MCA - 301 COMPUTER ORIENTED OPTIMIZATION MODELS

UNIT – I

Linear Programming, Applications in linear programming, Graphical method for solving LP's, Mathematical Model, Assumptions of Linear Programming,simplex Method, Degeneracy, Applications, Duality, Dual Simplex Method, & Algorithm Assignment Problem. Hungarian Method & its Algorithm.

UNIT – II

Transportation Problem, Integer Programming :- Gomorra's method, Branch and Bound techniques. Integer Programming Algorithm.
Dynamic Programming:-   Basic Concept, Bellman's Principle of optimality, Dynamic Programming Approach, optimal subdivision problem, Decomposition, DPP Algorithms.

UNIT – III

Inventory Model :- Introduction to the inventory problem, Deterministic Models, classification of Inventory systems & models,Economic order quantity, EoQ Models without shortages, EoQ Models with shortages, Probabilistic Inventory Models within stantaneous demand, no set up cost model, Discrete and continuous cases.

UNIT – IV

Games Theory : solution of games with saddle points, Minimax-Maxmin principle for Mixed strategy games, Dominance, to reduce size of game, Graphical method, solution of (mxn) game by simplex method & Algorithms.

UNIT V

Sequencing Models: Job sequencing : Processing n jobs through 2 machines, Processing n jobs through 3 machines & Algorithms. PERT – CPM: introduction, applications, network diagram representation, Determination of the critical path, updating.

TEXT BOOKS :
1) S.D. Sharma Operations Research, Kedarnath Ramnath & Co. Meerut
2) P.K.Gupta & D.S.Hira Operations Research, S.Chand & Co.
3) Kantiswaroop Operations Research, S.Chand & Sons.
4) Gillet, B.E. Introduction to operations Research - A Computer
Algorithm Approach, McGraw Hill.
5) Introduction to operations Research, 7/e by Hillier. TMH.

MCA - 302 SOFTWARE ENGINEERING

UNIT - I

Software Concept, characteristics of software, Component of software, , software myths, Layered Technology – Process, Methods, Tools, S/W process models, prototyping, RAD, evolutionary models, formal methods models, management spectrum. Software Process and Project metrics – metrics and indicators, software management, metric for quality.

UNIT - II

Software Project Planning – objectives, scope, resources, project estimation, decomposition techniques, empirical estimation models, make buy decision. Risk Management . Software Design: Design Principles, Cohesion & Coupling, Design notation and specification, structure design methodology.

UNIT – III

Software Quality Assurance : Quality Concepts,meaning, movement, reviews, measures of reliability, SQA plan. Project Scheduling and Tracking – Basic concepts, task set for s/w project, selecting tasks, refinement, scheduling, project plan.

UNIT – IV

System engineering: Hierarchy, strategy planning, area analysis, product engineering, three feasibilities.
Analysis Concepts – requirement analysis, principles, prototyping, specification, review.
Analysis Modeling – elements of analysis model, data modeling, functional modeling, behavioral modeling, data dictionary.

UNIT – V

Testing Strategies: A strategic approach of software testing strategic issues, unit testing, integration testing, validation testing, system testing, the art of debugging. OOA, OOD.

Text & Reference Books

1) Software Engineering by Pressman – TMH
2) Software Engineering by
3) System Analysis & design Methods by Whiten and Barlow.
4) Analysis and design methods by J. Senn

MCA-303 programming in C++

UNIT-I

Concept of OOPS, Objects and classes, Encapsulation and Information hiding, Type of objects, C++ basics, loops and decisions, structures and functions, object and classes, object arrays, constructor and destructor functions,passing objects as function arguments.

UNIT-II

Function overloading, Constructor overloading, Operator overloading pointers, object pointer, pointers to base and derived classes inheritance, public and private inheritance, Type of inheritance, multiple inheritance.

UNIT-III

Introduction of Polymorphism, Type of polymorphism, virtual functions, abstract base classes and pure virtual function, friend function, early and late binding.

UNIT-IV

Formatted I/O with manipulators, C++ I/O system, formatted I/O, creating insertors and extractors, file I/O basis, creating disk files and file manipulations using seekg(), seekp(), tellg() and tellp() functions, exception handling: try, catch and throw.

UNIT-V

UML concepts, object-oriented paradigm and visual modeling, UML diagrams, UML specifications, object model, object oriented design, identifying classes and object, object diagrams.

Functional modeling – functional models, example of functional model, relation of functional to object and dynamic models, OMT methodology

BOOKS

1. Lafore R. "Object Oriented Programming in C++", Galgotia Pub.
2. Lee "UML & C++ a practical guide to Object Oriented Development 2 ed, Pearson.
3. Schildt "C++ the complete reference 4ed, 2003.
4. Hans Erit Eriksson "UML 2 toolkit" Wiley.
5. Balagurusawmy "Object Orienter Programming with C++".

MCA–304 THEORY OF COMPUTATION

UNIT – I

Theory of automata, Strings Alphabets and language, Finite state systems, Deterministic finite automata with moves, Two way finite automata, finite automata with output, Mealy & Moore machines

UNIT – II

Description, DFA,NFA, Transition systems, Conversion of NDFA to DFA. Removal of $\in$ transition from $\in$ – NDFA. Pumping lemma for regular set, Closure properties of regular set, Decision algorithm for Regular set, Myhill Ners de theorem and initialization of finite automata Regular Expression and Language.

UNIT – III

Regular languages, Context free grammar, Chomsky Normal form, Greibach Normal form, Pumping lemma for CFL, Application for CFL of Pumping lemma. Closure properties of CFL ,CYK algorithm, YACC, Introduction to LR grammar.

UNIT – IV

Pushdown automata: Informal description Definition Equivalence of PDA's and CFL's Prop Turning machine construction. Modification of turning machine.

UNIT – V

Undecidability Universal turning machine and an undecidable problem Rice theorem Greibach theorem. Recursion finite theory. Chomsky hierarchy, Unrestricted Grammar. Context sensitive Language Computational Complexity theory, Intractable problem.

Text & Reference Books
1. Introduction to Automata Theory Language and Computation, By John E. Hopcraft & Jeffary D. Ullman
2. Introduction to Automata Theory Language and Computation,By John E. Hopcraft Jeffary D. Ullman & Rajeev Motwani.
3. Theory of Computer Science K.L.P. Mishra, N. ChandraShekaran

MCA-305 Computer Networks & data communication

UNIT-I

Introduction: Computer Network, Use of computer networks; Type of networks; Network software: protocol hierarchies. Design; issues for the layers, interface and services, types of services, services primitives; Reference models: The OSI reference model, TCP/IP reference model, Example networks: The Internet, Novel Netware, Window NT.

UNIT-II

Physical layer: Transmission media: magnetic media, Twisted pair, Base band / broadband coaxial cable, fiber optics; Analog, digital, wireless transmission; Transmission and switching; ISDN system architecture, Satellite versus fiber; Terminal handling. The Data link layer Design issues: services provided, framing, Error control, flow control; Error detection and correction; Error correcting codes, Error detecting codes; Elementary data link protocols: Unrestricted simplex, simplex stop and wait, simplex protocol for noisy channels; sliding window protocols: one bit, go back n, selective repeat; DLL in the Internet.

UNIT-III

Medium access sub layer: Static/dynamic channel a llocation in LANs and MANs; multiple access protocols: ALOHA, carrier sense, collision free, limited contention, wireless LAN; IEEE standard 802 for LANs and MANs: Ethernet; token bus, token ring, comparison of 802.3, 802.4, 802.5; Bridges: bridges from 802.x and 802.y, Transparent bridges, High speed LANs.

UNIT-IV

Network Layer: Design issues, Internet organization of network layer; Rating algorithms: optimality principle, shortest path, flooding, Flow - bared, hierarchical, multicast, broadcast; congestion control algorithms: General principle, prevention, Traffic shaping, choke packets, load shading etc.; Internetworking: How network differ, connectionless internetworking, Tunneling, internetworking, fragmentation, firewalls; Network layer in the Internet: IP protocol, IP address, subnets, OSPF, BGP, FTP, telnet, email. etc

UNIT-V

Network Programming: Basically Sockets : Overview, Unix Domain Protocols, Overview, Unix Domain Protocols, socket-address, socket-system calls, reserved ports, passing file descriptions, I/O asynchronous & multiplexing, socket implementations.

BOOKS

1. A.S.Tanenbaum, "Computer Network", 4th addition,PHI

2. Forouzan "Data Communication and Networking 3ed", TMH