



**MASTER OF COMPUTER APPLICATION
SESSION 2013-14**

DETAILED SYLLABUS

SEMESTER I



C - PROGRAMMING CODE MCA 101

Objective: To enable the student to learn the major components of a computer system, To know the correct and efficient ways of solving problems, To learn to use office automation tools, To learn to program in C

Course Contents

Unit – I

Introduction and Definition of Computer; Classification of Computers, Components of Computer Systems-Input CPU, Storage and Output unit, Memory Hierarchy, Input and output devices; Concept of an algorithm; termination and correctness. Algorithms to programs: specification, top-down development and stepwise refinement, Introduction to Programming Concept.

Unit - II

Standard I/O in “C”, Fundamental Data Types and Storage Classes: Character types, Integer, short, long, unsigned, single and double-precision floating point, storage classes, automatic, register, static and external, Operators and Expressions: Using numeric and relational operators, mixed operands and type conversion, Logical operators, Bit operations, Operator precedence and associativity.

Unit - III

Conditional Program Execution: Applying if and switch statements, nesting if and else, restrictions on switch values, use of break and default with switch, Program Loops and Iteration: Uses of while, do and for loops, multiple loop variables, using break and continue, Modular Programming: Passing arguments by value, scope rules and global variables, separate compilation, and linkage.

Unit – IV

Arrays: Array notation and representation, manipulating array elements, using multidimensional arrays, arrays of unknown or varying size, Structures: Purpose and usage of structures, declaring structures, assigning of structures, Understanding Pointers, declaring and initialization of pointers, pointer and arrays, using pointers as function arguments, Dynamic memory allocation.

Unit - V

Sequential search, Sorting array: bubble sort, selection sort, insertion sort, Strings, Text files, The Standard C Pre-processor: Defining and calling macros, utilizing conditional compilation, passing values to the compiler, The Standard C Library: Input/Output: fopen, fread, etc, string handling functions, Math functions : log, sin, pow, abs C functions.



Text Books:

1. “Problem Solving and Program Design in C”, Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley.
2. “ANSI C”, E. Balagurusamy. Mc Graw Hill

Reference Books:

1. Brian W. Kernighan, Dennis M. Ritchie “The C Programming Language”, Pearson (1988)
 2. “Schaum Series – Programming in C”, TMH publication
 3. “Let us C”, Yashvant Kanitkar
 4. “Computer Concepts with Programming in C”, Forouzan
- *Latest editions of all the suggested books are recommended.

DISCRETE MATHEMATICS CODE MCA 102

Objective: This course is designed to introduce students to the techniques, algorithms, and reasoning processes involved in the study of discrete mathematical structures. Students will be introduced to inductive reasoning, elementary and advanced counting techniques, recurrence relations, graphs, trees and combinatorics. Through their study of these topics students will develop a greater understanding of the breadth of mathematics and will acquire a familiarity with concepts, structures and algorithms that are essential to the field of computer science and applied mathematics.

Course Contents

Unit - I

Propositional Calculus: Propositions, Truth tables, Logical Equivalence, Logical implications, Algebra of propositions, Conditional propositions, Bi-conditional statements, Negation of Compound statements, Tautologies and Contradiction, Normal Form, Arguments, Fallacies.

Unit - II

Principle of Counting: The Principle of Inclusion-Exclusion, Mathematical Induction, Addition and Multiplication Rules, Pigeon-Hole Principle, Permutations and Combinations

Unit – III

Graphs: Introduction to Graphs, Finite and Infinite Graphs, Incidence and Degree, Isolated Vertex, Pendant Vertex, and Null graph, Hand Shaking Lemma, Regular graph, Complete Graph, Bipartite Graph, Isomorphic and Homeomorphisms of Graphs, Subgraph, Connected and Disconnected graphs, Operations on Graphs, Euler graph, Fleury’s Algorithm to find Eulerian Circuit, Hamiltonian graph, Chinese Postman Problem and Travelling-Salesman problem.



Unit - IV

Planar Graph and Coloring of Graphs: Introduction, Planar Graphs, Kuratowski's Graphs, Detection of Planarity, Coloring of Graphs, Chromatic Partitioning, Chromatic Polynomial, Edge Coloring, Vertex Coloring, Four Color Theorem, Five Color Theorem.

Trees: Definition, Properties of trees, Spanning tree, Minimal Spanning tree, Kruskal's and Prim's Algorithms to find Minimal Spanning tree.

Unit - V

Combinatorics: Generating function, Recurrence Relations- Homogeneous solution, particular solution, Solving Recurrence Relations using the Characteristic Polynomial and Generating function

Text Books:

1. J. P. Tremblay and R Manohar, "Discrete Mathematics", TMH
2. K Rosen, "Discrete Mathematics", TMH
3. Seymour Lipschutz and Marc Lipson, "Discrete Mathematics", Schaum Outlineseries – Tata McGraw Hill.
4. Narsingh Deo, "Graph Theory with Applications to Engineering and Computer Science", Prentice Hall of India.

Reference Books:

1. Liu C.L., "Elements of Discrete Mathematics"
2. Neville Dean, "Essence of Discrete Mathematics Prentice Hall"
3. Swapan Kumar Sarkar "Discrete Mathematics", -S Chand

PROFESSIONAL COMMUNICATION CODE MCA 103

Objective: This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

Course Content

Unit-I

Basics of Technical Communication: Technical Communication: features; Distinction between General and Technical communication; Language as a tool of communication; Levels of Communication: Interpersonal, Organizational, Mass communication; The flow of



Communication: Downward, Upward, Lateral or Horizontal (Peer group); Importance of technical communication; Barriers to Communication.

Unit-II

Forms of Technical Communication: Business Letters: Sales and Credit letters; Letter of Enquiry; Letter of Quotation, Order, Claim and Adjustment Letters; Job application and Resumes. Official Letters: D.O. Letters; Govt. Letters, Letters to Authorities etc. Reports: Types; Significance; Structure, Style & Writing of Reports, Technical Proposal; Parts; Types; Writing of Proposal; Significance. Technical Paper, Project, Dissertation and Thesis Writing: Features, Methods & Writing.

Unit-III

Spoken English: Description and Articulation of English Speech Sounds, Syllables and Stress (Weak Forms, Intonation), Connected Speech, Spelling and Pronunciation, International Phonetic Alphabet Transcription of Received Pronunciation of Words as per the Oxford Advanced Learners Dictionary

Unit-IV

Presentation Strategies: Defining Purpose; Audience & Locale; Organizing Contents; preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Space; Setting Nuances of Voice Dynamics; Time- Dimension.

Text Books:

1. “Technical Communication – Principles and Practices”, Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, New Delhi
2. Spoken & Communication- Mosam Sinha, Pointer Publication, Jaipur.
3. Spoken English, R.K.Bansal, Oxford University Press.
4. Advanced Learner’s Dictionary, Oxford University Press.
5. Living English Structure, William Stannard Allen, published by Longman.
6. English Errors of Indian Students, Oxford University Press, New Delhi.

COMPUTER ORGANIZATION AND ARCHITECTURE CODE MCA 104

Objective: Course Objective is to have a thorough understanding of the basic structure and operation of a digital computer, to discuss in detail the operation of the arithmetic unit, to study the different ways of communicating with I/O devices and standard I/O interfaces.



Course Contents

Unit-I

Number System: Binary, Octal, Hexadecimal and Decimal, Codes: BCD Code, Excess -3 Codes, Gray code, Alphanumeric Codes, Parity Bits, Floating Point Numbers. Binary Arithmetic: Basic Rules of Binary Addition, Subtraction, multiplication and division. Addition and subtraction using 1's and 2's Complement Method.

Unit-II

Combinational and Sequential Circuit: Logic Gates, Karnaugh Map, SOPs & POSs Boolean Expressions, Demorgan's theorem Combinational Circuits: Implementing Combinational Logic, Arithmetic Circuits : Basic Building Blocks, half adder, full adder ,half subtractor,full subtractor, De-multiplexers and Decoders, Encoders, R-S Flip Flop, Level Triggered and Edge Triggered Flip Flops, J.K Flip Flop, Master-slave Flip Flops, T-flip Flop, D-flip Flop.

Unit - III

Register Transfer and Micro operations: Register Transfer Language, Bus and Memory Transfer, Three State Bus Buffers, Memory Transfer, Arithmetic Micro operation (Binary Adder, Binary Adder-Subtractor, Binary Increment, Arithmetic Circuit), Logic Micro operations(List of logic operation), Shift Micro operations, Arithmetic Logic Shift Unit.

Unit - IV

Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Instruction Cycle, Data transfer & manipulations, Program Control, Introduction to RISC and CISC.

Unit - V

Input-Output Organization: I/O Interface, I/O bus and interface modules, Asynchronous data transfer: Strobe control, Hand Shaking, Modes of transfer: Programmed I/O, Interrupt initiated I/O, DMA, Interrupts & Interrupt handling, Direct Memory access: DMA Controller and DMA Transfer.

Text Books:

1. Mano M., *Computer System Architecture*, Prentice Hall of India.
2. Mano Morris, *Digital Logic*, Prentice Hall of India.
3. Stallings, *Computer Organization*, Prentice Hall of India.



Reference Books:

1. Vravice, Zaky & Hamacher, *Computer Organization*, Tata Mc Graw Hill
2. Tannenbaum, *Structured Computer Organization*, Prentice Hall of India.
3. Hayes John P., *Computer Organization*, McGraw Hill.

INFORMATION SECURITY AND CYBER LAWS CODE MCA 105

Objective: The objective of this subject is to make the individual aware of cybercrimes and acquire a critical understanding of cyber laws in order to prevent their information systems from cybercrimes and to give the learners in depth knowledge of Information security Act and frame work for data security. It helps to develop the understanding of relationship between commerce and cyberspace.

Course Contents

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 Concepts in Internet and World Wide Web: Brief review of Internet Protocols-TCP/IP. Functions of various networking components- routers, bridges, switches, hub, gateway.

Unit-II

Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles. Security Threats to E Commerce, Virtual Organization, and Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards.

Unit-III

Physical Security: Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls. Access Control- Biometrics, Factors in Biometrics Systems, Benefits, and Criteria for selection of Biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges. Framework for Information Security, ISO 27001, Security Metrics, Information Security V/s Privacy.

Unit-IV



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-V

Laws, Investigation and Ethics: Cyber Crime, Information Security and Law, Types & overview of Cyber Crimes, Cyber Law Issues in E-Business Management, Overview of Indian IT Act, Ethical Issues in Intellectual property rights, Copy Right, Patents, Data privacy and protection, Domain Name, Software piracy, Plagiarism, Ethical hacking.

Text Books:

1. Godbole, “Information Systems Security”, Willey
2. Merkov, Breithaupt, “Information Security”, Pearson Education

Reference Books:

1. Yadav, “Foundations of Information Technology”, New Age, Delhi
2. Schou, Shoemaker, “Information Assurance for the Enterprise”, Tata McGraw Hill
3. Sood, “Cyber Laws Simplified”, Mc Graw Hill
4. Furnell, “Computer Insecurity”, Springer
5. IT Act 2000

C- PROGRAMMING LAB CODE MCA 106

Objective: The objective of this lab is to develop logical and conceptual skills of programming in the students so that they can develop programs in ‘C’ language.

1. Programs based on data Types
2. Programs to calculate factorial, Fibonacci series.
3. Programs on Arrays – Maximum, Minimum, Sum of the elements, etc
4. Basic Sorting Algorithms
5. Function based programs
6. Returning from Functions
7. Static data handling examples
8. Pointers based address manipulations programs
9. Programs to handle data through the use of structures.
10. Programs based on file handling – create, read, append etc



PROFESSIONAL COMMUNICATION LAB CODE MCA 107

Objective: The basic objective of this course is to develop the personality and confidence of the individual.

1. Speaking along with structures used in modern English

Objective & Methodology: Use of different grammatical structures like the use of modals, Use of connectors etc. in speaking, Speaking on a particular structure at a time on the basis of activities made.

2. Speaking along with quizzes with emphasis on kinesics

Objective & Methodology: Conducting quizzes on different aspects of communication to make them aware of different parameters of communication and checking their body language.

3. Role plays based on different situations with stress, intonation and rhythm

Objective & Methodology: Knowledge of Stress, intonation and rhythm and their sound application make communication sweet. Conduct of role plays on business and general issues to check the sweetness and intensity of communication.

4. Group Discussion, its pointers, preparation

Objective & Methodology: Conduct of GD on different issues, putting them in stressful situations, checking their over aggression, Working on body language.

5. Know Your Self (SWOT)

Objective & Methodology: To know their interests and counsel them accordingly, Making their outlook professional by organizing activities like psychological tests (e.g ink test), tests on different business situations.

6. Basics of Interview skills with emphasis on candidates preparation

Objective & Methodology: Discussion over the general questions in interview, How to keep cool in complex situations, Working on maintaining positive attitude, posture, handshaking etc.

7. Self Grooming: - “First Impression is the Last Impression”

Objective & Methodology: Telling them about dress sense, primping, maintaining parts of the body, cosmetic care of the body etc.

Reference Book:

1. Sethi & Dhamija, *A Course in Phonetics & Spoken English* – Prentice Hall, New Delhi.



2. Pandey L.V.B & Singh R. P., *A Manual of Practical Communication*, A.I.T. B.S. Publication. India Ltd. Krishna Nagar, Delhi.
3. Joans & Daniel, *English Pronouncing Dictionary* – Cambridge University, Press.





**MASTER OF COMPUTER APPLICATION
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DETAILED SYLLABUS

SEMESTER II



DATA STRUCTURE WITH C CODE MCA 201

Objective: The purpose of this course is to provide the students with solid foundations in the basic concepts of programming: data structures. The main objective of the course is to teach the students how to select and design data structures and algorithms that are appropriate for problems that they might encounter.

Course Contents

Unit - I

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off.

Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices, and Vectors, Arrays in terms of pointers, Static and Dynamic Memory Management.

Recursion: Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion. Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

Unit - II

Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Linked Representation of Stack, Operations Associated with Stacks, and Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

Queues: Array representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queue, Deque, and Priority Queue.

Linked List: Representation and Implementation: Singly Linked List, Doubly Linked List, Circular Linked List, Circular Doubly Linked List, Header Linked List. Operations on Linked List: Insert, Delete, Searching, Traversing, Array and Queue Implementation using Linked List, Polynomial representation and addition.

Unit - III

Sorting: Insertion Sort, Bubble Sort, Selection Sort, Quick Sort, Merge Sort, Heap Sort, and Radix Sort, Practical consideration for Internal Sorting.

Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

Unit - IV

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees,



Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary trees, Huffman algorithm.

Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

Unit - V

Graphs: Graph definitions and concepts: Edge, Vertices, and Graph representation using Adjacency matrix, Adjacency lists. Types of graphs: Weighted, Unweighted, Directed, Undirected Graphs. Graph operations: creation, insertion, deletion, traversals and searching (depth-first, breadth-first) of various types of graphs and Dijkstra's algorithm for shortest distance calculation. Spanning Trees and Minimum Cost Spanning Trees.

File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

Text Books:

1. S. Lipschutz, Data Structures , TMH
2. Yashwant Kanitkar "Data Structure using C"
3. R. S. Salaria, "Data Structures & Algorithms Using C"

Reference Books:

1. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia
2. T. H .Cormen "Introduction to Algorithms " PHI
3. K Loudon, "Mastering Algorithms With C", Shroff Publisher & Distributors
4. A M Tenenbaum, "Data Structure using C", Pearson

*Latest editions of all the suggested books are recommended.

OPERATING SYSTEM CODE MCA 202

Objective: This course has theory component to teach students the concepts and principles that underlie modern operating systems. In this component, students will learn about processes and processor management, concurrency and synchronization, memory management schemes, file system and secondary storage management, security and protection, etc.



Course Contents

Unit - I

Introduction to the Operating System, Types of Operating System: Batch System, Time Sharing System, Real Time System. Multi Programming, Distributed System, Functions of Operating System and its services.

Unit - II

Process Management: Process Concept, Process State, Process Control Block, Process Scheduling, CPU Scheduling - CPU Scheduling, Scheduling Criteria, Scheduling Algorithms, Preemptive & Non Preemptive Scheduling.

Unit - III

Process Synchronization: Critical Section Problem, Race Condition, Synchronization Hardware, Semaphores, Classical Problems of Synchronization. Dead Locks: Characterization, Methods for Handling Deadlock, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Unit - IV

Memory Management: Contiguous Allocation, External and Internal Fragmentation, Paging & Segmentation. Virtual Memory: Concept of Virtual Memory, Concept of Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

Unit - V

Directory Structure, Allocation Methods: Contiguous Allocation, Linked Allocation, Indexed Allocation Free Space Management. Disk Structure, Disk Scheduling Algorithms, Disk Management.

Text Books:

1. Silbershatz and Galvin, "Operating System Concept", Addison Wesley, 2002.
2. Nutt, G., "Operating Systems", Addison-Wesley.
3. Godbole Ahyut, "Operating System", PHI, 2003.

Reference Books:

1. Flynn, Mchoes, "Understanding Operating System", Thomson Press, Third Edition, 2003
2. Tannenbaum, "Operating System Concept", Addison Wesley, 2002.
3. Joshi, R. C. and Tapaswi, S., "Operating Systems", Wiley Dreamtech.

*Latest editions of all the suggested books are recommended.



OBJECT ORIENTED DESIGN & C++ CODE MCA 203

Objective: To get a clear understanding of object-oriented concepts. To understand object oriented programming through C++.

Unit-I

Features of OOP's, Comparison of C and C++, Object Modeling: Objects and classes, links and Association, generalization and inheritance, aggregation, abstract class, multiple inheritances.

Dynamic Modeling: Events and states, operations, nested state diagrams and concurrency, a sample dynamic model.

Unit-II

C++ Programming Basics: Variables, data type, Manipulator. Type Conversions, Functions, Call by Reference, Call by Address, Call by Value, Default Arguments, Const Arguments, Function Overloading, Inline Function, Enumerations, Data Conversion.

Unit-III

Object & Classes: Constructors. Default, Copy Constructor, destructor, Object as Function Arguments, Returning Object from Function, Static Data Members, Static Member Functions, Abstract class, Const Data and Classes. Friend Function, Container class, Forward Declaration of class.

Arrays and String: Arrays Fundamentals, Arrays as Class Member Data. Arrays of Object, String, And The Standard C++ String Class.

Unit-IV

Inheritance: Concept of Inheritance, Derived Class And Base Class, Derived Class Constructors, Overriding Member Function, Public, protected And Private Inheritance, Levels Of Inheritance, Multiple Inheritance, Ambiguity in Multiple Inheritance, Aggregation: Classes Within Classes, Inheritance and program Development.

Polymorphism: - Function Overloading, Operator overloading, operator overloading using friend.

Unit-V

Pointers: Concept, Pointers to function, new & delete, Pointers To Objects, void pointers, Debugging pointers.

Virtual Function: Static Function, Pure Virtual function, Assignment & Copy Initialization, 'this' Pointer, Dynamic Type Information.



Streams and Files - Complete File Handling Mechanism in C++, Error Handling in File Operation, binary file operations, structures and file operations, classes and file operations, random access file processing, Command line Arguments.

Templates and Exceptions: Function Templates, Class Templates, Exception handling.

Text Books:

1. Rambaugh Jamesetal, “Object Oriented Design and Modeling”, PHI-1997
2. Object Oriented Programming in-C++ By Robert Lafore Techmedia Publication
3. Mastering in C++

References Books:

1. Object Oriented Programming in-C++ By Robert Lafore Techmedia Publication
2. The Complete Reference c++ - By Herbert Sehlidt Tata Megraw-hill publication
3. Object Oriented Programming in C++ Saurav Sahay Oxford University Press
4. Balagurusamy E, “Object Oriented Programming with C++”, TMH, 2001
5. Booch Grady, “Object Oriented Analysis and Design with application 3/e”, Pearson

SOFTWARE ENGINEERING CODE MCA 204

Objective: To develop methods and procedures for software development that can scale up for large systems and that can be used consistently to produce high-quality software at low cost and with a small cycle of time and to help students to develop skills that will enable them to construct software of high quality software that is reliable, and that is reasonably easy to understand, modify and maintain

Course Contents

Unit - I

Introduction: Introduction to software engineering, Importance of software, The evolving role of software, Principle of Software engineering, Software Characteristics, Software Components, Software Applications, Software Crisis, Reasons of Software Crisis, SDLC.

Software Process Models: Water Fall Model, The Incremental Model, RAD, Evolutionary Prototyping, Spiral Model.

Unit - II

Requirement Engineering: Requirement Gathering, and Analysis, SRS, IEEE Standards for Requirement Specification.

Software-Design: Design principles, problem partitioning, abstraction, and top down and bottom up design, Structured approach, functional versus object oriented approach, design specifications and verification, Cohesion, Coupling, Functional independence, Structured Analysis, DFD, Data Dictionary, Developing DFDs.



Unit - III

Coding: Characteristics of Coding, Programming Style, Code Review, Code Walkthrough, Code Inspections

Testing: Testing principles, Levels of testing, Stress testing, Regression Testing, functional testing (Black Box Testing), structural testing(White Box Testing), test plane, test case specification, software testing strategies, Verification & validation, Unit testing, Integration Testing, Alpha & Beta testing, system testing and Debugging

Unit - IV

Software Project Management: Project Planning, Project Size estimation, Project Estimation Technique, cost estimation, COCOMO Model, project scheduling, staffing, Staffing Level Estimation, Putnam Model, Organization and Team Structure, risk management, Software configuration Management.

Unit - V

Software Maintenance: Software Maintenance Process Model, Types of Maintenance, software Reverse Engineering, Estimation of Maintenance Cost.

Software Reliability & Quality Assurance: Reliability issues, Reliability metrics, Reliability growth modelling, Software quality, Quality Assurance, ISO 9000 certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM, CASE and its Scope, Architecture of CASE environment, Characteristics of Case Tools.

Text Books:

1. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.
2. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International
3. Pressman, Roger S., “Software Engineering: A Practitioner’s Approach”, McGraw Hill

Reference Books:

1. Pankaj Jalote, Software Engineering, Wiley
 2. Ian Sommerville, Software Engineering, Addison Wesley.
- *Latest editions of all the suggested books are recommended.

COMPUTER NETWORKS CODE MCA 205

Objective: At the end of the course, the students will be able to:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize student with the basic taxonomy and terminology of the computer networking area.



3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks

Course Contents

Unit - I

Introductory Concepts: Goals and Applications of Networks, Network structure and architecture, the OSI reference model, services, networks topology, Physical Layer transmission, switching methods, Integrated services digital networks.

Unit - II

Medium access sub layer : Channel allocations, LAN protocols, ALOHA Protocols- Pure ALOHA, slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, IEEE standards, Ethernet, FDDI, Data Link Layer- basic design issues, error correction & detection algorithms, elementary data link layer protocols, sliding window protocols, error handling, High Level Data Link Control.

Unit - III

Network Layer: Point-to Point networks, concept of virtual circuit and LAN, routing algorithms, congestion control algorithms, internetworking, TCP/IP protocol, IP addresses, IPv6.

Unit - IV

Transport Layer: Design issues, connection management, Internet Transport Protocol (UDP), Ethernet transport Protocol, Transmission Control Protocol. (TCP) ,Header Format of TCP and UDP.

Unit -V

Application Layer: Domain Name System, Simple Network Management Protocol, Electronic mail, File Transfer Protocol, Hyper Text Transfer Protocol, Introduction to Cryptography and Network Security (DES, RSA algorithms), Communication Security (IPSec, Firewalls), Authentication protocols such as authentication based on shared key (Diffie Helleman Key exchanger), Introduction to multimedia and compression Techniques.

Text Books:

1. S Tanenbaum, "Computer Networks, 3rd Edition", PHI
2. Forouzan, "Data Communication and Networking", TMH
3. Godebole, "Data communication and networking"



Reference Books:

1. Sanjay Sharma, "Computer Network" , Katson
2. S. Keshav, "An Engineering Approach on computer networking", AW
3. W.Stallings, "Data and Computer Communication", Macmillan Press Comer
4. "Computer Networks & Internet", PHI

DATA STRUCTURE LAB CODE MCA 206

Course Contents

1. Programs to implement Array and Dynamic Array.
2. Implement various sorting techniques.
3. Program to implement recursion in C.
4. Program to implement Stack and Queue Operation.
5. Implement Recursive algorithms – Tower of Hanoi, recursive maximum & minimum etc
6. Program to implement Linked List Operation.
7. Program to implement Stack and Queue Operation using Linked List.
8. Program to implement Binary tree and Binary Search tree.
9. Program to implement *Breadth First Search* and Depth First Search.
10. Implementing Priority Heap.

C++ PROGRAMMING LAB CODE MCA 207

C++ Programming assignments based on class:

1. Using `iostream.h` functions in C++
2. Implementing a basic class in C++
3. Creation of Objects and parameter passing.
4. Implementing basic programs using object oriented approach
5. Implementing Constructors and destructor
6. Implementing friend functions, inline functions.
7. Implementing Inheritance
8. Implementing Virtual Functions & Virtual Base classes.
9. Implementing Function Overloading, constructor overloading, operator Overloading
10. Using Container Classes.
11. Passing Objects by reference.
12. Implementing Templates and Exceptions
13. Filing operations using `fstream.h`