

Computer Science

POST GRADUATE DEGREE STANDARD

UNIT I

DISCRETE STRUCTURES

Set Theory, Principles of mathematical Induction, Relations, functions, algebraic structure - semigroup, monoid, group, propositional calculus generating functions and graph theory.

UNIT II

NUMERICAL METHODS

Number representation and the concept of precision, errors in computation, analysis procedures and error estimation, interpolation, root finding, linear system of equations, differentiation and integration

UNIT III

AUTOMATA, LANGUAGES AND COMPUTATION

Basic concepts of strings, alphabets, languages, finite automation, regular expressions, Moore and Mealy machines, regular sets, minimization of finite automata, Chomsky hierarchy of languages, relation between classes of languages, context free grammar, pushdown automata, Linear bounded automata, Turing machines, halting problem and decidability.

UNIT IV

PROGRAMMING AND DATA STRUCTURES

Structured programming with C, arrays, stacks, strings, queues, lists, graphs, trees and sets, graph and tree traversals, recursion, tree balancing, hashing, file structures, sorting and searching, algorithm design and analysis techniques.

UNIT V

DESIGN AND ANALYSIS OF ALGORITHMS

Design Techniques, divide and conquer, greedy method, dynamic programming etc., graph algorithms, Strassen's matrix multiplication algorithm, geometric algorithms, NP complete problems, approximation algorithms

UNIT VI

LANGUAGE PROCESORS

Assemblers loaders, linkers, macroprocessor, text editors, programming languages, lexical analysis, parsing techniques, precedence grammars, symbol tables, scope rules and parameter passing mechanisms, syntax directed translation, run time environment, machine code generation, interpreters.

UNIT VII

DOS AND UNIX INTERNALS

System memory, interrupt assignment, BIOS interrupts entry points and changing interrupt vectors. DOS function calls, DEBUG mode, networking with MSDOS, Macros and Macro library. Introduction to UNIX Operating systems, file system, visual editor, unix commands, shell programming, Unix-C interface programming, support tools - lex, yacc etc., process control, process creation, trapping signal, process termination, interprocess communication, shared memory, semaphores, messages, disk blocks, system calls and library.

UNIT VIII

ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

Production systems, different strategies, hill climbing, backtracking, graph search specialised production systems, minimax procedure, alphabeta pruning, resolution and refutation, control strategies, structured representation of knowledge, semantic nets, frames, Expert system components, languages and tools, non monotonic reasoning, fuzzy reasoning, knowledge acquisition and machine learning.

PAPER -II

UNIT I

COMPUTER HARDWARE

Logic families, flip flops, logic function, minimization techniques, design of combinational and sequential circuits, design with integrated circuits including ROM PLA and multiplexers, microprocessor architecture, interfacing with memory and I/o devices, modes of data transfer and their implementation, serial and parallel communication interfaces, knowledge of 8085.

UNIT II

ADVANCED COMPUTER ARCHITECTURE

Review of elements of Computer organisation - machine instructions, addressing modes, instruction pipelining, memory organization. CPU and system buses, bus standards, Von Neumann Vs Non Von Neumann architectures, language directed architectures, RISC architectures, object oriented architectures, memory and I/O subsystems - Hierarchical memory, virtual memory system memory allocation and management, cache memories, I/O subsystems, architectural classification, pipelined processors, vector processing. Array processors, multiprocessor architectures.

UNIT III

ADVANCED OPERATING SYSTEMS (a) Review of uniprocessor operating system:

Batch, multiprogramming and time-sharing systems, operating system concepts, memory, device and file management, process scheduling, interprocess communication, process synchronization and concurrency, deadlocks, protection.

(b) Multiprocessor operating system:

Classification of multiprocessor operating systems, software and operating system requirements for multiprocessors, multiprocessor scheduling strategies.

(c) Distributed Operating System:

Communication in distributed systems, client server model, remote procedure call, group communication, synchronization in distributed systems, mutual exclusion and election algorithms, deadlocks in distributed systems, processor allocation algorithms, scheduling in distributed system, distributed file systems.

UNIT IV

DATA BASE SYSTEMS

Elements of data base systems, file organization, relational and network data models, normal forms, query languages. Design and implementation of typical database systems, Internal and external consistency, concurrency control techniques, object oriented data bases.

UNIT V

SOFTWARE ENGINEERING

Definition, objectives, life cycles, system engineering, software project planning, specification, dataflow oriented software design, structured and modular design, implementation and testing, maintenance, reliability, validation and verification, CASE tools.

UNIT VI

OBJECT ORIENTED PROGRAMMING

C ++ programming, objects and data, derived types, loops and relational expressions, branching statements and logical operators, functions, objects and classes, operator overloading, conversion of functions, dynamic memory and classes, class inheritance, input/ output and files, benefits of OOP, object oriented system development tools.

UNIT VII

COMPUTER NETWORKS

Data communication concepts, concepts of LAN evolution of LAN, OSI - 7 layer reference model and design issues. Physical layer, transmission media, packet and circuit switching, topologies, Data link

layer, local area networks, token passing, sliding window protocols, protocol specification and verification, network layer-routing, congestion control, transport layer, session and presentation layers, design issues, application layer, file transfer, electronic mail. Multimedia systems, mobile computing.

UNIT VIII

ARTIFICIAL NEURAL NETWORKS AND PATTERN RECOGNITION

Artificial neural networks, principles, pattern recognition basics of artificial neural networks, activation synaptic dynamics, feedforward ANN, pattern association, classification, back propagation, learning algorithms, feedback ANN, Hopfield net, pattern storage and pattern environment storage, pattern clustering and feature mapping.