Data link control - Flow and Error control - Sliding window protocol - ARQ schemes, HDLC protocol - Point to Point Protocol, Multiple Access Techniques - Random Access, Controlled Access, Logical Link Control (LLC) and Medium Access Sub-layer functions - LAN standards - IEEE 802.3

(CSMA/CD) - Fast Ethernet - Giga Bit Ethernet, IEEE 802.4 (Token Bus), IEEE 802.5 (Token Ring), IEEE 802.11 (Wireless LAN).

Unit-3: Network Layer: Inter-networking - Addressing - Routing - Link state and Distance Vector Routing - Congestion control algorithms - Network Layer Protocols - ARP, RARP, IPv4, ICMP, IPv6 and ICMPv6 - Unicast Routing - RIP, OSPF, BGP and Multicast Routing - IGMP, DVMRP, MOSPF, CBT, PIM.

Unit-4: Transport Layer: Processes to Processes Delivery - Transmission Control Protocol (TCP) - User Datagram Protocol, Stream Control Transmission Protocol (SCTP) - Data Traffic - Congestion Control and Quality of Service - Techniques to improve QOS - Integrated Services - Differentiated Services, QoS in switched networks.

Unit-5: Session, Presentation and Application Layers: Services, Network security - security Cryptography, Message confidentiality, message integrity, message authentication, Digital Signature, Entity Authentication, Key Management, Application layer- DNS, E-mail (SMTP), FTP, HTTP, Voice over IP. ATM, ISDN,SONET

Course Outcomes:

1. To understand the terminology, concepts of the OSI reference model and the TCP-IP reference model and protocols, design issues in local area networks and wide area networks
2. To be familiar with protocols and issues at physical and data link layer including various IEEE standards.
3. To have a good understanding of the network layer including IP Addressing, routing and transport layer.
4. To have a basic knowledge of the session layer, presentation layer, application layer, use of cryptography and network security.

REFEREENCES

1. Computer Networks (3rd edition), Tanenbaum Andrew S., International edition, 1996.
2. Forouzan, Data Communications and Networking, TMH, 4 th Edition, 2006.
3. William Stallings, Data and Computer Communications, PHI, 7 th Edition, 2003
4. Data Communications, Computer Networks and Open Systems (4th edition), Halsall Fred,2000, Addison Wesley, Low Price Edition.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-207C

SUBJECT NAME: DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

NO OF CREDITS: 4

B.TECH SEMESTER III		SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To understand the fundamental concepts of Communication Systems.
2. To understand and analyze the signal flow in a digital communication system.
3. To acquire knowledge about various types of transmission media and communication modes.
4. To design the hardwired and micro-programmed control units.
5. To study the different ways of communicating with I/O devices and standard I/O interfaces.
6. To study the hierarchical memory system including cache memories and virtual memory.

Unit 1 Communication system components: Introduction to Communication: Definition & means of communications; Digital and analog signals: sign waves, square waves; Properties of signals: amplitude, frequency, phase, modulation: types of modulation amplitude-modulation, frequency-modulation, phase- modulation.

Unit 2 Transmission Media and Communication Modes: Twisted pair-, co-axial, fiber optic-cables, wireless media Transmission impairments: attenuation, limited bandwidth of the channels, delay distortion, noise, and data rate of the channels (Nyquist theorem, Shannon limit), Communication modes: simplex, half duplex, full duplex.

Unit 3 Fundamentals of Digital Techniques: Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra, Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCII, Error detection and correction codes, Design using gates, Karnaugh map and Quine Mcluskey methods of simplification.

Unit 4 Combinational Design and Sequential Using Gates: Combinational circuits: Multiplexers and Demultiplexers and their use as logic elements, Decoders, Adders/Subtractors, BCD arithmetic circuits, Encoders, Decoders/Drivers for display devices. Sequential circuits : Flip Flops; S-R, J-K, T, D, master-slave, edge triggered, shift registers, Counters, Asynchronous and Synchronous Ring counters and Johnson Counter, Design of Synchronous and Asynchronous sequential circuits.

Unit 5 Computer Organization and Design: Instruction cycle, Fetch-Decode-Execute cycle(typically 3 to 5 stages), Instruction code, computer registers, computer instructions, type of instructions, memory reference, register reference, I/O reference, Hardwired controlled unit.

Unit 6 Micro programmed Control & Central Processing Unit: Micro programmed controlled unit, Control memory and address sequencing, Design of Control Unit, General Register Organization, Stack Organization, Addressing Modes: register, immediate, direct, indirect, indexed, Operations in the instruction set: Arithmetic and Logical, Data Transfer and Manipulation, Program Control, RISC Vs. CISC architectures.

Unit 7 Memory Hierarchy & I/O techniques: The need for memory hierarchy(Locality of reference) Main Memory, Associative Memory, Cache Memory, Auxiliary Memory, memory parameters (access/ cycle time, cost per bit) Virtual Memory.

Course Outcomes:

The Student will be able to

1. Acquire knowledge about Communication System.
2. Understand the difference between digital and analog signals.
3. To identify and compare different methods for computer I/O
4. Identify functional units, bus structure and addressing modes.
5. Design the hardwired and micro-programmed control units.
6. Identify memory hierarchy and performance

REFERENCES

1. Data Communications, Computer Networks and Open Systems Halsall Fred, (4th editon) 2000, Addison Wesley, Low Price edition
2. Modern Digital Electronics(Edition III) : R. P. Jain; TMH
3. Digital Design : Morris Mano; PHI.
4. Computer System Architecture : Morris Mano; PHI.
5. Business Data Communications, Fitzgerald Jerry, 7 th Ed. New York, 2001, JW&S, Communication Systems, 4th Edition, by A. Bruce Carlson, Paul B. Crilly, Janet C. Rutledge, 2002, TMH.
6. Data Communications, Computer Networks and Open Systems, Halsall Fred, 1996, AW. Digital Communications, J.G. Proakiss, 4 th Ed.,
7. Introduction to Digital & Data Communications, Miller Jaico Pub. Data Communications and Networking, Behrouz A. Forouzan, 2003, 2 nd Edition, T.M.H
8. Digital Integrated Electronics : Taub & Schilling; MGH
9. Digital Principles and Applications : Malvino & Leach; McGraw Hill.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-209C

SUBJECT NAME: THEORY OF AUTOMATA AND COMPUTATION

NO OF CREDITS: 4

B.TECH	SEMESTER III		SESSIONAL:	25
L	P	T	THEORY EXAM:	75
3	0	1	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

1. To understand the fundamental concepts of Finite state Systems and Non-Deterministic finite automata (NDFA), Deterministic finite automata (DFA), Chomsky hierarchy of grammars.
2. To acquire knowledge about Regular Grammar and Regular Sets, Context Free and Context Sensitive Grammars: Definition, Context free and Context sensitive grammar.
3. To implement push down automata and turing machines.
4. To understand the concept of undecidability and Computability.

Unit-1: Finite State Automata: Finite State Systems, Properties and limitations of Finite State machines, Basic Definitions, Non-Deterministic finite automata (NDFA), Deterministic finite automata (DFA), Equivalence of DFA and NDFA, Equivalence of two DFA's, Finite automata with null moves: removal of null moves, Myhill-Nerode Theorem and minimization of finite Automata, finite Automata with outputs: Moore and mealy Machines, Equivalence of Moore and Mealy machines.

Unit-2: Chomsky Classification: Chomsky hierarchy of grammars, Unrestricted languages, Context sensitive languages, Context free and regular languages, Relation between classes of languages.

Unit-3: Regular Grammar and Regular Sets: Regular Expressions, Identities, Regular languages and finite automata, Arden theorem: Equivalence of finite automata and Regular Expressions, The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets.

Unit-4: Context Free and Context Sensitive Grammars: Definition, Context free and Context sensitive grammar, Parse trees, Ambiguity in CFG, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

Unit-5: Pushdown Automata: Introduction to Pushdown Machines, Two types of acceptance by PDA, Design of PDA corresponding to a language.

Unit-6: Turing Machines: Basic structure and working, Deterministic and Non-Deterministic Turing Machines, Design of TM, Universal TM, Halting problem of TM.

Unit-7: Undecidability and Computability: Recursive and non-recursive languages, PCP problem, Basic concepts, Primitive Recursive Functions.

Course Outcomes:

1. The students will be able to understand Finite State Systems, Properties and limitations of Finite State machines, Basic Definitions, Non-Deterministic finite automata (NDFA),Deterministic finite automata (DFA)and be able to explain Chomsky hierarchy of grammars.
2. The students would be able to define Regular Expressions, Identities, Regular languages and finite automata, Arden theorem: Equivalence of finite automata and Regular Expressions and be able to understand Context free and Context sensitive grammar, Parse trees, Ambiguity in CFG.
3. The students will be able to analyze Design of PDA and will become familiar with Deterministic and Non-Deterministic Turing Machines, Design of TM, Universal TM, Halting problem of TM. Permutations and Combinations,
4. The students will be able to find the various solutions of Recursive and non-recursive languages.

REFERENCES

1. Formal languages and Automata Theory- C. K. Nagpal, Oxford University Press 2011.
2. Theory of Computer Sc.(Automata, Languages and computation): K. L. P. Mishra & N. Chandrasekaran, PHI.
3. Introduction to automata theory, language & computations- Hopcroaft & D. Ullman, R Mothwani, 2001, AW
4. Introduction to formal Languages & Automata- Peter Linz, Narosa Publications.
5. Fundamentals of the Theory of Computation- Principles and Practice by Ramond Greenlaw and H. James Hoover, 1998, Harcourt India Pvt. Ltd..
6. Elements of theory of Computation by H.R. Lewis & C.H. Papaditriou, PHI.
7. Introduction to languages and the Theory of Computation by John C. Martin, T.M.H.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-211C

SUBJECT NAME: INTRODUCTION TO E-COMMERCE AND ERP

NO OF CREDITS: 4

B.TECH	SEMESTER III	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To understand the basic concept of electronic transactions, types of business models and about customer relationship management.
2. To study various types of business strategies and marketing strategies.
3. To study about various legal and ethical issues related to electronic transactions and also understating the concepts of IPR.
4. To study in detail about various business processes, ERP implementations, various types of information systems, business intelligence and knowledge management.

Unit-1

Introduction to e-commerce: Need, importance, Business models, revenue models and business processes, economic forces & e-commerce, identifying e-commerce opportunities, international nature of e-commerce, technology infrastructure-internet & WWW; Business strategies for e-commerce: Revenue models in transaction, revenue strategic issues, creating an effective web presence, Marketing on the web: Web marketing strategies, communicating with different market segments, customer behavior and relationship intensity, advertising on the web, e-mail marketing, technology enabled CRM.

Unit-2

Business to business strategies: (Overview strategic methods for Developing E-Commerce) Purchasing, logistics and supply activities, electronic data interchange (EDI), electronic data interchange on the internet, supply chain management using internet technologies, electronic market place & portals (Home shopping, E-marketing, Tele marketing), auctions, online auctions, virtual communicative & web portals; legal, and ethical issues in e-commerce — use and protection of intellectual property in online business, online crime, terrorism & warfare, ethical issues.

Unit-3

Enterprise resource planning: Business functions, processes & data requirements, development of ERP systems, marketing information systems & sales order process, production & supply

chain management information systems, accounting in ERP systems, human resource processes with ERP, process modeling, process improvement and ERP implementations, Relationship between ecommerce and ERP.

Unit-4

ERP-Information System perspective: Evolution of Application Software Technology Management,EDP,MIS,DSS,OLAP,TPS,KBS,BPR,CRM,Business process re-engineering,Data ware house and Data mining, Business Intelligence and knowledge management.

Course Outcomes:

The students will be able to

1. Understand the basic concepts of electronic transactions.
2. Study various types of business models and customer relationship management.
3. To understand about various business strategies and marketing strategies.
4. Study various legal and ethical issues related to electronic transactions.
5. Study of intellectual property rights and its importance.
6. Study of various business process and ERP implementation.

REFERENCES

1. Gary P. Schneider, “Electronic Commerce”, Seventh Edition, CENGAGE Learning India Pvt. Ltd., New Delhi.
2. K.K.Bajaj, D. Nag “E-Commerce”, 2nd Edition, McGraw Hill Education, New Delhi
3. P.T. Joseph, “E-Commerce An Indian Perspective”, PHI Publication, NewDelhi.
4. Bhaskar Bharat, “Electronic Commerce-Technology and Application”, McGraw Hill Education, New Delhi
5. Mary Sumner, “Enterprise Resource Planning”, 2005, PHI Learning India Pvt. Ltd. / Pearson Education, Inc. New Delhi.
6. Chan, “ E-Commerce fundamentals and Applications”, Wiley India, New Delhi

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-202C

SUBJECT NAME: DATABASE MANAGEMENT SYSTEM

NO OF CREDITS: 4

B.TECH	SEMESTER IV		SESSIONAL:	25
L	P T		THEORY EXAM:	75
3	0 1		TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. The students will be able to understand basic terminology used in database systems, basic concepts, the applications of database systems and understand role of Database administrator in DBMS.
2. The students will be able to understand various data model like Hierarchical model, Network Model, Relational model, E-R model and will be able to make E-R diagram from data given by user and table from E-R diagram.
3. The students will be familiar with relational database theory and be able to write relational algebra expressions for query.
4. The students will be able to understand the logical design guidelines for databases, normalization approach, primary key, super key, foreign key concepts
5. The students will be familiar with basic issues of transaction processing and concurrency control and serializability, its various protocols to maintain it and parallel and distributed databases.

UNIT 1: Introduction: Overview of database Management System; characteristics of database, database users, Advantages of DBMS over file processing systems, Responsibility of Database Administrator, components of DBMS, Introduction to Database Languages, Three schema architecture, Introduction to Client/Server architecture.
UNIT 2: ER Modeling: Basic concepts, mapping Constraints, Keys, Design of E-R Diagram, Reduction of E-R diagram into tables.
UNIT 3: Data Models: Network data model, Hierarchical data model, Relational data model, Respective Advantages and Disadvantages.
UNIT 4: Introduction to Query Languages: Relational Algebra, Structured query language, Relational constraints- Domain Constraint, Key Constraint, Integrity Constraints.

UNIT 5: Functional dependencies & Normalization: Introduction to functional dependency, Inference rules, minimal cover, closure, Types of keys, desirable properties of decompositions, Normalization & de-normalization process.

UNIT 6: Transactions, Concurrency Management and recovery: Transactions, desirable properties, Concurrent Transactions, Serializable Schedules, Locks, Two Phase Locking (2PL), Timestamp based protocols, Deadlock and its Prevention, What is Recovery, Kinds of failures, Failure controlling methods (Log base recovery, shadow copy scheme, checkpoints)

Unit-7: Distributed Data processing, parallel Databases: Architecture for Parallel databases, Parallel query evaluation, Data Partitioning, Types of distributed databases, Architecture of distributed databases, Fragmentation, Replication, catalog management.

Course Outcomes:

The Student will be able

1. To understand the basic concepts, applications and architecture of database systems.
2. To master the basics of ER diagram, SQL, construct queries using SQL, relational database theory and relational algebra expressions for queries.
3. To understand sound design principles for logical design of databases, normalization and become familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree and hashing.
4. To understand the basic issues of transaction processing, concurrency control, recovery, parallel and distributed databases.

REFERENCES

1. Fundamentals of Database Systems by R. Elmasri and S.B. Navathe, 3rd edition, 2000, Addision-Wesley, Low Priced Edition.
2. An Introduction to Database Systems by C.J. Date, 7th edition, Addison-Wesley, Low Priced Edition, 2000.
3. Database Management and Design by G.W. Hansen and J.V. Hansen, 2nd edition, 1999, Prentice-Hall of India, Eastern Economy Edition.
4. Database Management Systems by A.K. Majumdar and P. Bhattacharyya, 5th edition, 1999, Tata McGraw-Hill Publishing.
5. A Guide to the SQL Standard, Date, C. and Darwen,H. 3rd edition, Reading, MA: 1994, Addison-Wesley.
6. Data Management & file Structure by Loomis, 1989, PHI

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-204C

SUBJECT NAME: ANALYSIS AND DESIGN OF ALGORITHMS

NO OF CREDITS: 4

B.TECH	SEMESTER IV		SESSIONAL:	25
L	P	T	THEORY EXAM:	75
3	0	1	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. Introducing students with mathematical preliminaries required to analyze and design computer algorithms and study advanced data structures required to design efficient computer algorithms
2. Familiarizing students with specific algorithms for a number of important computational problems like sorting, searching, and graphs, etc.
3. Use various techniques for efficient algorithm design (divide-and-conquer, greedy, dynamic programming, backtracking and branch and bound algorithms) and are able to apply them while designing algorithms.
4. Introducing the concept of NP-complete problems and different techniques to deal with them. Know the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.

Unit I

Brief Review of Graphs, Sets and disjoint sets, union, sorting and searching algorithms and their analysis in terms of space and time complexity.

Unit II-Divide and Conquer

General method, binary search, merge sort, quick sort, selection sort, Strassen's matrix multiplication algorithms and analysis of algorithms for these problems.

Unit III-Greedy Method

General method, knapsack problem, job sequencing with dead lines, minimum spanning trees, single source paths and analysis of these problems.

Unit IV-Dynamic Programming

General method, optimal binary search trees, O/I knapsack, the traveling salesman problem.

Unit V-Back Tracking
General method, 8 queen's problem, graph coloring, Hamiltonian cycles, analysis of these problems.

Unit VI-Branch and Bound
Method, O/I knapsack and traveling salesman problem, efficiency considerations. Techniques for algebraic problems, some lower bounds on parallel computations,NP hard ,NP complete

Course Outcomes:

1. Able to analyze and compare complexity for different types of algorithms for different types of problems and apply mathematical preliminaries to the analyses and design stages of different types of algorithms.
2. Choose among different types of data structures the best one for different types of problems and recognize the general principles and good algorithm design techniques for developing efficient computer algorithms. Familiarizing students with specific algorithms for a number of important computational problems like sorting, searching, and graphs, etc.
3. Decide on the suitability of a specific algorithm design technique for a given problem.
4. Design efficient algorithms for new situations, using as building blocks the techniques learned and apply algorithm design techniques to solve certain NP-complete problems.

REFERENCES

1. Fundamental of Computer algorithms, Ellis Horowitz and Sartaj Sahni, 1978, Galgotia Publ.,
2. Introduction To Algorithms, Thomas H Cormen, Charles E Leiserson And Ronald L Rivest: 1990, TMH
3. The Design and Analysis of Computer Algorithm, Aho A.V. Hopcroft J.E., 1974, Addison Wesley.
4. Algorithms-The Construction, Proof and Analysis of Programs, Berlion, P.Bizard, P., 1986.
5. Johan Wiley & Sons,
6. Writing Efficient Programs, Bentley, J.L., PHI
7. Introduction to Design and Analysis of Algorithm, Goodman, S.E. & Hedetnieni, 1997, MGH.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: IT-202C

SUBJECT NAME: HIGH SPEED NETWORKS

NO OF CREDITS: 4

B.TECH	SEMESTER IV	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To make the students familiar with High Speed Network technologies and its advantages and disadvantages of high speed technologies.
2. Study of techniques available for congestion control traffic management in TCP and ATM
3. To study integrated and differentiated services architecture.
4. Protocols for high speed communication.

UNIT I

HIGH SPEED NETWORKS : Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL.High Speed LANs: Fast Ethernet, Gigabit Ethernet, Fiber Channel – Wireless LANs: applications, requirements – Architecture of 802.11

UNIT II

CONGESTION AND TRAFFIC MANAGEMENT : Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III

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

UNIT IV

INTEGRATED AND DIFFERENTIATED SERVICES : Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services

UNIT V

PROTOCOLS FOR QOS SUPPORT : RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data TransferProtocol,RTCP.

Course outcomes:

After the completion of the course, students will be able to

1. Understand basic high speed networks like Frame relay and ATM.
2. Aware of congestion control traffic management techniques in TCP and ATM
3. Learn the functionality of integrated and differentiated services architecture.
4. Familiar with various high speed protocols.

REFERENCES

1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Educatin, Second Edition, 2002.
2. Warland & Pravin Varaiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
3. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MLS and VPN architecture", Cisco Press, Volume1 and 2, 2003.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-208C

SUBJECT NAME: OBJECT-ORIENTED PROGRAMMING USING C++

NO OF CREDITS: 4

B.TECH	SEMESTER IV	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To become familiar with procedural and object oriented techniques of problem solving
2. Become familiar with the syntax of C++ while understanding the features such as composition of objects, encapsulation, data hiding, inheritance, polymorphism and advanced features like generic classes, exception handling and File I/O
3. Be able to build the classes by following the principles of object oriented programming
4. Be able to improve the problem solving skills, so that object oriented or non-object oriented techniques can be applied to solve bigger real-world computing problems.

Unit 1: Introduction to C++

Introduction; Characters used in C++; Basic data types, Data type modifiers; C++ Tokens – identifiers, keywords, constants, variables; Input – Output statements, structure of a C++ program;**Escape Sequence (Backslash Character Constants);**Operators and Expressions – arithmetic, relational, logical, and conditional operator; special operators – sizeof(), comma, assignment operators; Flow of control – compound statement, the if and if-else, and switch statements, the while, do-while, and for loops, break and continue statements, exit() function; Arrays – one dimensional and multi-dimensional arrays, array initialization; Structures – referencing structure elements, arrays of structures, initializing structures, assigning structures, nested structures; Functions – prototypes, calling a function, parameter passing , call by value, call by reference, array parameters, returning values from functions.

Unit 2:POINTERS

Introduction to pointers- the '&' and '*'operators; pointer variables; dangling pointers; pointers and arrays; array of pointers; pointers and structures; dynamic allocation; self-referential structures, introduction to linked structures and lists;

Unit 3:Programming Techniques- A Survey

Introduction to programming paradigms – unstructured programming, structured , procedural, and modular programming; drawbacks of structured programming; Object Oriented programming.

Unit 4:Classes and Objects

Introduction to objects; classes – declaration in C++, abstraction and encapsulation, creating objects; array of objects; objects as function arguments, scope resolution operator, static data members; properties of classes and objects.

Unit 5:Functions: advanced concepts

Polymorphism, Function overloading; inline functions; friend functions- Member functions of a class as friends of another class, Friend Function as a bridge between two classes; friend classes; recursion – types of recursion: linear, binary, tail recursion

Unit 6:Constructors and Destructors

Constructors – types of constructors: default, user defined, parameterized, copy constructors, and constructors with default arguments; rules for constructor definition and usage; destructors -rules for destructor definition and usage.

Unit 7:Inheritance: Extending classes

Introduction to code reuse; containership-aggregation; inheritance – visibility modes, 'Open Close Principle'(OCP) types of inheritance: multilevel, multiple inheritance; function overriding – virtual functions, 'Liskov's Substitution Principle' (LSP), pure virtual functions; roles of constructors and destructors in inheritance; virtual base class – graph inheritance.

Unit 8:Templates: code sharing (Genericity):

Introduction to code sharing; templates; generic classes; templates with more than one generic parameter;

Unit 9:Operator overloading

Introduction to operator overloading, Overloading of binary operators, arithmetic assignment operators; overloading of unary operators; overloading of input-output operators; rules of operator overloading.

Unit 10:File handling in C++

File concepts; files and streams; opening and closing of files – functions get(), getline(), put() etc., opening files using function open(); reading and writing blocks and objects into the files; detecting 'end of file' (eof)

Unit 11:Exception handling

Introduction – traditional error handling; exception handling in C++ - 'try, throw, and catch blocks', multiple throw and multiple catch blocks, throwing objects; situations of usage of exception handling.

Course Outcomes:

After the successful completion of the course, student is able to:

1. Differentiate between various programming paradigms available
2. Is able to build the classes using proper syntax and applying the various features of the language.
3. Is able to implement and build the advanced concepts of the language into the classes like inheritance, polymorphism, templates, pointers, exception handling and file I/O
4. To apply the object oriented concepts to the real world problems.

REFERENCES

1. C++ How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall
2. Object Oriented Programming in Turbo C++ by Robert Lafore ,1994, The WAITE Group Press.
3. Programming with C++ By D Ravichandran, 2003, T.M.H
4. Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley,

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-210C

SUBJECT NAME: MICROPROCESSOR AND INTERFACING

NO OF CREDITS: 4

B.TECH SEMESTER IV	SESSIONAL: 25
L P	THEORY EXAM: 75
4 0	TOTAL: 100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. Identify the basic elements and functions of contemporary microprocessors (8085, 8086) And understanding the architecture and operation of microprocessors.
2. Analyze timing sequence of different instruction and applying programming in the instruction sets of microprocessors.(Basically Intel family). .
3. To introduce the students with instruction format and addressing modes.
4. Identify and explain the operations of peripherals and memories typically interfaced with microprocessors.
5. The students should be able to understand DMA, 8255 PPI and Programmable interrupt controller 8259 and to introduce the students with basic architecture of 32-bit microprocessors (80386/80486), Pentium processor architecture and microcontroller

Unit-1: **8085 PROCESSOR:** Introduction to microprocessor, 8085 microprocessor: Architecture, instruction set, interrupt structure, and assembly language programming.

Unit-2 : 8086 MICROPROCESSOR ARCHITECTURE : Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals.

Unit-3 : INSTRUCTION SET OF 8086 : Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

Unit-4:INTERFACING DEVICE: Basic interfacing concepts, handshaking, 8255 PPI chip: Architecture, control words, modes and examples. Interfacing D/A and A/D converters.DMA:

Introduction to DMA process, 8237 DMA controller, Programmable interrupt controller 8259, Programmable interval timer chips 8253/8254

Unit- 5: Advance Microprocessors: Overview ofbasic architecture of 32-bit microprocessors (80386/80486), Overview of Pentium processor architecture. Introduction to microcontroller, UART

COURSE OUTCOMES:

The students will be able to:

1. Understand the architecture (register sets, address bus, data bus and signals), functioning of 8085/8086 microprocessors, calculating memory addresses, timing diagrams of various read and write cycles.
2. Apply the programming techniques in designing simple assembly language programs and gain hands-on experience on microprocessors using hardware kit.
3. Understand the various addressing formats and instruction formats of 8085, 8086 microprocessors, the concept of virtual mode and protected mode operations of the advanced microprocessors (80286, 80386 and 80486) and the architecture of Pentium microprocessors and microcontrollers.
4. Write interrupt service procedures and response of 8085/8086 processors along with working of interrupt controller (8259) and programmable interval timer chips (8253/8254) and connect DMA controller device in 8085,86 family of microprocessors.

REFERENCES

1. Microprocessor Architecture, Programming & Applications with 8085 : Ramesh S Gaonkar; Wiley Eastern Ltd.
2. Microprocessors and interfacing : D V Hall TMH
3. Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design : Yu-Chang Liu & Glenn A Gibson; PHI.
4. Advanced Microprocessors and Interfacing: Badri Ram; Danpat Rai Publicatins
5. The Intel MIcroproceesors 8086-Pentium processor:Brey; PHI

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-212C

SUBJECT NAME: WIRELESS COMMUNICATION

NO OF CREDITS: 4

B.TECH SEMESTERIV	SESSIONAL: 25
L P	THEORY EXAM: 75
4 0	TOTAL: 100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To provide an overview of Wireless Communication networks area and its applications and examples of wireless communication devices.
2. To understand the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.
3. Distinguish the major cellular communication standards (1G/2G/3G systems) and Introduce various wireless systems and standards such as GSM and their basic operation cases. It also deals with second generation and third generation wireless networks.
4. Able to understand the characteristics of different multiple access techniques such as TDMA, FDMA and CDMA in mobile/wireless communication
5. It deals with the fundamental cellular radio concepts such as frequency reuse and handoff and It provides an overview for the need of Cell splitting and Cell sectoring in cellular networks.
6. It provides idea about the different spectrum allocation techniques and also provides the need of Intelligent cell concept, applications of intelligent micro cell systems and how this is applied in in-building communication.

Unit-1: Introduction to Wireless Communication System: Evolution of mobile radio communications, examples of wireless communication systems, paging systems, Cordless telephone systems, comparison of various wireless systems.
Unit-2: Modern Wireless Communication System: Second generation cellular networks: GSM, third generation wireless networks: CDMA, Introduction to 4G wireless networks wireless in local loop, wireless local area networks, Blue tooth and Personal Area Networks.
Unit-3: Introduction to Cellular Mobile Systems: Spectrum Allocation, Basic cellular Systems, performance criteria, Operation of Cellular systems, Analog cellular systems, Digital cellular systems.

Unit-4: Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, hand off strategies(MAHO, MCHO, NCHO), Interference and system capacity, tracking and grade off service, improving coverage and capacity :Cell splitting, Cell sectoring, Zone concepts.

Unit-5: Multiple Access Techniques for Wireless Communication: Introduction to Multiple Access, FDMA, TDMA, spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

Unit-6: Wireless Networking: Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless network, wireless data services, common channel signaling, ISDN (Integrated Service Digital Networks), Advanced Intelligent Networks.

Unit-7: Intelligent Cell Concept and Application: Intelligent cell concept, applications of intelligent micro cell systems, in-building communication, CDMA cellular radio networks.

Course Outcome:

After the successful completion of the course the student will be able to

1. Understand the basics of wireless communication networks and knowledge about overall GSM cellular concept along with Cellular systems from 1G to 3G, Wireless 4G systems
2. Understand the fundamentals of cellular communications as hexagonal cell geometry, Handoffs, Co-channel interference, Cellular system design, Frequency reused, Sectoring using directional antennas and different spread spectrum techniques.
3. Have an understanding of the basic principles channel allocation and handoffs.
4. Gain knowledge and awareness of the technologies used in Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA) and how intelligent cell concept is useful in in-building-communication.

REFERENCES

1. Wireless Communications: Theodore S Rappaport; Pearsons
2. Mobile Cellular Telecommunication: W.C.Y. Lee; McGraw Hill
3. Mobile Communications: Jochen Schiller; Pearson

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-301C

SUBJECT NAME: PRINCIPLES OF OPERATING SYSTEM

NO OF CREDITS: 4

B.TECH SEMESTER V			SESSIONAL:	25
L	P	T	THEORY EXAM:	75
3	0	1	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To understand evolution and types of OS and to understand the structure, components and functions of OS.
2. To learn about Processes, threads and various Scheduling policies.
3. To understand process concurrency and synchronization.
4. To understand the principles of concurrency and Deadlocks.
5. To understand various memory management schemes.
6. To understand virtual memory management, Disk management, I/O management and File systems.

Unit-1: Introduction: Need of OS, Evolution of OS, OS Concepts (Multiprogramming & Multitasking, multiprocessing, multi user), Types of Operating Systems: Batch operating system, Time-sharing systems, Distributed OS, Network OS, Real Time OS, Embedded system, Mobile OS.
OS functions, Interrupt-driven operations for OS, Hardware protection to implement multiprogramming/multitaksing, Various Operating system services, architecture, System programs and system calls.

Unit–2:Process Management: Process concept, process lifecycle, operation on processes; CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), Priority Scheduling, Round Robin(RR), Multilevel Queue Scheduling, Introduction to Multithreading.

Unit–3:Process-Synchronization: Critical Section Problems, Hardware support for process synchronization, semaphores.
Methods for handling Deadlocks-deadlock prevention, avoidance & detection, deadlock recovery.

Unit–4:Memory Management: Logical & Physical Address Space, swapping, relocation, fixed & variable memory partitioning, contiguous memory allocation, non-contiguous memory allocation paging and segmentation techniques, page table structure, segmentation with paging.

Virtual memory management - Principal of Locality, Demand Paging & Page-Replacement Algorithms, Demand Segmentation, Thrashing.

Unit–5:File System: Different types of files and their access methods, directory structures, various allocation methods, free space management.
Disk management: need of disk scheduling, disk scheduling criteria, disk scheduling algorithm.

Unit-6: I/O Systems: I/O Hardware, I/O software, types of I/O, kernel I/O subsystems.

Course Outcomes:

After the completion of the course

The student will be able to

1. Implement Software life cycle models and have a knowledge of different phases of Software life cycle
2. Identify, formulate, review, estimate and schedule complex software projects using principles of mathematics.
3. Create a bug free software with good design and quality by using appropriate techniques and modern engineering and IT tools.
4. Analyze verification, validation activities, static, dynamic testing, debugging tools and techniques and importance of working in teams.

REFERENCES

1. Principles of Operating System,Dr. Naresh chauahn
2. Operating System By Peterson , 1985, AW.
3. Operating System By Milankovic, 1990, TMH.
4. Operating Systems by Mandrik & Donovan, TMH
5. Operating Systems By Deitel, 1990, AWL.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-303C

SUBJECT NAME: INTERNET FUNDAMENTALS AND WEB TECHNOLOGY

NO OF CREDITS: 4

B.TECH	SEMESTER V	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

1. To familiarize the students with the basic concepts of internet, its history and ways to connect to internet and various fundamental features of world wide web like HTTP, TCP,IP protocols etc.
2. To provide a detailed understanding of search engines and also familiarize him with the fundamental language of internet i.e. HTML & the concepts of cascading style sheets.
3. To teach the student the basics of client side JavaScript and various server side programming constructs
4. To familiarize the student with the basics of delivering multimedia over web pages.

Unit-1: Introduction to Networks : Introduction to internet, history, Working of Internet, Modes of Connecting to Internet, Internet Address, standard address, classful and classless ip addressing, subnetting, supernetting.

Unit-2: World Wide Web: w3c consortium, web 2.0, web 3.0, searching the www: Directories search engines and Meta search engines, search fundamentals, search strategies, Architecture of the search engines, Crawlers and its types, Telnet and FTP.

Unit-3: Hypertext markup language: The anatomy of an HTML document: Marking up for structure and style: basic page markup, absolute and relative links, ordered and unordered lists, embedding images and controlling appearance, table creation and use, frames, nesting and targeting.

Unit 4: Separating style from structure with style sheets: Internal style specifications within HTML, External linked style specification using CSS, page and site design considerations.

Unit 5: Client side and Server Side programming: Client Side Programming: Introduction to the Java Script syntax, the Document object model, Event handling, Output in JavaScript, Forms handling, cookies, Introduction to VBScript, Form Handling.
Server Side Programming: Introduction to ASP, JSP.

Unit6: **Other dynamic content technologies**: Delivering multimedia over web pages, VRML.

Course Outcomes

After the completion of the course, the student will be able to:

1. Learn the basic concepts of networks, internet, its history, applications and fundamentals of internet based protocols used like HTTP, IP,TCP etc. He will also be acquainted with the concepts of Subnetting, Supernetting, Web Browser details etc.
2. Learn the working of internet terminologies like searching fundamentals and its types on internet, Telnet, Email, Chat Servers,FTP and Net Meeting etc. He will also have hands on basics and advanced HTML concepts like lists,styling, mark-up etc. and learn the need and basics of CSS and its design considerations.
3. Familiar with difference between client side and server side scripting, the basics of Javascript, Event Handling, the concepts of DOM etc.
4. Acquainted with topics such as cookies, hidden fields etc. and various server side technologies like ASP/JSP, the concept of forms and its processing, input output operations on WWW and basics of delivering multimedia over web.

REFERENCES

1. Fundamentals of the Internet and the World Wide Web, Raymond Greenlaw and Ellen Hepp – 2001, TMH
2. Internet & World Wide Programming, Deitel,Deitel & Nieto, 2000, Pearson Education
3. Complete idiots guide to java script,. Aron Weiss, QUE, 1997.
4. Network firewalls, Kironjeet syan -New Rider Pub.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-305C

SUBJECT NAME: COMPUTER GRAPHICS AND MULTIMEDIA TECHNOLOGY

NO OF CREDITS: 4

B.TECH SEMESTER V	SESSIONAL: 25
L P T	THEORY EXAM: 75
3 0 1	TOTAL: 100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

1. To learn the principles of hardware and software behind the graphical environment. To learn about the design and implementation of graphical object. To understand basic algorithms for computer graphics and image processing.
2. To fill inner areas of different graphical primitives and to learn about transformation and modeling of an object into dimensional space by learning the techniques of projecting any graphical primitive from higher dimensional space to 2-D space.
3. Extract scene with different clipping methods to learn the various aspects of rendering visible surfaces.
4. To learn the creation of animated objects and their images. To understand various aspects of media and learn the concept of audio, images and videos.
5. To learn minimization of memory requirements for graphical objects by rendering objects and surfaces and compressing Images.

Unit I- Introduction to Computer Graphics

What is Computer Graphics, Computer Graphics Applications, Computer Graphics Hardware and software, Two dimensional Graphics Primitives: Points and Lines, Line drawing algorithms: DDA, Bresenham's; Circle drawing algorithms: Using polar coordinates, Bresenham's circle drawing, mid point circle drawing algorithm; Filled area algorithms: Scanline: Polygon filling algorithm, boundary filled algorithm.

Unit II-Two/Three Dimensional Viewing

The 2-D viewing pipeline, windows, viewports, window to view port mapping; Clipping: point, clipping line (algorithms):- 4 bit code algorithm, Sutherland-cohen algorithm, parametric line clipping algorithm (Cyrus Beck).

Polygon clipping algorithm: Sutherland-Hodgeman polygon clipping algorithm. Two-dimensional transformations: transformations, translation, scaling, rotation, reflection, and composite transformation.

Three-dimensional transformations: Three-dimensional graphics concept, Matrix representation of 3-D Transformations, Composition of 3-D transformation.

Unit III-Viewing in 3D

Projections, types of projections, the mathematics of planner geometric projections, coordinate systems.

Unit IV-Hidden surface removal

Introduction to hidden surface removal. The Z- buffer algorithm, scan line algorithm, area sub-division algorithm.

Unit V-Image Compression & Standard

Making still images; editing and capturing images; scanning images; computer color models; color palettes; vector drawing; 3D drawing and rendering; JPEG-objectives and architecture; JPEG-DCT encoding and quantization, JPEG statistical coding, JPEG predictive loss less coding; JPEG performance; overview of other image file formats as GIF, TIFF, BMP, PNG etc.

Course Outcomes:

Students completing this course are expected to be able to:

1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics. Implement the various algorithms for scan conversion and filling of basic objects and their comparative analysis.
2. Use of composite geometric transformations on original and clipped graphics objects in 2D and 3D.
3. Understand the techniques for improving the object appearance with the help of clipping objects outside the view and filling relevant parts of the area. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.
4. Create interactive and efficient graphics applications in C++ based on techniques of compression.

REFERENCES

1. Computer Graphics Principles and Practices second edition by James D. Foley, Andeies van Dam, Stevan K. Feiner and Johb F. Hughes, 2000, Addision Wesley.
2. Computer Graphics by Donald Hearn and M.Pauline Baker, 2nd Edition, 1999, PHI
3. Procedural Elements for Computer Graphics – David F. Rogers, 2001, T.M.H Second Edition
4. Fundamentals of 3Dimensional Computer Graphics by Alan Watt, 1999, Addision Wesley.
5. Computer Graphics: Secrets and Solutions by Corrign John, BPB
6. Graphics, GUI, Games & Multimedia Projects in C by Pilania & Mahendra, Standard Publ.
7. Computer Graphics Secrets and solutions by Corrign John, 1994, BPV
8. Introduction to Computer Graphics By N. Krishanmurthy T.M.H 2002

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE:CE-307C

SUBJECT NAME: CORE JAVA

NO OF CREDITS: 4

B.TECH	SEMESTER V	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. Study the software and Hardware requirement of java and to introduce fundamentals of object oriented programming using Java
2. Compare C++ and Java and study the various features provide by java and to introduce the java programming constructs
3. To introduce the use of class, object, method, constructors , abstract class, nested class, method overriding , inheritance in java programming and study the interface, multiple inheritance using interface, abstract class and polymorphism
4. To introduce the number, strings & Collections and study the various file handling operations
5. To introduce the Exception handling and concurrency in Java and study the AWT and java API Packages

UNIT I: FUNDAMENTALS OF JAVA

Origin of JAVA, features of JAVA, JAVA Environment, Hardware and Software Requirements, ByteCode , Installing JDK,Difference between C++ and JAVA, The Platform Environment, Command-Line Arguments, Environment Variables, System Utilities, PATH and CLASSPATH

UNIT II: JAVA PROGRAMMING CONSTRUCTS

JAVA program structure ,Variables, Primitive Data Types, Identifiers, Literals, Operators, Expressions, Precedence Rules and Associativity, Primitive type Conversion and Casting, Flow of Control(Conditional Statements, Loops, Branching Mechanism) Command Line Arguments.

UNIT III: CLASSES AND OBJECTS

Defining a class, creating objects, methods(declaration, invocation, overloading) , constructors ,garbage collection, static keyword, this keyword, arrays, inheritance and its types, method overriding, super keyword, final keyword, abstract class. Nested Classes, Inner Class, Local Classes, Anonymous Classes, When to Use Nested Classes

UNIT IV: INTERFACES AND INHERITANCE

Defining Interface, Extending and implementing interface, interface vs. abstract classes. , Using an Interface as a Type, Evolving Interfaces, Default Methods, Inheritance, Multiple Inheritance

of State, Implementation, and Type, Overriding and Hiding Methods, Polymorphism, Hiding Fields, Using the Keyword super, Writing Final Classes and Methods, Abstract Methods and Classes

UNIT V: NUMBERS, STRINGS & COLLECTIONS

The Numbers Classes, Formatting Numeric Print Output, Strings, Converting Between Numbers and Strings, Manipulating Characters in a String, The StringBuilder Class, Autoboxing and Unboxing

UNIT VI: I/O IN JAVA

I/O Streams, Byte Streams, Character Streams, Buffered Streams, Scanning, Formatting, I/O from the Command Line, Data Streams, Object Streams, File I/O, The Path Class, Path Operations, File Operations, Checking a File or Directory, Deleting a File or Directory, Copying a File or Directory, Moving a File or Directory,, Managing Metadata (File and File Store Attributes), Reading, Writing, and Creating Files, Random Access Files

UNIT VII: EXCEPTIONS AND CONCURRENCY

What Is an Exception?, The Catch or Specify Requirement, Catching and Handling Exceptions, The try Block, The catch Blocks, The finally Block, The try-with-resources Statement, Specifying the Exceptions Thrown by a Method, How to Throw Exceptions, Creating Exception Classes, Unchecked Exceptions, Advantages of Exceptions, Types of errors, exception handling techniques, user defined exceptions, multiple catch statement, finally statement.

UNIT VIII: AWT & PACKAGES

JAVA API packages, using system packages, naming conventions, creating packages, accessing a package, use package, adding class to a package. Basics of AWT, Components and Containers

Course Outcomes:

After the completion of the course,

The student will be able to

1. Understand the basic concepts of the java.
2. Study java programming constructs like variable, primitive data types, operators, type conversion, type casting etc. .
3. Implement interface, inheritance of classes, polymorphism,conversion of numbers and Strings, manipulations of strings, Unboxing and autoboxing.
4. Work with file like creating file, deleting file, copying the content in files, reading and Writing in files, managing Metadata etc.
5. Handle the checked and unchecked exception and understand basics of AWT, components and containers.

REFERENCES

1. Sachin Malhotra and Saurabh Chaudhary , “Programming in JAVA”, Oxford University Press, ISBN : 0-19-806358
2. E-Balagurusamy, “Programming with JAVA- A Primer” Tata McGraw-Hill Publishers, ISBN 0-07-463542-5.
3. Dietel and Dietel “CORE JAVA”P. Naughton,Herbert Shield “ The complete reference-JAVA2” , TMH, http://java.sun.com/docs/books/tutorial

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: IT-301C

SUBJECT NAME: MOBILE AD-HOC NETWORKS

NO OF CREDITS: 4

B.TECH	SEMESTER V	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To make the students familiar with wireless network and adhoc network.
2. To introduce the advantages and issues related to mobile adhoc network routing.
3. To make the students familiar with different table driven base protocols for mobile adhoc networks.
4. To introduce the concept of on demand approach and various protocols related to this approach.
5. To make the student familiar with the GPS system and introduce the concept of location based routing.
6. To make the student aware about the quality of service in mobile adhoc environment. To find out various QoS parameters and how QoS can be achieved in adhoc environment.
7. To introduce the necessity of energy and how to manage the energy of a node and network in adhoc networks.

UNITI :

Introduction: Wireless Networks, Infrastructure and Infrastructure less Wireless Networks, Ad hoc Wireless Networks, Heterogeneity in Mobile Devices, Types of Ad hoc Mobile Communications, Challenges Facing Ad hoc Mobile Networks, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks , classifications of Routing Protocols: Table Driven Routing Protocols, On-Demand Routing Protocols

UNIT II

Table-Driven Ad hoc Routing Protocols: Destination Sequenced Distance Vector (DSDV), Wireless Routing Protocol (WRP), Cluster Switch Gateway Routing (CSGR)

UNIT III:

On-Demand Ad hoc Routing Protocols:Ad hoc On–Demand Distance Vector Routing (AODV) , Dynamic Source Routing (DSR) ,Temporally Ordered Routing Algorithm (TORA) , Signal

Stability Routing (SSR) , Location–Aided Routing (LAR) , Power–Aware Routing (PAR) , Zone Routing Protocol (ZRP).

UNIT IV:

QoS in Ad hoc Networks:Issues and Challenges in Providing QoS in Ad hoc Wireless Networks , classifications of QoS Solutions , MAC Layer Solutions , Network Layer Solutions , QoS Frameworks for Ad hoc Wireless Networks Energy Management in Ad hoc Wireless Networks.

UNIT V:

Energy ManagementNeed for Energy Management in Ad hoc Wireless Networks – Classification of Energy Management Schemes – Battery Management Schemes – Transmission Power Management Schemes – System Power Management Schemes.

Course Outcomes

Upon successful completion of the course, the student will be able to:

a. Understand the basic concept (*including advantage, disadvantage ,limitation, applications, routing*) of adhoc network and will be able to differentiate between mobile adhoc and infrastructure based wireless communication.
b. Understand the various categories and existing routing protocols under these categories.
c. Understand the importance of QoS in communication and various routing protocols proposed for QoS achievement in mobile adhoc network.
d. Understand the scarcity of resources (like bandwidth, power etc) and how resources can be preserved or efficiently utilized using various approaches in mobile adhoc environment.

REFERENCES

1. Data Mining; Pieter Adriaans & Dolf Zantinge; 1997, Pearson,
2. Data Warehousing, Data Miniing and OLTP; Alex Berson, 1997, Mc Graw Hill.
3. Data warehousing System; Mallach; 2000, Mc Graw Hill.
4. Building the Data Warehouse; W.H. Inman, 1996, John Wiley & Sons.
5. Developing the Data Warehouses; W.H Ionhman,C.Klelly, John Wiley & Sons.
6. Data Warehousing In the Real World; Sam Anahory & Dennis Murray; 1997, Pearson
7. Data Mining Techniques; Arun Pujar; 2001, University Press; Hyderbad.
8. Managing the Data Warehouses; W.H.Inman, C.L.Gassey, John Wiley & Sons.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-311C

SUBJECT NAME: DISTRIBUTED OPERATING SYSTEM (Elective-I)

NO OF CREDITS: 3

B.TECH	SEMESTER V	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To address hardware, software and communication in distributed systems in a broader sense and also the issues in designing the distributed operating systems.
2. Emphasis will be placed on process, naming, synchronization, consistency and various processor allocation techniques.
3. To gain an insight on Distributed operating system concepts that includes Mutual exclusion algorithms, Deadlock detection algorithms and file sharing.
4. To gain an insight into the algorithms for implementation of distributed shared memory, recovery and consistency models. To address MACH and UNIX operating system in a broader sense.

Unit-1: Introduction: Introduction to Distributed System, Goals of Distributed system, Hardware and Software concepts, Design issues. Communication in distributed system: Layered protocols, ATM networks, Client – Server model, Remote Procedure Calls and Group Communication. Middleware and Distributed Operating Systems.

Unit-2: Synchronization in Distributed System: Clock synchronization, Mutual Exclusion, Election algorithm, the Bully algorithm, a Ring algorithm, Atomic Transactions, Deadlock in Distributed Systems, Distributed Deadlock Prevention, Distributed Deadlock Detection .

Unit-3: Processes and Processors in distributed systems: Threads, System models, Processors Allocation, Scheduling in Distributed System, Real Time Distributed Systems.

Unit-4: Distributed file systems: Distributed file system Design, Distributed file system Implementation, Trends in Distributed file systems.

Distributed Shared Memory: What is shared memory, Consistency models, Page based distributed shared memory, shared variables distributed shared memory.

Unit-5: Case study MACH: Introduction to MACH, process management in MACH, communication in MACH, UNIX emulation in MACH.

Course Outcomes:

After the successful completion of the course, student will be able to:

a. Learn various types of OS in a broader sense and will be acquainted with the various design issues, communication primitives and models of DOS in particular.
b. Learn about process synchronization strategies and various processor allocation techniques of DOS.
c. Learn various deadlocks handling techniques in distributed system. He will also learn the concept of distributed file sharing.
d. Learn about distributed shared memory concepts, types of consistency models and also the fundamentals of an example distributed system (MACH, UNIX etc).

REFERENCES

1. Distributing Operating System ;Andrew S.Tanenbaum,PhI
2. Distributing Operating System : Concepts & Design – Willey Publications.
3. Advanced Concept in Operating System – Mukesh Singhal, Niranjan G Shivratri, Mc Graw Hill.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-313C

SUBJECT NAME: DATA COMPRESSION TECHNIQUES (Elective-I)

NO OF CREDITS: 3

B.TECH	SEMESTER V	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To introduce the concept of data compression techniques and Mathematical Preliminaries for compression
2. To make the student familiar with The Huffman coding algorithm: Minimum variance Huffman codes.
3. To make the student familiar with Coding sequence and dictionary techniques.
4. The students can identify the characteristics and issues file compression and image compression.
5. To make the student able to understand Distortion criteria , Models , Scalar Quantization: The Quantization problem
6. Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo-Gray Algorithm

Unit - I:

Compression Techniques: Loss less compression , Lossy Compression ,Measures of prefonnance , Modeling and coding.

Mathematical Preliminaries for Lossless compression: A brief introduction to information theory.
Models: Physical models, Probability models, Markov models, composite source model,
Coding: uniquely decodable codes, Prefix codes.

Unit – II:

The Huffman coding algorithm: Minimum variance Huffman codes.
Adaptive Huffman coding: Update procedure, Encoding procedure , Decoding procedure.
Golomb codes, Rice codes, Tunstall codes.

Applications of Hoffman coding: Loss less image compression, Text compression, Audio Compression.

Unit-III:
Coding a sequence , Generating a binary code , Comparison of Binary and Huffman cding , Applications: Bi-level image compression-The JBIG standard , JBIG2 , Image compression. Dictionary Techniques: Introduction , Static Dictionary: Diagram Coding , Adaptive Dictionary. The LZ77 Approach , The LZ78 Approach , Applications: File Compression-UNIX compress , Image Compression: The Graphics Interchange Format (GIF) , Compression over Modems: V.42 bits , Predictive Coding: Prediction with Partial match (ppm): The basic algorithm , The ESCAPE SYMBOL , length of context , The Exclusion Principle , The Burrows-Wheeler Transform: Moveto-front coding , CALIC , JPEG-LS , Multi-resolution Approaches , Facsimile Encoding , Dynamic Markoy Compression.

UnitIV –
Distortion criteria , Models , Scalar Quantization: The Quantization problem , Uniform Quantizer, AdaptiveQuantization,NonuniformQuantization.

Unit-V:
Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo-Gray Algorithm, Tree structured Vector Quantizers, Structured Vector Quantizers.

Course Outcomes

Upon successful completion of the course, the student will be:

a. The student will be able to understand the concept of data compression techniques and various models associated with compression.
b. The student will be able to perform compression using Huffmann coding algorithm.
c. The students will become familiar Coding sequence and dictionary techniques Static Dictionary: DiagramCoding, AdaptiveDictionary. The LZ77 Approach , The LZ78 Approach.
d. The students will be able to differentiate between various types of quanitization techniques.
e. The students will be able to understand the concept of vector Quantization over Scalar Quantization

REFERENCES

1. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-315C

SUBJECT NAME: FUZZY LOGIC (Elective-I)

NO OF CREDITS: 3

B.TECH	SEMESTER V	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

Students will learn about

1. Fundamentals of fuzzy sets and logic
2. Fuzzy logic based control/ expert systems.
3. Introduction to fuzzy arithmetic.
4. Fuzzy relationships and Projections and Cylindric Extensions.
5. Applying Fuzzy logic in soft computing.

Unit - 1

Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, cuts, Properties of a-cuts, Decomposition, Theorems, Extension Principle,

Unit - 2

Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations

Unit - 3

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Unit - 4

Fuzzy Relations: Crisp & Fuzzy Relations, Projections & Cylindric Extensions, Binary Fuzzy Relations, Binary Relations on single set, Equivalence, Compatibility & Ordering Relations, Morphisms, Fuzzy Relation Equations.

Unit – 5

Possibility Theory: Fuzzy Measures, Evidence & Possibility Theory, Possibility versus Probability Theory.

Unit – 6
Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Unit – 7
Uncertainty based Information: Information & Uncertainity, Nonspecificity of Fuzzy & Crisp sets, Fuzziness of Fuzzy Sets.

Unit – 8
Applications of Fuzzy Logic in soft computing.

Course Outcomes
Students will be able to

1. Design and use fuzzy sets and numbers in the context of various domains.
2. Design fuzzy rule based system for a control application like washing machine.
3. Design soft computing models to solve real life problems

Text books :

1. Fuzzy Sets, Uncertainty &Information by G.J.Klir & T.A. Folyger, PHI, 1988.
2. Fuzzy sets & Fuzzy logic by G.J.Klir & B.Yuan, PHI, 1995.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-317C

SUBJECT NAME: REAL TIME SYSTEMS ELECTIVE 1

NO OF CREDITS: 3

B.TECH SEMESTER V	SESSIONAL: 25
L P	THEORY EXAM: 75
3 0	TOTAL: 100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. The student has an understanding and practical experience with real-time systems.
2. To introduce the students the basic understanding and design of embedded systems.
3. The student has an understanding of embedded software development tools.
4. The students can identify the characteristics and issued in real-time systems design.
5. The student should be able to understand the basic concepts of real time operating systems.
6. To introduce the students with fault tolerant systems and issues in real time languages

Unit I Embedded Systems

What is an embedded system? Categories: Stand-alone, Real-time, Networked appliances, mobile devices. Requirements of Embedded systems, Challenges and issues in Embedded software development. Embedded Software Development Tools: Host and Target machines, Linker/ locators for embedded software, Getting embedded software into target system.

Unit II Real Time Embedded systems

Definition, characteristics, classification, release times, deadlines and timing constraints, temporal parameters of real-time workload, periodic task model, issues involved in real time system design.

Unit III Real Time Operating Systems

Typical structure of an RTOS, Scheduling strategies, priority structures, task management, memory management, code sharing, task co-operation and communication, interrupt routines in an RTOS environment, mutual exclusion, Liveness, Minimum operating system Kernel, capabilities of commercial RTOS: VxWorks, pSoS, Micro C/OS II.

Unit IV Task assignment and Scheduling

Allocation / Scheduling problem, offline scheduling, online scheduling, pre-emptive / non-pre-emptive scheduling, static / dynamic scheduling, Rate-monotonic scheduling algorithm, problem

of priority inversion, priority inheritance protocol, priority ceiling protocol, earliest-deadline-first scheduling algorithm

Unit V Real-Time Language Issues

Real-time language requirements, data typing, control structures, facilitating hierarchical decomposition, synchronization, packages, exception handling, overloading and generics, multitasking, low-level facilities,

Unit VI Fault-Tolerance Techniques

Fault types, fault detection measures, fault detection mechanisms, fault and error containment, Redundancy: Hardware and software redundancy, time redundancy.

Unit VII Case Study of RTLinux and VxWorks RTOS

COURSE OUTCOME

After the completion of the course

The student will be able to

1. Understand the issues and challenges in real-time systems, embedded system design.
2. Understand the basics of RTOS.
3. Understand basic multi-task scheduling algorithms and Familiarize with the fault types and error containment zone.
4. Familiarize with the concepts of h/w and s/w redundancy.

REFERENCES

1. Programming for Embedded systems by Dreamtech software team, Wiley Dreamtech India Pvt. Ltd.
2. Embedded Realtime systems programming, by Sriram V. Iyer and Pankaj Gupta, TMH
3. Realtime computer control by Stuart Bennett, Pearson Education
4. Real time systems by C. M. Krishna, McGraw-Hill
5. Embedded Systems by RajKamal, TMI

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-309C

SUBJECT NAME: DATA WAREHOUSING AND DATA MINING(Elective 1)

NO OF CREDITS: 3

B.TECH	SEMESTER V	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

1. To understand the principle differences between database and data warehouse and learn basic concepts(like its schemas and OLAP operations) and applications of data warehouse and data mining.
2. To learn the system and process architecture of data warehouse ,its backend tools and utilities and concept and need for testing a warehouse.
3. To understand the concept of data mining, the task of data mining as an important phase of knowledge discovery process, its applications and its DMQL specifications
4. To develop further interest in research and design of new Data Mining techniques.

Unit-1: **Introduction to Data Warehouse:** Data warehousing Definition, usage and trends, DBMS Vs data warehouse, Data marts, Metadata repository, concept hierarchies, Multidimensional data model, OLAP operations for multidimensional data model, Data cubes, Various Schemas: star, snowflake and fact constellation, Defining schemas.

Unit-2: **Data Warehouse Design**: The design process, 3-Tier data warehouse architecture, types of OLAP servers: ROLAP, MOLAP, HOLAP; distributed and virtual data warehouses, data warehouse process managers: Load manager, warehouse manger and query manager.

Unit-3: **Data Warehouse Implementation:** Computation of data cubes, modeling OLAP data, indexing, data warehouse back-end tools, complex aggregation at multiple granularities, tuning and testing of data warehouse.

Unit-4: Data Mining: Definition & task, Data mining system architecture, KDD process, KDD versus data mining, data mining tools and applications, data mining task primitives.

Unit-5: Data mining query language: Basic concepts, task-relevant data specification, specifying knowledge, hierarchy specification, pattern presentation & visualization specification using DMQL, data mining languages and standardization.

Unit-6: Data Mining Techniques: Association rule mining: a-priori algorithm, generating rules; Clustering techniques: partitioning methods, hierarchical methods, density based methods; Classification techniques: Decision tree knowledge discovery, back-propagation through Neural Networks, Genetic Algorithm, Rough Sets, Support Vector Machines and Fuzzy techniques; Prediction techniques: linear and non-linear regression.

Course outcomes: After the completion of the course, the student will be able to:

1. Understand the distinctive features of database and data warehouse, different schemas supported by data warehouse and the concepts OLAP Operations and need of metadata and data cube in a typical DW.
2. Design both system and process architecture of a data warehouse of considerable complexity which makes use of various OLAP Servers and will also be acquainted with its backend tools and utilities and the methodology to test and tune a data warehouse.
3. Learn the architecture of a Data Mining System as a whole, its various techniques and how data mining contributes towards knowledge discovery, its applications and various DMQL steps to extract knowledge from Data Warehouse.
4. Learn ways and means to perform different Data Mining tasks like Association, Classification ,and Clustering through methods like Apriori approach, Decision Tree Induction, Backpropogation, K-Means, K-Mediods etc.

REFERENCES

1. Data Mining; Pieter Adriaans & Dolf Zantinge; 1997, Pearson,
2. Data Warehousing, Data Miniing and OLTP; Alex Berson, 1997, Mc Graw Hill.
3. Data warehousing System; Mallach; 2000, Mc Graw Hill.
4. Building the Data Warehouse; W.H. Inman, 1996, John Wiley & Sons.
5. Developing the Data Warehouses; W.H Ionhman,C.Klelly, John Wiley & Sons.
6. Data Warehousing In the Real World; Sam Anahory & Dennis Murray; 1997, Pearson
7. Data Mining Techniques; Arun Pujar; 2001, University Press; Hyderbad.
8. Managing the Data Warehouses; W.H.Inman, C.L.Gassey, John Wiley & Sons.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-302C

SUBJECT NAME: PRINCIPLES OF SOFTWARE ENGINEERING

NO OF CREDITS: 4

B.TECH	SEMESTERVI	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To enable the students to apply a systematic application of scientific knowledge in creating and building cost effective software solutions to business and other types of problems.
2. To make the students understand project management concepts & their metrics.
3. To make the students understand requirement engineering and its models (Information, functional, behavioral).
4. To make the students aware about the design models & its principles (data design, component design, interface design & architectural design).
5. To make the students understand different testing techniques for different projects.
6. Making the students understand to develop quality software, its maintenance & introduce about software reliability.

Unit-1: Introduction: Evolving role of software, Software Characteristics, Software crisis, Silver bullet, Software myths, Software process, Personal Software Process (PSP), Team Software Process (TSP), emergence of software engineering, Software process, project and product, Software Process Models: Waterfall Model, Prototype Model, Spiral, Model ,RAD Model, Iterative Model, Incremental Model, Aspect-oriented Model, Agile Model.

Unit 2: Software project management: Project management concepts, Planning the software project, Estimation—LOC based, FP based, Use-case based, empirical estimation COCOMO- A Heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management.

Unit 3: Requirements, Analysis and specification: Software Requirements engineering, Requirement engineering process, Requirement Engineering Tasks, Types of requirements, SRS.

Unit-4: **System modeling:** Data Modeling, Functional modeling and information flow: Data flow diagrams, Behavioral Modeling, The mechanics of structured analysis: Creating entity/ relationship diagram, data flow model, control flow model, the data dictionary.

Unit-5: System Design: Design principles, the design process; Design concepts: Abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, data structure, software procedure, information hiding; Effective modular design: Functional independence, Cohesion, Coupling; Design Heuristics for effective modularity, Data Design, Architecture Design, Interface Design

Unit-6 : Software Testing and maintenance: Testing terminology—error, bug/defect/fault, failure, Verification and validation, Test case design, Static testing ,Dynamic testing--- Black box testing—Boundary value analysis, White box testing-- basis path testing, Unit testing, Integration testing, Acceptance Testing, debugging, debugging process debugging approaches. Software maintenance categories, Models

Unit-7: Software Quality Models and Standards: Quality concepts, Software quality assurance, SQA activities, Formal approaches to SQA; Statistical software quality assurance; CMM, The ISO 9126 Standard

Unit-8: Advanced topics in software Engineering: Configuration Management, Software re-engineering, reverse engineering, restructuring, forward engineering, Clean Room software engineering.

Case Study: To develop SRS and SDD for a Software Project.

Course Outcomes:

After the completion of the course

The student will be able to

1. Implement Software life cycle models and have a knowledge of different phases of Software life cycle
2. Identify, formulate, review, estimate and schedule complex software projects using principles of mathematics.
3. Create a bug free software with good design and quality by using appropriate techniques and modern engineering and IT tools.
4. Analyze verification, validation activities, static, dynamic testing, debugging tools and techniques and importance of working in teams.

REFERENCES

1. Software Engineering – A Practitioner's Approach, Roger S. Pressman, 1996, MGH.
2. Fundamentals of software Engineering,Rajib Mall, PHI
3. Software Engineering by Ian sommerville, Pearson Edu, 5th edition, 1999, AW,
4. Software Engineering – David Gustafson, 2002, T.M.H
5. Software Engineering Fundamentals Oxford University, Ali Behforooz and Frederick J. Hudson 1995,JW&S,
6. An Integrated Approach to software engineering by Pankaj jalote , 1991 Narosa

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: IT-302C

SUBJECT NAME: Network Security

NO OF CREDITS: 4

B.TECH SEMESTERIV	SESSIONAL: 25
L P T	THEORY EXAM: 75
3 0 1	TOTAL: 100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To study goals of security and ethical issues related to the misuse of computer security.
2. Understand the basic concept of Cryptography and Network Security, their mathematical models.
3. To understand various types of ciphers, DES, AES, message Authentication, digital Signature System.
4. To get knowledge about network security, virus, worms and firewall and Acquire knowledge in security issues, services, goals and mechanism
5. Understand the SSL or firewall based solution against security threats.

Unit-1 Introduction:
Introduction to security, characteristics of computer intrusion, Attacks: vulnerabilities, threats, attacks and controls, security goals, Computer criminals.

Unit- 2 Basic Encryption and Decryption:
introduction to Ciphers, characteristics of good ciphers, Monoalphabetic Substitutions such as the Caesar Cipher, Cryptanalysis of Monoalphabetic Ciphers, Polyalphabetic Ciphers such as Vigenere Tableaux, Cryptanalysis of Polyalphabetic Ciphers, Perfect Substitution Cipher such as the Vernam Cipher, Transposition ciphers, rotor machines, Stream and Block Ciphers.

Unit-3 Secure Secret Key Encryption and hash fuction:
Data Encryption Standard (DES), Analyzing and Strengthening of DES, Advance Encryption Standard (AES), Concept of Public key Encryption System, Rivest-Shamir-Adelman (RSA) Encryption, Diffie Hellman Key Exchange Algorithm, Hash Concept, Description of Hash Algorithms , Message Digest Algorithms (MD5) , Secure Hash Algorithms(SHA) .

Unit-4 Network Security Practice: Threats to network, Authentication Applications- Kerberos, X.509 Authentication Service; Electronic Mail Security- Pretty Good Privacy, S/MIME, Firewalls;
IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations;
Web Security: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

Unit-5 System Security: Intruders, Intrusion Detection, Password Management, Malicious Software: Viruses and related threats, Virus countermeasures, Distributed Denial of Service Attacks.

Course Outcomes:

After the completion of this course the student will able to:

1. Understand theory of fundamental cryptography, encryption and decryption algorithms,
2. Build secure authentication systems by use of message authentication techniques.
3. Understand a given ciphering algorithm and to analyze it.
4. Apply the crypto systems so far learned to building of information and network security mechanisms.

REFERENCES

1. P. Pfleeger, Shari Lawrence Pfleeger Charles: Security in Computing, PHI.
2. William Stalling, Cryptography and Network Security, 3rd Edition. PHI New Delhi
3. William Stalling, Network Security Essentials, 2nd Edition. PHI New Delhi
4. Bruce Schneier, Niels Ferguson : Practical Cryptography, Wiley Dreamtech India Pvt. Ltd.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: IT-304C

SUBJECT NAME: ADVANCED CLIENT/SERVER TECHNOLOGY

NO OF CREDITS: 4

B.TECH	SEMESTER VI	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. Introduce to client server models,
2. To make the student familiar with Network programming
3. For study the JDBC driver, JDBC process and transaction management.
4. To make the student familiar with development of distributed application using RMI.
5. To introduce the fundamentals of enterprise java beans.
6. To Introduce the student with the working of servlet Programming.

UNIT1
Introduction to Client-server computing, Evolution of Corporate computing models from centralized to Distributed computing, Client –Server Models, Benefits & pitfalls of client-server computing.

UNIT 2
NETWORKING : Connecting to a Server, Implementing Servers, Sending E-Mail, Making URL Connections, Advanced Socket Programming

UNIT 3
DATABASE NETWORKING: The Design of JDBC. The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Matadata, Row Sets, Transactions, Advanced Connection Management, Introduction of LDAP

UNIT 4
DISTRIBUTED OBJECTS: The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods Server Object Activation, CORBA, Designing Client-server using RMI

UNIT 5COMPONENT MODELS: Beans , Introduction to Enterprise Java Beans , session & entity beans , EJB Deployment , EJB transactional issues, Distributed Component models.

UNIT 6

SERVLETS: Overview, Servlet Lifecycle: init(), service(), destroy(), GenericServlet, ServletRequest and ServletResponse, HttpServlet, HttpServletRequest and HttpServletResponse : GET, POST, accessing parameters

Course Outcomes:

Upon successful completion of the course, the student will be able to understand:

1. The client server computing and evolution of corporate computing models and Networking programming in java using java.net package, socket.
2. The students will be familiar with JDBC driver, concepts basic JDBC Programming, result sets, transaction management, and advance connection management.
3. The student will be familiar with RMI architecture, concept of RMI registry and Corba and to create distributed application using RMI.
4. The student will be familiar with session and entity beans, deployment of EJB and EJB transactional issues and with life cycle of servlet, creating a servlet, generic servlet, HTTP servlet request and HTTP servlet request.

REFERENCES

1. Core JavaTM 2, Volume II-Advanced Features, 7th Edition by Cay Horetmann, Gary Cornelll Pearson Publisher, 2004

2. Professional Java Programmingby Brett Spell, WROX Publication

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-308C

SUBJECT NAME: CLOUD COMPUTING

NO OF CREDITS: 4

B.TECH	SEMESTER VI	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To introduce the basic concepts of Cloud Computing, service layers involved, deploy applications over cloud computing platform, Utility Computing and Elastic Computing .and to discuss the various Cloud Technologies: AJAX , web services and software for enterprise applications.
2. To discuss the cloud data in Relational databases and various filesystems: GFS, HDFS, BigTable, HBase and Dynamo in cloud.
3. To introduce the fundamentals of cloud security, its tool and cloud computing security architecture and to familiarize the students with challenges involved in cloud computing security: Virtualization security management.
4. To discuss the issues involved in cloud computing while implementing real time application over cloud.
5. To discuss the issues regarding intercloud environments, QOS, Dependability, data migration, streaming.
6. To make students understand the basics of cloud middleware, Mobile Computing, Grid Computing, Sky Computing and to discuss research issues to be explored regarding load balancing, resource optimization, dynamic resource provisioning in cloud computing.

UNIT 1: PRINCIPLES OF PARALLEL AND DISTRIBUTED COMPUTING:

Eras of Computing , Parallel vs. Distributed Computing , Elements of Parallel Computing , Hardware Architectures for Parallel Processing , Levels of Parallelism, Elements of Distributed Computing, Architectural Styles for Distributed Computing, Technologies for Distributed Computing , Distributed Object Frameworks , Service Oriented Computing

UNIT II - CLOUD COMPUTING FUNDAMENTALS

Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS,PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture, Application availability, performance, security and disaster recovery; next generation Cloud Applications.

UNIT III – DESIGN OF CLOUD COMPUTING PLATFORMS

Cloud Computing and Service Models, Datacenter Design and Interconnection Networks, Architecture Design of Compute and Storage Clouds, Public Cloud Platforms: GAE, AWS and Windows Azure, Cloud Resource Management and Exchanges, Cloud Security and Trust Management, Service Oriented Architectures, Services and Service Oriented Architectures, Message-Oriented Middleware, Portals and Science Gateways, Discovery, Registries, Metadata, and Databases, Workflow in Service-Oriented Architectures

UNIT IV - CLOUD PROGRAMMING AND SOFTWARE ENVIRONMENTS

Features of Cloud and Grid Platforms, Parallel and Distributed Programming Paradigms, Programming Support of Google App Engine, Amazon Web Services (AWS) Programming, Microsoft Azure Programming Support, Emerging Cloud Software Environments, Cloud Computing and Resource Management, Cloud Architecture and Service Modeling, Middleware Support for Cloud Resource Management

UNIT V - ADVANCED TOPICS IN CLOUD COMPUTING

Energy Efficiency in Clouds, Energy-Efficient and Green Cloud Computing Architecture, Market Based Management of Clouds, Market-Oriented Cloud Computing, A Reference Model for MOCC, Technologies and Initiatives Supporting MOCC, Federated Clouds / InterCloud, Cloud Federation Stack, Technologies for Cloud Federations, MetaCDN, SpotCloud

Course Outcomes:

Upon successful completion of the course, the student will be able to understand:

a. The concept of cloud computing with its service layers and Utility Computing and Elastic Computing and deployment of applications over cloud computing platform.
b. Various Cloud Technologies, web services and software involved in cloud computing to design enterprise applications and manage cloud data in relational databases and file systems in cloud computing.
c. Concept of Map-Reduce and to design cloud based applications using map/reduce paradigm for handing distributed file system based data.
d. Concept of cloud security, its tool and architecture of cloud computing security and how VMs can be secured in Virtualization security management
e. How the various issues arise due to Intercloud environments, QOS, Dependability, data migration and streaming in cloud and understand how computation could be taken to data i.e. in-situ rather than moving volume of data around.

REFERENCES

1. Gautam Shroff, "*Enterprise Cloud Computing Technology Architecture Applications"*, Cambridge University Press; 1 edition, [ISBN: 978-0521137355], 2010.

2. Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra, "*Distributed and Cloud Computing: From parallel processing to IOT"* Morgan Kaufmann Publishers; 1 edition [ISBN: 978-0-12-385880],2012.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-310C

SUBJECT NAME: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS
(Elective - II)

NO OF CREDITS: 3

B.TECH SEMESTER VI	SESSIONAL: 25
L P	THEORY EXAM: 75
3 0	TOTAL: 100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:-

1. To make the students familiar with Expert system and their features and to introduce applications of Expert Systems and their relation with AI.
2. To introduce the Problem areas addressed by ES, and their success factors.
3. To tell the importance of human expert in the design of expert system. Also to introduce the organization of Expert Systems and to make acquainted with development life cycle of expert system.
4. To make introduce with some useful representation schemes like frames and tools used to develop the Expert System and to introduce Task and stages in building Expert Systems by taking some real life examples. Also to make student able to analyse of some classic expert systems and their limitations.
5. To introduce the design and architectures of Expert Systems like Deep expert systems, Co-operating expert system, Neural Expert System, Fuzzy Expert System and Real Time Expert Systems.

Unit I Introduction to Expert System
What are Expert Systems, Features of Expert System, features of good Expert System, Types of applications of Expert Systems; relationship of Expert Systems to Artificial Intelligence and to Knowledge-Based Systems. Problem areas addressed by ES, ES success factors. Role of human in Expert System, Expert System organization.

Unit II Expert system development life cycle
Difference between expert system and conventional program, Basic activities of expert system and the areas in which they solve problems. Expert system development life cycle: Problem selection, Prototype construction, Formalization, Implementation, Evaluation.

Unit III Expert System Tools

Knowledge representation in expert systems-using rules semantic nets, frames, Types of tools available for expert system building and how they are used, Stages in the development of expert system tools, Examples of knowledge engineering.

Unit IV Building an Expert Systems
Necessary requirements for expert systems development, Task in building expert systems, Stages of expert system development, Examples of the expert system building process, Examples of expert system used in different areas, Architecture of Rule based Expert system, Non Rule based Expert system.

Unit V Types of Expert System
An analysis of some classic expert systems, Limitations of first generation expert systems, Deep expert systems, Co-operating expert system, Neural Expert System, Fuzzy Expert System, Real Time Expert Systems, Applications of Expert System.

Course Outcomes:

Upon successful completion of the course, the student will be able to understand:

1. The applications of Expert Systems and their relation with AI.
2. The students will be known to Problem areas addressed by ES, and their success factors.
3. The students will be able to understand the importance of human expert in the design of expert system. The students will be familiar with organization of Expert Systems.
4. The students will be skilled to design the representation schemes like frames and they will also be able to use tools to develop the expert system.
5. The students will be familiar to Task and stages in building Expert Systems with help of some real life examples.
6. The students will be familiar with the design and the architectures of Expert Systems like Deep expert systems, Co-operating expert system, Neural Expert System, Fuzzy Expert System and Real Time Expert System.

REFERENCES

1. David W. Rolston: Principles of Artificial Intelligence and Expert System Development, McGraw Hill Book Company.
2. Peter Jackson: Introduction To Expert Systems, Addison WesleyElaine Rich and Kevin Knight: Artificial Intelligence and Expert Systems, McGraw Hill Book Company.
3. Elias M. Awad : Building Expert Systems, principles, procedures, and applications, west publishing co.1996.
4. Dan W. Patterson: Introduction to Artificial Intelligence and Expert Systems, Prentice Hall (April 1, 1990)

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-312C

SUBJECT NAME: NEURAL NETWORKS (Elective - II)

NO OF CREDITS: 3

B.TECH SEMESTER VI	SESSIONAL: 25
L P	THEORY EXAM: 75
3 0	TOTAL: 100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

Students will be able to lean about

1. Neuron models relating to supervised and unsupervised learning.
2. Training the neurons on given input/output class information.
3. Combining neural and fuzzy paradigms
4. Genetic modeling of a problem
5. Solving a problem with huge state space using genetic modeling and operators
6. Applying soft computing in common domains like IR, Drug design etc.

Unit I-Overview of biological neurons
Structure of biological neurons relevant to ANNs.

Unit II- Fundamental concepts of Artificial Neural Networks
Models of ANNs; Feed forward & feed back networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner –lake all learning rule, etc.

Unit III-Single layer Perception Classifier
Classification model, Features & Decision regions; training & classification using discrete perception, algorithm, single layer continuous perception networks for linearly separable classifications.

Unit IV-Multi-layer Feed forward Networks
Linearly non-separable pattern classification, Delta learning rule for multi-perceptron layer, generalized delta learning rule, Error back-propagation training, learning factors, Examples.

Unit V- Single layer feed back Networks

Basic Concepts, Hopfield networks, Training & Examples.

Unit VI-Associative memories

Linear Association, Basic Concepts of recurrent Auto associative memory: retrieval algorithm, storage algorithm; By directional associative memory, Architecture, Association encoding & decoding, Stability.

Unit VII-Self organizing networks

UN supervised learning of clusters, winner-take-all learning, recall mode, Initialization of weights, separability limitations

Course Outcomes

Students will be able to

1. Identify the problems suitable for solution using neural networks
2. Train a perceptron network over a given input/output pattern information.
3. Design a genetic model for a given problem with huge state space.
4. Apply GA tools and solution to a problem to find an amicable solution for the same.
5. Design soft computing models to solve real life problems

REFERNCES

1. Introduction to artificial Neural systems by Jacek M. Zurada, 1994, Jaico Publ. House.
2. "Neural Networks :A Comprehensive formulation", Simon Haykin, 1998, AW
3. "Neural Networks", Kosko, 1992, PHI.
4. "Neural Network Fundamentals" – N.K. Bose , P. Liang, 2002, T.M.H

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-314C

SUBJECT NAME: NATURAL LANGUAGE PROCESSING (Elective-II)

NO OF CREDITS: 3

B.TECH	SEMESTER VI	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To make the students familiar with difference levels/stages of natural language processing and to introduce concept of Formal languages and grammars: Chomsky hierarchy and problems associated (like Left-Associative grammars, ambiguous grammars) with them.
2. To introduce the top down and the bottom up parsing approaches and their respective types of parsers.
3. To make the students familiar with grammar types like ATN & RTN.
4. To make the students familiar with the basic techniques of parsing like CKY, Earley & Tomita's algorithms.
5. To introduce the students with Morphology of natural languages by taking examples from Hindi, English.
6. To make the students familiar with Semantics-knowledge and its utilization.

Unit-1: Components of natural language processing: lexicography, syntax, semantics, pragmatics: word level representation of natural languages prosody & natural languages.

Unit-2: Formal languages and grammars: Chomsky hierarchy, Left-Associative grammars, ambiguous grammars, resolution of ambiguities. **Introduction of top down and bottom up parsers.**

Unit-3: Computation linguistics: **Morphology of natural languages like Hindi, English etc.**, recognition and parsing of natural language structures: ATN & RTN, General techniques of parsing: CKY, Earley & Tomita's algorithms.

Unit-4: Semantics-knowledge representation semantic networks logic and inference pragmatics, graph models and optimization, Prolog for natural language semantic **(e.g. DCG)**.

Unit-5: Application of NLP: intelligent work processors: Machine translation, user interfaces, Man-Machine interfaces, natural language querying, tutoring and authoring systems, speech recognition, commercial use of NLP.

Course Outcomes:

Upon successful completion of the course, the student will be able to understand:

1. Difference levels/stages of natural language processing and the concept of Formal languages and grammars: Chomsky hierarchy and problems associated (like Left-Associative grammars, ambiguous grammars) with them.
2. The top down and the bottom up parsing approaches and their respective types of parsers like CKY, Earley & Tomita's
3. The student will be able to write small ATN & RTN grammars for simple English sentences.
4. The student will be able to do Morphology of words from natural languages like Hindi, English and Semantics-knowledge and its important to understand the documents.

REFERENCES

1. "Natural Language Understanding" James Allen, -1995Benjamin/cummings Pub. Comp. Ltd
2. "Language as a cognitive process", Terry Winograd 1983, AW
3. "Natural Language processing in prolog", G. Gazder, 1989, Addison Wesley.
4. " Introduction of Formal Language Theory", Mdlj Arbib & Kfaury, 1988, Springer Verlog

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: IT-306C

SUBJECT NAME: Digital Signal Processing (Elective-II)

NO OF CREDITS: 3

B.TECH	SEMESTER VI	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Unit-1: Discrete-Time Signals: Signal classifications, frequency domain representation, time domain representation, representation of sequences by Fourier transform, properties of Fourier transform, discrete time random signals, energy and power theorems.

Unit-2 : Discrete-Time Systems: Classification, properties, time invariant system, finite impulse Response (FIR) system, infinite impulse response (IIR) system.

Unit-3 : Sampling of Time Signals: Sampling theorem, application, frequency domain representation of sampling, reconstruction of band limited signal from its samples. discrete time processing of continuous time signals, changing the sampling rate using discrete time processing.

Unit-4 : Z-Transform : Introduction, properties of the region of convergence, properties of the Z-transform, inversion of the Z-transform, applications of Z-transform.

Unit-5 : Basics of Digital Filters : Fundamentals of digital filtering, various types of digital filters, design techniques of digital filters : window technique for FIR, bi-linear transformation and backward difference methods for IIR filter design, analysis of finite word length effects in DSP, DSP algorithm implementation consideration. Applications of DSP.

Unit-6 : Multirate Digital Signal Processing : Introduction to multirate digital signal processing, sampling rate conversion, filter structures, multistage decimator and interpolators, digital filter banks.

REFERENCES

1. Digital Signal Processing : Proakis and Manolakis; PHI
2. Digital Signal Processing: Salivahanan, Vallavaraj and Gnanapriya;TMH
3. Digital Signal Processing: Alon V. Oppenhelm;PHI
4. Digital Signal processing(II-Edition): Mitra, TMH

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: IT-401C

SUBJECT NAME: Optical Network Design

NO OF CREDITS: 4

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To make students familiar with SONET and SDH Architecture and add Drop Multiplexer.
2. To make students aware of wavelength division multiplexing techniques.
3. To introduce T-Carrier multiplexed hierarchy.
4. To introduce features of SONET and SDH.
5. To study about OSNR and OSNR calculation for amplifiers
6. To study about LDP protocol in detail

UNIT 1, "Introduction to Optical Networking"
Introduction SONET/SDH and dense wavelength-division multiplexing (DWDM) , Add/drop multiplexers (ADMs), ADM nodes on the ring. Multiservice provisioning platforms - ADM, DACS, RPR, SAN transport, DWDM, and Ethernet switching.

UNIT 2, "Fiber-Optic Technologies"
This chapter discusses the physics behind fiber-optic cables. It examines various linear effects, such as attenuation and dispersion, as well as nonlinear effects at high bit rates with WDM signaling. Various fiber types are presented along with their refractive index profiles. Fiber loss budget analysis is also presented with examples.

UNIT 3, "Wavelength-Division Multiplexing"
Wavelength-division multiplexing principles, coarse wavelength-division multiplexing, dense wavelength-division multiplexing, the ITU grid, WDM systems, WDM characteristics, impairments to transmission, and dispersion and compensation in WDM systems.OSNR calculations for fiber amplifiers.

UNIT 4, "SONET Architectures"

SONET framing, multiplexing, virtual tributaries, SONET network elements, SONET topologies, SONET protection mechanisms, APS, two-fiber UPSR, DRI, and two-fiber and four-fiber BLSR rings.

UNIT 5, "Packet Ring Technologies"
Ethernet over SONET/SDH encapsulation schemes, Ethernet over SONET/SDH using ANSI T1X1.5 147R1 Generic Framing Procedure (GFP) headers, Ethernet over Packet over SONET/SDH using ITU-T x.86 LAPS, and IEEE 802.17 RPR.

UNIT 6, "Multiservice SONET Platforms"
Cisco ONS 15000 family.- ONS 15454 MSPP, 15454 MSTP, and the 15454 SDH. Electrical and optical cards associated with the ONS 15454, E-Series Ethernet switch cards and the ML-Series Layer 2/3..

UNIT 7, "Ethernet, IP, and RPR over SONET and SDH"
Ethernet, IP, and RPR provisioning aspects of the ONS 15454 for SONET and SDH., SONET/SDH optical provisioning and the creation of Ethernet circuits over the optical layer. VRF and RPR provisioning.

Course Outcome:
Upon successful completion of the course, the student will be able to understand

1. SONET and SDH Architecture.
2. wavelength and time division multiplexing techniques.
3. SONET and SDH frames and their architectures
4. OSNR and OSNR calculation for amplifiers.
5. LDP protocol in detail.

REFERENCES

1. “Optical Network Design and Implementation (Networking Technology)”, by Vivek Alwayn, Cisco press
2. “Handbook of Fiber Optic Data Communication”, Third Edition: A Practical Guide to Optical Networking by Casimer DeCusatis

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: IT-403C

SUBJECT NAME: .NET TECHNOLOGIES

NO OF CREDITS: 4

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To understand the features of .Net Technologies & to understand Visual Studio .Net Environment
2. To give overview of C# programming fundamentals
3. To give overview of VB.Net programming constructs
4. To give overview of ADO.Net Object ModeL.
5. To give overview of ASP.Net of ASP.Net Web Programming

Unit-I: Introduction to .Net Framework

Introduction to .NET: The origin of .NET, Basics of .Net Framework & its Key design goals, 3-tier architecture, managed code, assemblies, CLR, Execution of assemblies code, IL, JIT, .NET framework class library, common type system, common language specification, metadata; Interoperability with unmanaged code

Net Framework Base Classes : System Namespaces; the System Types; System.object class; System.Exception Class; System.Collections;

Unit-II: Understanding the Development Environment

.NET Integrated Development Envirinment : Projects & Solutions,User Interface Elements, The Visual Studio Start Page; Visual Studio.Net work area; Navigational Features, Understanding Window Forms;Viewing and changing properties; Adding controls to the form.

Designing Visual Components; Using the task list

Unit-III: Introduction to VB .Net and C#

Data Types C#: Data Types, Operators, Methods, Handling Strings, Jagged Array, Array list, Indexer (one Dimension) and property, Interfaces, Delegates and events.

User Interface: Procedures in VB.NET, Garbage Collection, Message boxes; Dialog boxes; Menus and Toolbars; creating menu; adding Toolbars and buttons; defining an icon for a toolbar button; Adding Functionality to the Toolbar; Exception Handling.

Unit-IV: ADO.Net

Architecture of ADO.Net, Comparison with ADO, ADO.Net Object Model, Net Data provider, Data Adapter, Data Set, Data Row, Data Column, Data Relation, command, Data Reader, Connecting to Database, Accessing & Manipulating Data and Performing Data Updates.

Unit-V: ASP. Net

Anatomy of ASP .NET Page,ASP.Net Features, Introduction to Web Forms Server Controls : label, dropdown list box, Button, AdRotator , Textbox, Checkbox etc. , Validation controls, ASP.NET Web Services, State Management ,Caching, Authentication (window,.Net Passport, Forms Based), Securing ASP.NET Aplications

Course Outcomes:

Upon successful completion of the course, the students will be able to

1. Understand .net framework , its runtime environment and application development using IDE of Visual Studio 2010 and higher versions.
2. Implement C# and VB.Net language constructs in the form of stand-alone console and Window form applications .
3. Understand Database concepts in ADO.net and apply the knowledge to implement distributed data-driven applications using VB.Net, SQL-Server and ADO.Net
4. Design, document, debug ASP.Net web forms with server and validation controls and implement ASP.Net web services.

REFERENCES

1. Jeffrey Richter, Francesco Balena : Applied .Net Framework
2. Prog. In MS VB. Net, TMH Publications.
3. Herbert Schildt : Complete Reference C#, TMH Publication.
4. Michael Halvorsan : Microsoft Visual Basic.NET step by step,PHI Publication.
5. Balaguruswamy: Programming in C# , TMH Publications
6. Rebecca M.Riordan: Microsoft ADO.NET Step By Step , PHI Publications

B.TECH INFORMATION TECHNOLOGY AND COMPUTER APPLICATIONS

CODE: CE-405C

SUBJECT NAME: SOFTWARE TESTING

NO OF CREDITS: 4

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To get familiar the students about basic concepts of software testing and its techniques.
2. To study the concepts of Verification and validation activities.
3. To study in detail the process of performing the black box and white box testing approaches with examples.
4. To get familiar the students the concept of regression testing.
5. To study about the various testing automation and debugging tools and case studies.
6. To study the basic and advanced concepts of object oriented testing.

Unit 1Testing terminology and Methodology

Definition of testing, goals, psychology, model for testing, effective testing, limitations of testing, Importance of Testing, Definition of Failure, faults or bug, error, incident, test case, test ware, life cycle of bug, bug effects, bug classification, test case design, testing methodology, development of test strategy, verification, validation, Static testing: Inspection ,Review and Walkthrough, dynamic testing, testing life cycle model, testing techniques, testing principles, Testing Metrices.

Unit 2 Verification and validation

Verification activities, verification of requirements, verification of HL design, verification of data design, verification of architectural design, verification of UI design, verification of LL design, introduction to validation activities

Unit 3Dynamic testing

White Box testing: Boundary value analysis, equivalence class portioning, state table based testing, decision table based, error guessing.

Black Box Testing: Logic coverage criteria, basic path testing, graph matrices.

Unit 4Validation Testing

Unit testing, drivers , stubs, integration testing, methods, functional testing, system testing,

recovery testing, security testing, stress testing, performance testing, usability testing

Unit 5Regression Testing

Objective of regression testing, Regression test process, Regression testing techniques.

Unit 6Test Automation and debugging

S/w measurement and testing, testing metrics and tools

Case Study: Testing for Object-oriented and web-based systems

Unit 7Object-Oriented Testing

Use-case based testing; Class testing, Testing Exception handling

Course Outcomes:

After the completion of the course

The student will be able to

1. Design and develop bug free software systems using concepts of software testing.
2. Identify, formulate, review and analyze complex engineering problems of testing using principles of mathematics.
3. Create, select and apply appropriate techniques and modern engineering and IT tools for software testing.
4. Analyze verification, validation activities, static, dynamic testing, debugging tools and techniques and importance of working in teams.

REFERENCES

1. G.J Myers, The Art of Software Testing, John Wiley & Sons, 1979
2. Naresh Chauhan, Software Testing Principles and Practices,OXFORD University Press.

B.TECH INFORMATION TECHNOLOGY AND COMPUTER APPLICATIONS

CODE: CE-407C

SUBJECT NAME: OBJECT-ORIENTED SYSTEM DEVELOPMENT (ELECTIVE-III)

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objective

1. To become familiar with the object oriented methodology and its design
2. To become familiar with the objector process and need for Architectural Modeling
3. To become familiar with the various UML models, their notations and usage
4. To understand the role of iteration planning process and apply the models to the real world problem solving

Unit-1: Introduction to object oriented methodology: Review of the Traditional Methodologies, Classes, Objects, Encapsulation, Association, Aggregation, Inheritance, Polymorphism, States and Transitions.
Object Oriented Modeling: visual modeling and its importance , – UML Approach, conceptual model of the UML, Architecture, Software Development Life Cycle.
Object Oriented Design: Trends in software design, Design principles, Responsibility driven design, Separation of Responsibilities, Design phases and tools

Unit-2 Introduction to Objectory Software Development Process: Introduction, Benefits, Phases and Iterations, Elaboration Stage, Construction Stage, Transition Stage.

Unit-3 Structural modeling : Objects, classes: Names, attributes, operations, responsibilities; Stereotypes and Classes Relationships: Dependencies, Generalization, Association, Structural Diagrams: Class diagram, object diagrams.

Unit-4 Behavioral Modeling: Interaction diagrams, types of Interaction diagrams , Activity Diagrams Activities, Transitions, Decision Points, Swimlanes
Actors & Use cases, use case diagram, Use Case Relationships, Types of Relationships,

Unit-5 Architectural Modeling: Designing the System Architecture : The need for Architecture, The "4+1" view of Architecture, The Logical view, The Component View, The Process View, The Deployment View, The Use Case view.Checking the Model:Making the Model Homogeneous, Combining Classes, Splitting Classes, Eliminating Classes, Consistency Checking, Scenario Walk-through, Event Tracing, Documentation Review

Unit-6 The Iteration Planning Process: Benefits, Goals, Design the User Interface, Adding Design Classes, The Emergence of Patterns, Designing Relationships, Designing Attributes and Operations, Designing for Inheritance, Coding, Testing, and Documenting the Iteration.

Course Outcomes

After completing this course the student must demonstrate the knowledge and ability to:

1. Differentiate between traditional methodologies and object oriented methodologies and their design
2. Understand the need for Architectural Modeling and the various phases of Objectory Software development
3. Is able to gather SRS and design the required UML model along with their scenarios
4. Study the real world problems and apply the UML design Principles and methods and models.

REFERENCES

1. "UML User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, 2000, Addison Wesley.
2. Visual Modeling with Rational Rose 2000 and UMLBy Terry Quatrani Foreword by Grady Booch, 2000.
3. "UML Reference Guide", James Rumbaugh, Ivar Jacobson, Grady Booch, 2000, Addison Wesley.
4. "The Objectory Software Development Process", Ivar Jacobson, Grady Booch, James Rumbaugh, 1999, Addison Wesley.
5. UML Distiled by Maxtin Fowler with Kendall Scott,2000 ,Second Edition
6. Sams Teach Yourself "UML" In 24 Hours By Joseph Schmuller ,2000

B.TECH INFORMATION TECHNOLOGY AND COMPUTER APPLICATIONS

CODE: CE-409C

SUBJECT NAME: SOFTWARE PROJECT MANAGEMENT (Elective-III)

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To make the students understand the fundamental principles of Software Project management & will also have a good knowledge of responsibilities of project manager and how to handle these.
2. Understand the project planning process.
3. Be familiar with the different methods and techniques used for project management.
4. Be familiar with the techniques of project reporting, defect analysis and prevention.
5. To make the students understand the various quality techniques.

Unit-1: Introduction to Software Project Management (SPM): Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control, requirement specification, information and control in organization.

Unit-2: Stepwise Project planning: Introduction, selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, estimation techniques,COCOMO model, identifying activity risk, allocate resources, review/ publicize plan.

Unit-3: Project Evaluation & Estimation: Cost benefit analysis, cash flow forecasting, cost benefit evaluation techniques, risk evaluation. Selection of an appropriate project report; Choosing technologies, choice of process model, structured methods, rapid application development, water fall-, V-process-, spiral- models. Prototyping, delivery. Albrecht function point analysis.

Unit-4: Activity planning & Risk Management: Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, network planning model, representation of lagged activities, adding the time dimension, backward and forward pass, identifying critical path, activity throat, shortening project , precedence networks.

Risk Management: Introduction, the nature of risk, managing risk, risk identification, risk analysis, reducing the risks, evaluating risks to the schedule, calculating the z values.

Unit-5: Resource allocation &Monitoring the control: Introduction, the nature of resources, identifying resource requirements, scheduling resources creating critical paths, counting the cost, being specific, publishing the resource schedule, cost schedules, the scheduling sequence.

Monitoring the control: Introduction, creating the frame work, collecting the data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control.

Unit-6: Managing contracts and people: Introduction, types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: Introduction, understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures.

Unit-7: Software quality: Introduction, the place of software quality in project planning, the importance of software quality, defining software quality, quality factors,ISO 9126, Practical software quality measures, product versus process quality management, external standards, techniques to help enhance software quality, software quality metrices.

Unit 8: Study of any Software Project Management software, Viz. Project 2000 or equivalent

Course Outcomes:

1. The students will have good knowledge of the issues and challenges faced while doing the Software project Management.
2. Students will also be able to understand why majority of the software projects fails and how that failure probability can be reduced effectively. They will completely understand the complete software project planning process.
3. Students will be able to calculate the cost & staff for a particular project at the start.
4. Students will be able to do the project Scheduling, tracking, risk analysis, quality management and Project Cost estimation using different techniques
5. Students will be able to give quality software by making systematic approach i.e. Software engineering

REFERENCES

1. Software Engineering – A Practitioner's approach, Roger S. Pressman (5th edi), 2001, MGH
2. Software Project Management, Walker Royce, 1998, Addison Wesley.
3. Project Management 2/c. Maylor
4. Managing Global software Projects, Ramesh, 2001, TMH.

B.TECH INFORMATION TECHNOLOGY AND COMPUTER APPLICATIONS

CODE: CE-411C

SUBJECT NAME: WIRELESS SENSOR NETWORKS (Elective-III)

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

1. To make the student understand the basic concepts of WSN and its distinguishing features from its successor networks
2. To understand the application domain of WSN and protocol stack of WSN and the hardware of a sensor node
3. To discuss the challenges in designing various MAC and routing protocols for WSN
4. To understand the taxonomy of routing protocols of WSN and data dissemination and data aggregation techniques in WSN
5. To discuss the security mechanism and attacks in WSN
6. To discuss IEEE 802.15.4 and Zigbee Security

Unit-I OVERVIEW OF WIRELESS NETWORKS

Basic Concepts of Wireless Networks, Infrastructure & Infrastructure-less Wireless Networks, basic concepts of Mobile Adhoc Networks (MANETs), Design principles for MANETS, comparison of MANET & WSN

Unit-II ARCHITECTURE OF WIRELESS SENSOR NETWORKS

Unique constraints and challenges of WSN, Design principles for WSNs, Service interfaces of WSNs ,Sensor Node Hardware, Applications of WSNs, Enabling Technologies for Wireless Sensor Networks, mobility in WSN.

Unit-III PROTOCOLS OF WSN

Network Protocols: Issues in designing MAC protocol for WSNs, Classification of MAC Protocols, S-MAC Protocol, B-MAC protocol, IEEE 802.15.4 standard and Zig Bee, Dissemination protocol for large sensor network.

Routing Protocols:Issues in designing routing protocols, A Taxonomy of routing protocols (data centric, hierarchical, location based)

Unit-IV DATA DISSEMINATION IN WSN

Data Storage and Manipulation: Data centric and content based routing, storage and retrieval in network, compression technologies for WSN, Data aggregation technique. Applications: HealthCare, Underground Mining, WSN for Habitat Monitoring.

Unit-V SECURITY IN WSN

Challenges of Security in WSN, Security Attacks in WSN, Protocols and Mechanisms for Security, IEEE 802.15.4 and ZigBee Security.

Course Outcomes: At the end of the course/session the student would be

1. Acquainted with the basic concept of WSN and Learned the application domain of WSN
2. Become familiar with the protocol stack of WSN and have a detailed knowledge of the MAC protocols of WSN.
3. Become familiar with the various data dissemination techniques available in WSN
4. Able to apply the various data aggregation techniques of WSN for efficient data dissemination and become familiar with the various types of attacks in WSN and their security mechanisms

REFERENCES

1. Holger Karl & Andreas Willig, " Protocols And Architectures for Wireless Sensor
2. Networks" , John Wiley, 2005, ISBN : 0-470-09510-5
3. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information
4. Processing Approach", Elsevier, 2007.
5. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks-
6. Technology, Protocols, And Applications”, John Wiley, 2007, ISBN :978-0-471-74300-2

Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003, ISBN : 0-470-86736-1

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: IT-405C

SUBJECT NAME: Routing in Communication Networks (Elective-III)

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

1. To make the student understand the basic concepts of Circuit Switching Networks
2. To make the student understand the basic concepts of routing
3. To understand the application domain of High Speed Networks
4. To understand the Mobile Networks and Mobile Ad-hoc Networks.

Circuit Switching Networks

Dynamic Alternative Routing- Dynamic Routing in Telephone Network - ATM networks with virtual paths - Statistical multiplexing and homogeneous sources , delay guarantees, No statistical multiplexing , heterogonous sources.

Packet Switching Networks

Distance vector Routing, Link State Routing, Inter domain Routing-Classless Interdomain routing (CIDR), Interior Gateway routing protocols (IGRP) - Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Exterior Gateway Routing Protocol (EGRP) - Border Gateway Protocol (BGP), Apple Talk Routing.

High Speed Networks

Routing in optical networks- Optical link networks- Single hop, multi hop optical networks, hybrid optical networks, photonic networks , Routing in the PLANET network- Packet level Routing - Call level Routing - Network infrastructure -Deflection Routing.- Topologies, Deflection routing Algorithms- Performance of routing algorithms on regular topologies - Deflection routing on time varying topologies, resequencing - unslotted operation.

Mobile Networks

Routing in Cellular Mobile Radio Communication networks- Network Architecture, Air interface functionality, Mobility management, Connectionless Data service for cellular systems, Mobility and Routing in Cellular Digital Packet Data (CDPD) network, Packet Radio Routing- DARPA packet radio network, Routing algorithms for small, medium and large sized packet radio networks.

Mobile Ad-Hoc Networks

Internet based mobile ad-hoc networking, Routing algorithms - Table-driven routing - Destination Sequenced Distance Vector (DSDV), Source initiated on-demand routing- Dynamic Source Routing (DSR), Ad-hoc On- demand Distance Vector (AODV), Hierarchical based routing- Cluster head Gateway Switch Routing (CGSR) and Temporally-Ordered Routing Algorithm (TORA).

Course Outcomes

1. Student will understand the basic concepts of Circuit Switching Networks
2. Student will be able to understand the basic concepts of routing
3. It will be easy for students to understand the application domain of High Speed Networks
4. Students will get knowledge about Mobile Networks and Mobile Ad-hoc Networks

REFERENCES

1. M. Steen strub, Routing in Communication networks, Prentice Hall International, NewYork, 1995
2. Internetworking Technologies Handbook, 4 th Edition, Inc. Cisco Systems, ILSG Cisco Systems, 2003.
3. William Stallings, ISDN and Broadband ISDN with Frame Relay and ATM, PHI, New Delhi, 2004.
4. Behrouz A Forouzan, Data Communications and Networking , 3 rd Edition, TMH, 2004
5. William Stallings, High Speed Networks TCP/IP and ATM Design Principles, Prentice Hall International, New York, 1998.

B.TECH INFORMATION TECHNOLOGY AND COMPUTER APPLICATIONS

CODE: CE-415C

SUBJECT NAME: MOBILE APPLICATION DEVELOPMENT (Elective-3)

NO OF CREDITS: 3

B.TECH SEMESTER VII		SESSIONAL:	25
L P		THEORY EXAM:	75
3 0		TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To make students aware of Java concepts like OOPs, inheritance, exception handling, packages and interfaces. And to make students aware about JVM, multithreading, SQL-DML and DDL queries.
2. To make students aware about Android development environment, DVM and .apk file.
3. To make students aware of AndroidManifest.xml, Resources and R.java file.
4. To make students aware of Assets, Layout & Drawable Resources.
5. To make students aware of Activities and its life cycle.
6. To make students aware of emulator settings and various windows like LogCat and SharedPreferences and SQLite programming.

Unit I

JAVA Concepts, OOPs Concepts, Inheritance in detail, Exception handling, Packages & interfaces, JVM & .jar file extension, Multi threading (Thread class & Runnable Interface), SQL DML & DDL Queries in brief.

Unit 2

What is Android?, Setting up development environment, Dalvik Virtual Machine & .apk file extension, Fundamentals: Basic Building blocks - Activities,Services,Broadcast Receivers & Content providers, UI Components - Views & notifications, Components for communication - Intents & Intent Filters, Android API levels (versions & version names), Application Structure (in detail), AndroidManifest.xml, uses-permission & uses-sdk, Resources & R.java, Assets, Layouts & Drawable Resources, Activities and Activity lifecycle

Unit 3

Emulator-Android Virtual Device, Launching emulator, Editing emulator settings, Emulator shortcuts, Logcat usage, Introduction to DDMS, Second App:- (switching between activities) , Develop an app for demonstrating the communication between Intents, Basic UI design, Form widgets, Text Fields, Layouts, [dip, dp, sip, sp] versus px, Preferences, SharedPreferences, Preferences from xml, Examples, Menu,Option menu, Context menu, Sub menu, menu from xml, menu via code,Examples, Intents (in detail), Explicit Intents, Implicit intents, Examples, Content Providers.

Unit 4

SQLite Programming, SQLiteOpenHelper, SQLiteDatabse, Cursor, Reading and updating Contacts, Reading bookmarks, Example: Develop an App to demonstrate database usage. Adapters:- ArrayAdapters, BaseAdapters, ListView and ListActivity, Custom listview, GridView using adapters, Gallery using adapters, Broadcast Receivers, Services and notifications, Toast, Alarms, Examples, Threads,Threads running on UI thread (runOnUiThread),Worker thread,Handlers & Runnable, AsynTask (in detail), Examples

Course Outcomes:

After completing this course satisfactorily, a student will be able to:

1. Understand Java concepts like OOPs, inheritance, exception handling, packages and interfaces and understand about JVM, multithreading, SQL- DML and DDL queries.
2. explore Android development environment, DVM and .apk file and to create Activities, Broadcast receivers and content providers.
3. to make use of AndroidManifest.xml, Resources and R.java file.
4. understand emulator settings and various windows like LogCat and SharedPreferences.
5. create SQLite programming code development.

REFERENCES

1. https://developer.android.com/training/index.html
2. Android Programming: The Big Nerd Ranch Guide (Big Nerd Ranch Guides) by Bill Philips & Brian Hardy.
3. Android Design Patterns: Interaction Design Solutions for Developers by Greg Nudelman.
4. Programming Android by **Zigurd Mednieks, Laird Dornin, G. Blake Meike & Masumi Nakamura.**

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-417C

SUBJECT NAME: NETWORK PROGRAMMING & ADMINISTRATION (Elective-IV)

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To understand TCP/IP Protocol Suite and understand transport layer protocols.
2. To understand various networking commands and socket programming.
3. To understand how to communicate among networks and issues in server software design.
4. To develop the network programming skills and administrative issues for efficient working of the network.
5. To give overview of Remote Procedure Call (RPC) that helps make distributed programs easy to design and understand.
6. To understand network debugging techniques

Unit-1: Introduction to networking: TCP/IP Protocol architecture, Classful internet addresses, subnets, super netting, address resolution Protocol (RAP) and RARP, IP datagram format, UDP and TCP/data grams , TCP connection establishment and Format, Buffer sizes and limitation, ICMP its purpose , FINGER, NET STAT details & IP config, Ping, TRACERT, ROUTE.

Unit-2: Sockets : Socket introduction, Address structures, value – result arguments, Byte ordering and manipulation function and related functions, elementary TCP sockets, TCP client sever, I/O functions, select& poll functions, socket options elementary UDP sockets, elementary node and address conversions, DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information, echo service (TCP and UDP).

Unit-3: Algorithm and issues in server software design: iterative connectionless servers, (UDP), Iterative, connection oriented servers (TCP), single process, concurrent servers multiprotocol servers (TCP,UDP), multi service servers (TCP,UDP).

Unit-4: Remote procedure call concept (RPC) :RPC models, analogy between RPC of client and server, remote programs and procedures, their multiple versions and mutual exclusion communication semantics, RPC retransmits, dynamic port mapping ,authentication.

Unit-5: Network file system, NFS Procedure & File mount, concept of data link access, debugging techniques ,Routing sockets.

Course Outcomes:

After successful completion of the course, the students will be to:

1. Familiar with the concept of TCP/IP Model and use of different networking protocols, network addressing and network commands
2. Able to understand elementary and advanced socket system calls and write instructions to implement TCP and UDP based sockets.
3. Able to understand algorithm and issues in designing server software and distributed networking concepts of RPC & NFS
4. Able to execute administrative and super privileged socket functions and debug network applications

REFERENCES

1. Unix Network programming Vol -2nd edition, W.Richard Stevens
2. Internet working with TCP/IP Vol-1, Dougles E commer.
3. Internetworking TCP/IP Vol III Dougles E comer, David L.Stevens
4. Internetworking with TCP/IP, Vol II

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-419C

SUBJECT NAME: WEB MINING (Elective-IV)

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To familiarize the students with the basic roadmap of data mining and various data mining techniques.
2. To introduce the concept of Web mining, types, various measures and techniques
3. To acquaint students with Web content mining and its applications on World Wide Web.
4. To introduce students with Web structure mining and its applications on Web graph and page ranking algorithms.
5. To understand basics of Web usage mining, usage patterns and its applications on web logs.
6. To introduce various applications areas of web usage mining like personalized systems and recommendation systems.

Unit-1: Data Mining Techniques and Algorithms: Data mining, Association Rule Mining, Supervised Learning: Classification & Prediction; Unsupervised Learning: Cluster Analysis; Markov Models.

Unit-2: Foundation of Web Mining: Data mining and Web mining, Characteristics of Web Data, Web Data Model; Textual, Linkage and Usage Expressions; Similarity Functions, Information Retrieval Performance Evaluation Metrics, Web Mining Categories, Techniques and Applications.

Unit-3: Web Content Mining: Vector Space Model, Web Crawling, Web Search, Feature Enrichment of Short Texts, Automatic Topic Extraction from Web Documents.

Unit-4: Web Structure Mining: Web Search and Hyperlinks, Co-citation and Biographic Coupling, Page Rank and HITS Algorithm, Weighted Page Rank Algorithm, Web Graph Measurement and Modeling, Using Link Information for Web Page Classification.

Unit-5: Web Usage Mining: Modeling Web User Interests, Discovery and Analysis of Web Usage Patterns, Bipartite Graph Model, Clustering user sessions and web pages, Mining Web Logs to Improve Website Organization, Clustering User Queries from Web Logs for Related Query.

Unit-6: Web Mining and Recommendation Systems: User based and Item based Collaborative Filtering Recommender Systems, Web Query Recommendations.

Course Outcomes:

1. The students will be able to understand basic concepts of data mining, supervised and unsupervised learning techniques, association rule discovery, clustering, classification and prediction techniques.
2. The students will be able to understand Web mining in detail and how its different from data mining and also the students will be able to understand Web data models, various similarity functions and performance measures.
3. The students will be able to understand types of web mining viz. content, structure and usage mining and the students will be able to understand Web content mining in detail, vector space model and applications on the web.
4. The students will understand Web structure mining, concept of web graph and applications in ranking web pages.

REFERENCES

1. Web Mining and social Networking: Techniques and Applications- Guandong Xu, Yanchung Zhang, Lin Li, Springer Book Series 2011.

2. Web Data Mining- Bling Liu, Springer Book Series.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-421C

SUBJECT NAME: AGENT BASED COMPUTING (Elective-IV)

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

1. To teach the students fundamental concepts of agents and to explain the taxonomy and applications of software agents
2. To provide a detailed understanding of intelligent software agents and to explain the student need and approach for implementing Multi Agent Systems
3. To make the student learn various protocols available for communication in MAS
4. To make the students familiar with Agent Communication Languages
5. To provide an in depth knowledge of mobile agents

UNIT I AGENTS – OVERVIEW

Agent Definition, Origin of Agents, Agent Programming Paradigms, Distinguishing features of Software agents,Taxonomy of Agents, Applications of Agents

UNIT II INTELLIGENT SOFTWARE AGENTS

Environments, Intelligent Agents, Agents and Objects, Agents nd Expert Systems,Agents as Intentional Systems,Abstract Architecture for Intelligent Agents, Howe to tell an agent what to do,Synthesizing agents.

UNIT IIIMOBILE AGENTS : AGENTS WITH MOBILITY

Need of Mobile Agents, Application areas of Mobile Agents, Mobile Agent migration process,general framework for agent migration, mobility models, classification of communication models for mobile agents.

UNIT IV AGENTS AND SECURITY

Agent Security Issues , Mobile Agents Security , Protecting Agents against Malicious Hosts , Untrusted Agent , Black Box Security , Authentication for agents.

UNIT V AGENT BASED FRAMEWORKS

Study of various agent based frameworks , case study : aglets

Course Outcomes

1. Acquainted with the basics of software agents and learned the application domain of software agents
2. Have an in depth knowledge of intelligent software agents and learned where and how to use Multi Agent Systems
3. Develop various models for communication between agents using ACLs
4. To apply/ include mobile agents in given distributed systems and become familiar with the various types of attacks in agent systems and their security mechanism

REFERENCES

1. Michael Wooldridge, *An introduction to multiagent systems* , Wiley Publications, ISBN 0-471-4969 I-X, (2nd Edition)
2. Intelligent Software Agents by Richard Murch&Tony Johnson
3. Mobile Agents: Basic Concepts, Mobility Models, and the Tracy Toolkit by Peter Braun and Wilhelm R. Rossak
4. Bigus&Bigus,"ConstructingIntelligentagentswithJava",Wiley,1997.
5. Bradshaw,"SoftwareAgents",MITPress,2000.
6. Russel, Norvig, "Artificial Intelligence: A Modern Approach", Second Edition, PearsonEducation,2003.
7. RichardMurch,TonyJohnson,"IntelligentSoftwareAgents",PrenticeHall,2000.
8. GerhardWeiss,"MultiAgentSystems–AModernApproachtoDistributedArtificial
9. Intelligence",MITPress,2000.

B.TECH INFORMATION TECHNOLOGY &COMPUTER APPLICATIONS

CODE: CE-425C

SUBJECT NAME: SEMANTIC WEB(Elective-IV)

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:

1. To make the students familiar with Semantic Web technology and its applications and to make the students familiar with origin of semantic web and meta data search engines.
2. To enable students understand Ontology and to give knowledge about role of Ontology, OWL, OWL Stack.
3. To give knowledge about Protégé and make Ontology using protégé.
4. To make the student familiar with semantic web services: UDDI, OWL-S.
5. To make the students understand architecture of Swoogle and to make student familiar with FOAF.
6. To make the students understand sematic markup and semantic web search engine

Unit-1 Semantic Web: Introduction to semantic web technology,need, problems, applications, it's relation with Artificial Intelligence. Traditional web to semantic web – meta datasearch engines.

Unit-2 Ontology: XML, RDF, RDFS core, URI and other components of Ontology. Ontology for different applications,Role of Ontology in intelligent information retrieval on web. OWL,OWL Stack: define classes- set operators –enumerations- defining properties – Validating OWL ontology, Mapping Ontology, Writing OWL ontology with Protege.

Unit-3 Semantics: Kinds of semantics, use of semantics Search Engines: Role of search Engines in intelligent retrieval of information on web. Semantic web services and applications : Web services – web services standards – web services to semantic web services- UDDIConcept of OWL-S – building blocks of OWL-S- mapping OWL-S to UDDI- WSDL-S overview.

Unit-4 Real world examples and applications: Swoogle- architecture and usage of meta data; FOAF – vocabulary – creating documents – overview of semantic markup – semantic web search engines.

Course Outcomes:
After the completion of course, the student will be able to

1. Understand basics of Semantic Web technology and its applications and define Ontology: XML, RDF, RDFS.
2. Analyze how to map ontology .
3. Construct ontology using Protege.
4. Understand the concept of Semantic search engines and UDDI,OWL Stack: OWL-S.
5. The students will be familiar with the architecture of SWOOGLE(semantic search Engine)

References:

1. Tim Berner's Lee, "Weaving the web: The original design and ultimate destiny of www", Harper Business (imprint of Harper Collins) .

2. Liyang Yu .Introduction to the Semantic Web and Semantic web services. Chapman & Hall/CRC, Taylor & Francis group, 2007.

3. Michael C Daconta, Leo, Kelvin Smith , "The Semantic Web:A guide to the future of XML,Web services, and knowledge management", Wiley.

6. Dieter Fensel, James Hendler, Henry Lieberman, Tim Berner's Lee "Spinning the Semantic Web", MIT press

7. Grigoris Antonion, Frank Van Harmalen,"Semantic Web primer", MIT press Thomas B Passin, "Explorer's guide to Semantic Web", Hanning

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS

CODE: CE-403C

SUBJECT NAME: SECURITY OF INFORMATION SYSTEMS

NO OF CREDITS: 4

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
4	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives:
To impart the knowledge of:

1. Application of each of security goals: confidentiality, integrity, and availability and issues for creating security policy for a large organization.
2. Defense for protection and security, and the role of ethical considerations in computer use.
3. Efficient basic number-theoretic algorithms, including greatest common divisor, multiplicative inverse mod n, and raising to powers mod n.
4. Public-key cryptosystems, including a necessary complexity-theoretic assumption for their security and simple extensions of cryptographic protocols, using known protocols and Cryptographic primitives.
5. The basic categories of threats to networks and protocols for network security.

Unit-1 Basic Encryption and Decryption: introduction to Ciphers, Monoalphabetic Substitutions such as the Caesar Cipher, Cryptanalysis of Monoalphabetic Ciphers, Polyalphabetic Ciphers such as Vigenere Tableaux, Cryptanalysis of Polyalphabetic Ciphers, Perfect Substitution Cipher such as the Vernam Cipher, Stream and Block Ciphers..

Unit-2 Properties of Arithmetic Operations: Inverses, Primes, Greatest Common Divisor, Euclidean Algorithm, Modular Arithmetic, Properties of Modular Arithmetic, Computing the inverse, Fermat's Theorem, Algorithm for Computing Inverses, Random number generation.
Secure Secret Key (Symmetric) Systems: Data Encryption Standard (DES), Analyzing and Strengthening of DES, Advance Encryption Standard (AES)
Public Key (Asymmetric key) Encryption Systems: Concept of Public key Encryption System, Introduction to Merkle-Hellman Knapsacks, Rivest-Shamir-Adelman (RSA) Encryption, Digital Signature Algorithms (DSA)
Hash Algorithms: Hash Concept, Description of Hash Algorithms , Message Digest Algorithms such as MD4 and MD5 , Secure Hash Algorithms(SHA) .

Unit–3 Applied Cryptography, Protocols and Practice: Key Management Protocols: Diffie-Hellman Algorithm, Key Exchange with Public Key Cryptography.
Public Key Infrastructure (PKI): Concept of Digital Certificate, Certificate Authorities and it's roles, X509 Structure of Digital Certificate.

Unit-4 Network Security Practice: Authentication Applications- Kerberos, X.509 Authentication Service; Electronic Mail Security- Pretty Good Privacy, S/MIME;
IP Security: IP Security Overview,IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations;
Web Security: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

Unit–5 Operating System, Database and Program Security: Operating Systems Security: Security Policies, Models of Security, Security Features of Ordinary and trusted Operating System.
Database Security: Security Requirements of Databases, Reliability and Integrity, Protection of Sensitive Data.
Program Security: Kinds of Malicious Code, Virus Signatures, Preventing Virus Infection, Trapdoors, Convert Channels, Control Against Program Threats.

Course Outcomes:

After the completion of this course the students will be able to:

1. Understand various terms related to security, encryption and decryption algorithms, way to choose a suitable ciphering algorithm according to the required security level, security goals, its applications
2. Use and cryptanalysis of various basic and modern encryption algorithms, integrity providing algorithms.
3. Use of different Arithmetic operations in order to get security at various points in the network, algorithms for authentication and access control.
4. Understand various protocols which provide security at various layers during communication, and issues related to security of operating system, Database and Program and their solutions.

REFERENCES

1. William Stalling, Cryptography and Network Security, 3rd Edition. PHI New Delhi
2. William Stalling, Network Security Essentials, 2nd Edition. PHI New Delhi
3. Charlie Kaufman, Network Security: Private Communication in Public World, 2nd Edition PHI, New Delhi.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS (GENERAL ELECTIVE)

CODE-GC-101C

SUBJECT NAME: INTELLIGENT SYSTEMS

NO OF CREDITS: 3

B.TECH	SEMESTER VI	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course objectives:
Students undergoing this course are expected to:

1. To have an appreciation for and understanding of both the achievements of AI and the theory underlying those achievements.
2. Searching as a problem-solving technique: a review of "conventional" searching methods including breadth-first, depth-first, best-first search any many more heuristic techniques. Heuristic functions and their effect on performance of search algorithms..
3. Represent the knowledge in different forms as well as an understanding of other topics such as minimax, resolution, etc.
4. Know the different ways of planning and natural language understanding.
5. Realize the different methods of learning.
6. Introduction to genetic algorithms.

Unit 1: Fundamental Issues in IS : Defi of AI , History ,Domains AI ,AI problems & State space ,Some examples problems representations like Travelling Salespersons ,Syntax analysis Problem .Basic issues to solve AI problems ,Underlying assumptions ,AI techniques ,Level of model ,Criteria for success ,Control strategies ,DFS,BFS

Unit 2:Heuristic search techniques :Generate & Test ,HillClimbing(simple & stipest),Best first search ,A*, AO*, Constraint satisfaction.

Unit 3: Knowledge representation issues :Systax & Semantic for Propositional logic

,Syntax & Semantic for FOPL, Properties for WFF's, Resolution Basics :conversion to

clausal form ,Resolution of proposition logic ,Resolution algorithms for predicates ,Problems with FOPL ,Semantic nets ,Frames ,Scripts

Unit 4:Reasoning under uncertainity :An introduction ,Default reasoning & Closed world

assumptions ,Model & Temporal logic ,Fuzzy logic ,Basian Probabilstic inference ,Dempster Shafer theory ,Heuristic reasoning methods

Unit 5: Planning & Learning :Planning ,Planning in Situational calculus ,Representation for planning ,Partial order palnning, Partial order palnning algorithm ,Learning by Examples ,Learning by Analogy ,Explanation based learning ,Neurals nets ,Genetics algorithms

Unit 6:MINIMAX Game playing strategy ,Natural language processing ,Overview of

linguistics ,Grammer & Language ,Transformation Grammer ,Basic Parsing Techniques,

Expert System ,Architecture of Rule based Expert system ,Non Rule based Expert system.

Course outcomes:

After undergoing the course, Students will be able to:

1. Learn the use of AI in different real life problems and heuristic search techniques for AI related problems.
2. Develop an ability to analyze and formalize the problem (as a state space,graph, etc.) and select the appropriate search method.
3. Apply the natural language processing techniques to computer.
4. Can apply genetic algorithm to solve the complex problems.

REFERENCES

1. Artificial Intelligence by Elain Rich & Kevin Knight, Tata McGraw Hills Pub.
2. Principals of AI by Nills .J.Nilsson, Pearson Education Pub.
3. Artificial Intelligence by DAN. W.Petterson. Printice Hall of India
4. Artificial Intelligence by Petrick Henry Winston,
5. Artificial Intelligence by Russel and Norvig, Pearson Education Pub.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS (GENERAL ELECTIVE)

CODE:GC-102C

SUBJECT NAME: CYBER LAWS AND SECURITY

NO OF CREDITS: 3

B.TECH	SEMESTER VI	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks.It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

1. The objective of the course is to make students familiar about security, its related terms like threat, attack, control etc.
2. To introduce various security challenges in different application domains
3. To introduce Security threats in the internet based applications.
4. To make students familiar with various physical security methods
5. To make students familiar about various forensic tools and various laws for cyber crime and policy designed by the government for cyber security.

UNIT-I

History of Information Systems and its Importance, basics, Changing Nature of Information Systems, Need of Distributed Information Systems, Role of Internet and Web Services, Information System Threats and attacks, Classification of Threats and Assessing Damages Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles.

UNIT-II

Security Threats to E Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards. Physical Security- Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges

UNIT-III

Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues, Policies Network Security- Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring

and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN

UNIT-IV

Security metrics- Classification and their benefits Information Security & Law, IPR, Patent Law, Copyright Law, Legal Issues in Data mIning Security, Building Security into Software Life Cycle Ethics- Ethical Issues, Issues in Data and Software Privacy Cyber Crime Types & overview of Cyber Crimes

Course Outcome

1. By the end of the course, students should be able to understand the concept of security and its differentiation with its related terms.
2. By the end of the course, students should be able to understand why security is important for internet based applications and various security threats in these areas.
3. By the end of the course, students should be able to understand various methods to provide physical security.
4. By the end of the course, students should be able to know laws, policies initiated by the government against cyber crime.

REFERENCES

1. Godbole,“ Information Systems Security”, Willey
2. Merkov, Breithaupt, “ Information Security”, Pearson Education
3. Yadav, “Foundations of Information Technology”, New Age, Delhi
4. Schou, Shoemaker, “ Information Assurance for the Enterprise”, Tata McGraw Hill
5. Sood,“Cyber Laws Simplified”, Mc Graw Hill
6. Furnell, “Computer Insecurity”, Springer 7. IT Act 2000

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS (GENERAL ELECTIVE)

CODE:GC-103C

SUBJECT NAME: SOFT COMPUTING

NO OF CREDITS: 3

B.TECH	SEMESTER VI	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Course Objectives

Students will learn about

1. Need of soft computing in the context of real life scenarios and various constituent methodologies underlying in the domain of soft computing.
2. Fundamentals of fuzzy sets and logic ,Fuzzy logic based control/ expert systems.
3. Inductive logic and need for training in the context of machine learning and Neuron models relating to supervised and unsupervised learning.
4. Training the neurons on given input/output class information.
5. Solving a problem with huge state space using genetic modeling and operators
6. Applying soft computing in common domains like IR, Drug design etc.

Unit-I

Neural Networks: History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perception Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

Unit-II

Fuzzy Logic: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.

Unit-III

Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Unit-IV

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Unit-V

Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers,

Linguistic Hedges.

Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

Genetic Algorithms, Scope & application areas, solution of 0-1Knapsack problem using GA

Course Outcomes

After the completion of the course the student will be able to

1. Discuss the various aspects of uncertainty in real life and inability of conventional computing to handle them and to Relate real life problem contexts to soft computing paradigms tools
2. Design and use fuzzy sets and numbers in the context of various domains and Design fuzzy rule based system for a control application like washing machine.
3. Identify the problems suitable for solution using neural networks and train a perceptron network over a given input/output pattern information.
4. Design a genetic model for a given problem with huge state space and Apply GA tools and solution to a problem to find an amicable solution for the same.

REFERENCES

1. “Fuzzy sets and Fuzzy Logic: Theory and applications”,G.J. Klir,B.Yuan, PHI
2. “Introduction to Fuzzy sets and Fuzzy Logic”, M.Ganesh , PHI
3. “An Introduction to Fuzzy Control”, D Driankov, H Hellendoorn, M Reinfrank, Narosa Publishing Company
4. “ Neural Networks: A classroom approach”, Satish Kumar , Tata McGraw Hill
5. Haykin S., “Neural Networks-A Comprehensive Foundations”, Prentice-Hall International, New Jersey, 1999.
6.Anderson J.A., “An Introduction to Neural Networks”, PHI, 1999

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS (GENERAL ELECTIVE)

CODE:GC-104C

SUBJECT NAME: Web Technology and Information Retrieval

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

Unit 1 Web Server Technology:Web's Robot global access to information, HTML, HTTP, Accessing a web server, publishing on web server, secure HTTP, Secure Sockets Layer, WWW Proxies, IIS, Case study of apache web server.

Unit 2 Web search basics :Background and history,Anatomy of WWW, Web characteristics, Spam, The web graph, The Web Search Users, search engines, architecture of search engines, search tools, DNS resolution, The URL frontier, Link analysis, PageRank,

UNIT 3 Web Crawlers:Basics of Web crawling, Various crawling techniques , incremental crawler, parallel crawler, distributed crawlers, focused crawler, agent based crawler, Hidden web Crawler

Unit 4 Introduction to Information Retrieval :Information retrieval problem, an inverted index, Processing Boolean queries, The extended Boolean model versus ranked retrieval, an inverted index, Bi-word indexes, Positional indexes, Combination schemes

Unit 5 Index construction :Hardware basics, Blocked sort-based indexing, Single-pass in-memory indexing, Distributed indexing, Dynamic indexing, Other types of indexes Index compression: Statistical properties of terms in information retrieval, Heaps' law: Estimating the number of terms, Zipf's law: Modeling the distribution of terms, Dictionary compression, Dictionary as a string, Blocked storage, Postings file compression.

B.TECH INFORMATION TECHNOLOGY & COMPUTER APPLICATIONS
(GENERAL ELECTIVE)

GC-105C

SUBJECT NAME: Intellectual Property Rights (IPR)

NO OF CREDITS: 3

B.TECH	SEMESTER VII	SESSIONAL:	25
L	P	THEORY EXAM:	75
3	0	TOTAL:	100

NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.

UNIT 1: Introduction to Intellectual Property: Concept of Intellectual Property, Kinds of Intellectual Property, Economic Importance of Intellectual Property, **Indian Theory on Private Property:** Constitutional Aspects of Property, Constitutional Protection of Property and Intellectual Property, **Economic Development and Intellectual Property Rights Protection**

UNIT II: Introduction to Patents: Overview, Historical Development, Concepts: Novelty, Utility, **Patentable Subject-matter:** Patent Act, 1970- Amendments of 1999, 2000, 2002 and 2005, Pharmaceutical Products and Process and Patent , Protection, Software Patents, Business Method, Protection of Plant Varieties and Farmers' Rights Act, 2001, Patenting of Micro-organism

UNIT III: Procedure of Obtaining of Patents: Concepts of a Patent Application,, Specification: Provisional, Complete, Disclosure Aspects, Claims: Principal, Dependant, Omnibus, Examination of Application, Opposition of Application, Sealing of Patents

UNIT IV: Working of Patents – Compulsory License: Commercialization of Inventions: License- Terms of License Agreement, Assignments of Patents, Revocation of Patents

UNIT V: Infringement: What is Infringement?, How is Infringement determined? Who is an Infringer?, Direct, Contributory and Induced, Defences of Infringement:
5.2.1 Research Exemption, Invalidity, Misuse, Failure to mark, Laches and Estoppel and first sale doctrine

References Books:

1. W.R. Cornish, Intellectual Property, Sweet & Maxwell, London (2000)
2. P. Narayana, Patent Law, Wadhwa Publication
3. Merges, Patent Law and Policy: Cases and Materials, 1996
4. Brian C. Reid, A Practical Guide to Patent Law, 2nd Edition, 1993
5. Brinkhof (Edited), Patent Cases, Wolters Kluwer.
6. Prof. Willem Hoyng & Frank Eijsvogels, Global Patent Litigation, Strategy and Practice, Wolters Kluwer.
7. Gregory Stobbs, Software Patents Worldwide, Wolters Kluwer.
8. Feroz Ali Khader, The Law of Patents- With a special focus on Pharmaceuticals in India, Lexis Nexis Butterworths Wadhwa, Nagpur.
9. Sookman, Computer Law, 1996
10. N.S. Gopalakrishnan & T.G. Agitha, Principles of Intellectual Property (2009). Eastern Book Company, Lucknow.