

2nd Semester

MCA - 551 SOFTWARE ENGINEERING - I

UNIT - I

Software characteristics, components, 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 – S/W risks, risk identification, risk projection, monitoring and management.

UNIT – III

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

UNIT – IV

System engineering: Hierarchy, strategy planning, area analysis, product engineering, three feasibilities. Analysis Concepts – requirement analysis, principles, prototyping, specification, review.

UNIT – V

Analysis Modeling – elements of analysis model, data modeling, functional modeling, behavioral modeling, data dictionary.

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 - 552 OPERATING SYSTEM

UNIT – I

Overview of the Operating Systems: Services of O/s, Classification, File management: File concepts, file types, tape based system, disk based system, blocking, file operations: creating, writing, reading, deleting, file access methods, file allocation methods: contiguous, Dynamic, linked and indexed allocation, performance of allocation methods under various size of files, Directory systems: Single level, two level tree structured, A cyclic graph, general graph, file protection mechanism layered file system, Processor Management: Process view, structure, process state, process control block, multiprogramming, levels of schedulers and scheduling algorithms, evaluation of various scheduling algorithm, multiple processor scheduling, process synchronization, synchronization mechanism, virtual processors, interrupt mechanism, future trends in processor trends in processor management.

UNIT – II

Memory Management: Memory management schemes; single contiguous, partitioned, relocation, partitioned, paged, segmented. Paged segmentation and segmented paging. Virtual memory: concepts, demand paging, performance, page fault page replacement algorithms, thrashing. Future trends in memory management: Large main memories, storage hierarchies, Hardware support of memory management, Deadlocks:- Definition, characterization, necessary condition, resource allocation graph, methods for handling deadlocks: deadlock prevention, deadlock avoidance; deadlock detection and recovery.

UNIT – III

Concurrent Processor and Programming: Precedence graphs, concurrency to the fork and join constructs, the concurrent statement, critical section and mutual exclusion problems; Two pass and N-pass software solutions, h/w solutions, semaphore solution, classical process co-ordination problems, interprocess communication. Modularization: Processes, Procedures, abstract data types, synchronization: Critical regions, conditional critical regions, monitors, concurrent languages.

UNIT – IV

Distributed Systems: Topologies, types, Design strategies, NOS, DOS, remote services Design issues. Distributed File Systems: Naming & Transparency, Remote file Access, Stateful & Stateless service, file replication. Distributed Coordination: Event ordering, Mutual exclusion, concurrency control, Deadlock Handling, Election procedure, Reaching Agreement.

UNIT – V

Protection & Security: Domain of protection, Access Matrix, Revocation of access rights, capability based systems, Language based protection; Security: Authentication, One Time passwords, program threats, Threat monitoring, Encryption, Computer security classifications, Case Studies; Unix, Linux, Windows NT

Text Book

Operating System concepts by James L. Patterson

Reference Books:

- 1) Internal structure of window 95 - By N.Zipps. PHI.
- 2) Novel Netware - David James Clarke, Comdex publication.
- 3) Operating System - By James L. Patterson.
- 4) An introduction to operating system - H.M.Deital.
- 5) Operating System Principles & design - By Tanenbaum A.S.

MCA - 553 COMPUTER BASED NUMERICAL METHODS

UNIT - I

Newton forward and backward formulae, Everett and Bessel Interpolation formulae, Lagrange's, Hermite and spline interpolation. Implementation of these method in C.

UNIT - II

Integration: Weddle, Gauss-Legendre, Monte Carlo methods of integration, Differential Equations: Modified Euler, Runge-Kutta methods, Predictor-Corrector methods- Milne Adams-Bashforth methods, Accuracy of Runge-Kutta and Milen's methods. Solution of second order differential equations. Solution of simultaneous differential equations.

UNIT - III

Solution of algebraic and transcendental equation: Newton-Raphsan method, Newton's method for multiple roots, Lin-Barstow's and Graffe's method for complex roots, Solution of Non-linear equations.

UNIT - IV

Simultaneous Equations : Gauss elimination and Pivotif, Gauss-Siedel and Gauss-Jacobi iteration techniques. Inversion of Matrix by Cholesky's method. Non-linear Equations: Solving simple non-linear equations. Programs of simultaneous and non-linear equations.

UNIT - V

System Models : Concept, environment, continuous and discrete simulation, Model Type- static, dynamic and probabilistic models. Growth and Decay model examples. Principles of Mathematical modeling.

* Mathematical Methods are to be implemented in C.

Text & Reference Books

1. B.S. Grewal : Numerical Algorithms, Khanna Publications.
2. Krishnamutry & Sen : Numerical Algorithms EWP.
3. M.K. Jain & Iyengar: Numerical Methods for Scientists & Engineers
4. Gordan – Simulation and Modeling PHI.

MCA – 554 OBJECT ORIENTED METHODOLOGY AND C++

UNIT – I

What are OOA and OOD ? Three models – Object, Dynamic and Functional. Object modeling – objects and classes, links, associations, generalization and inheritance, grouping concepts, aggregation, abstract classes, multiple inheritance, metadata, candidate keys.

UNIT – II

Dynamic modeling – Events and states, operations, nested state diagrams, concurrency. Functional modeling – functional models, example of functional model, relation of functional to object and dynamic models, OMT methodology.

UNIT – III

Classes and objects, constructors and destructors, passing objects as function arguments, returning objects, array of objects, object pointer, new and delete operators, inline function, implementation of data structures like stack, queue and linked – list.

UNIT – IV

Function overloading, copy constructor, default arguments, Operator overloading, friend function Inheritance, multiple inheritance, virtual base classes.

UNIT – V

Virtual functions, pure virtual functions, polymorphism, Formatted I/O with manipulators, formatting with ios class, streams and files, writing and reading objects on a file, random access of files, updating file, introduction to templates, function and class templates.

Text & Reference Books

1. J.Rumbaugh, M.Blaha et.al - Object - Oriented modeling and design - PHI.
2. G.Booch - Oware - Object – Oriented design – Benjamin/Cummings.
3. M.Kumar – Programming with C++ made simple - TMH.
4. H.Schildt – Teach yourself C++ - TMH

MCA-555 THEORY OF COMPUTATION

UNIT – I

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

UNIT – II

Conversion of NDFSA to DFA. Removal of ϵ transition from ϵ – NDFSA. 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

Properties of 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

HUM - 556 ORAL AND WRITTEN COMMUNICATIONS

UNIT - I

Communication - A Vital necessity for good management, Communication Process, Barriers to Communication Viz. organizational, individual and interpersonal, dealing with these barriers, effective communication & Modern Techniques of spoken and written communication .

UNIT - II

Oral Communication Skills - Verbal and non verbal communication, executive speaking and listening skills, presentation skills, Body language, Voice modulation, Negotiating skills, Development of positive personal attitudes, personal SWOT analysis and development of career plan. Identifying the job, selection process, written test-structural, situational and psychological analysis, principles of interviewing-reducing stress, retaining control, setting objectives for the Interview, planning and preparation - the challenge of face to face skills.

UNIT - III

Written communication skills - Writing Techniques and guidelines - letter writing - basic principle purpose, Types of Business correspondence.

UNIT - IV

Report Writing : Types of Reports - Structure of Reports - Drafting Reports - Preparation, analysis and interpretation of Reports.

UNIT - V

Developing other skill : Inter personal and human skills, Meeting skills, Reading skills, Time management skills - avoiding time wasters and identification of prime time, choosing an appropriate leadership style, development of an ideal mix of skills.

Text & Reference Books

- 1) Effective Business Communication - Murphy, Allied Publishers.
- 2) The essence of effective communication - Ron Ludlow and fergus Panton, PHI.
- 3) Business correspondence & Report Writing - R.C.Sharma & Krishna Mohan-Tata McGraw Hill.

MCA 591 OPERATING SYSTEM

Viva-Voce shall be conducted on Operating System. Assignment related to Operating System shall be given. Case Study of different Operating Systems shall be studied.

MCA 592 PROGRAMMING LAB IN C++

Assignment on C++ based on Class, Objects, Operator Overloading, Polymorphism, Function Overloading, Pointers, Files shall be covered.

Some sample programs

- 1) Create class Distance having private data feet(type integer), inches(type float) and function getdist() and showdist() . Overload + operator to add two distance values and > operator to compare them.
- 2) Create a class called employee containing protected data name(20 characters), employee number(long integer).Also write its constructor and destructor functions. Create two derived classes called hourly _employee containing private data rate and hours and salary_ employee containing basic salary and allowances as data members. The class employee is inherited as public by these derived classes. Write appropriate functions in each classes to calculate total salary of each employee and to display name, number and total salary.
- 3) Create a class dimension containing three float type data and a constructor to accept values, also declare a pure virtual function area() in it. Now create three derived classes rectangle, square and triangle, each inheriting dimension as public. Define corresponding constructors and redefine virtual function area() in each to give area of respective figure. A main() program should create suitable objects to implement this inheritance.
- 4) Write a program using class pointer to read 20 strings each containing maximum 15 characters. Write a member function that arranges these in alphabetical order and print the alphabetical arranged list.
- 5) Write a program to demonstrate working of a stack using constructor and destructor function.