2nd SEMESTER MCA

F.M -70

MCA-106 Data Structure Using C

Module – 1: Development of Algorithms

Notation and Analysis, storage structure for arrays, sparse matrices, stacks and Queues, Representations and application, polish notations with arithmetic expressions. Converting infix expression into post fixes expressions.

Module - 2 : Linked List

Singly Linked list – linked stacks and queues operations on polynomials, doubly linked list, circular linked list, garbage collection and compaction.

Module – 3 : Binary trees and Graphics

General trees, BST, Spanning trees, conversion of general tree to binary, Red Black Trees, Tree traversing , operations on binary trees. AVL trees.
Graphs: Representation of graphs, path matrices – BFS, DFS, Shortest path problems.

Module - 4 : Sorting and Searching

Growth of function, Ó notation, complexity of algorithms, internal sorting, Insertion sorting, selection sort, Bubble sort, Quick sort, heap sort, radix sort, External sort, multiway merge.
Searching: Sequential search, binary search, search tree traversal,Threaded binary search trees.

Module - 5 : Hashing and File structures

Hashing techniques, hash functions, address calculations techniques – common hasing functions, collision resolution, linear probing, quadratic probing, double hasing, bucket addressing, sequential file – structures and processing , indexed sequential files – structures and processing

Books:

1. Data structures by S. Lipschutz,schaum's outline series in computers.
2. Fundamentals of Data Structures in C by Hariwitz and Sahni & Anderson Freed, University Press.
3. Data structures and Algorithms Analysis in C weiss (Pearson Education)
4. Data & File Structures – Loomis - PHI

2nd SEMESTER M C A

F.M.- 70

MCA-107 **COMPUTER SYSTEM ARCHITECTURE (3-1-0)Cr.-4**

Module 1:
Basic organization of the computer and block level description of the functional units as related to the execution of a program.

Fetch, decode and execute cycle. Role of operating systems and compilers (introduction only).

Module 2:
Assembly language programming: instruction set, instruction cycles, registers and storage, addressing modes, discussions about RISC versus CISC architectures;

Inside a CPU: information representation, computer arithmetic and their implementation; control and date path, data path components, design of ALU and data path, controller design.

Module 3:
Memory and IO access: Memory maps, Read Write operation, Programmed IO, Concept of handshaking, Polled and interrupt driven IO, DMA data transfer.

IO subsystems: Input-Output devices such as Disk, CD-ROM, Printer etc.; Interfacing with IO devices, keyboard and display interfaces.

Module 4:
Inside the Memory: Memory organization, static and dynamic memory; Cache memory and Memory Hierarchy cache memory access techniques; Virtual memory.

Introduction to Multiprogramming and Multiprocessing; Introduction to pipelined operation and architecture.

Books:

1. Computer System Architecture by M. Morris Mano. PHI
2. Computer Organization and Architecture by William Stallings, Pearson / PHI
3. Computer Organisation and Design – 3rd Edition, David A. Patterson & John L.Hennessy – Morgan Kaufmann Publishers (Elseviers)

2nd SEMESTER M C A

F.M.- 70

MCA-108 **OBJECT ORIENTED PROGRAMMING USING C++ (3-1-0)Cr.-4**

Module 1:
Introduction to object oriented programming, user defined types, polymorphism, and encapsulation. Getting started with C++ - syntax, data-type, variables, strings, functions, exceptions and statements, namespaces and exceptions operators. Flow control, functions, recursion. Arrays and pointers, structures.

Module 2:
Abstraction Mechanisms: Classes, private, public, constructors, destructors, member functions, static members, references etc. class hierarchy, derived classes.

Inheritance: simple inheritance, polymorphism, object slicing, base initialization, virtual functions.

Module 3:
Prototypes, linkages, operator overloading, ambiguity, friends, member operators, operator function, I/o operators etc. Memory management: new, delete, object copying, copy constructors, assignment operator, this Input/Output.

Exception handling: Exceptions and derived classes function exception declarations, Unexpected exceptions.

Exceptions when handling exceptions, resource capture and release etc.

Module 4:
Templates and Standard Template library: template classes declaration, template functions, namespaces, string, iterators, hashes, iostreams and other type.

Design using C++ design and development, design and programming, role of classes.

Books:

1. Herbert Schildt – C++. The Complete Reference, Tata McGraw Hill Publications
2. Balaguru Swamy – C++, Tata McGraw Hill Publications.
3. A.K.Kamthane, Object Oriented Programming with ANSI & Turbo C++., Pearson Education.

2nd SEMESTER M C A

F.M.- 70

MCA-109 **NUMERICAL METHODS (3-1-0)Cr.-4**

Module 1:
Fixed point arithmetic, rounding error, truncation error, loss of significance and error propagation, condition and stability, computational methods for error estimation, convergence of sequences, some mathematical preliminaries.

Module 2:

1. Roots of f (x) by bisection method, method of false position, secant method, Newton-Raphson method, fixed point iteration method.
2. Solution of Ax = b : Solution of simultaneous linear equations by Cramer's rule, Gauss' elimination method Grauss-Jordan method, Gauss-Seidel method, matrix Inversion by Gauss-Jordan method.
3. Curve Fitting: Least square approximation of functions by linear regressing, polynomial regression.

Module 3:
Numerical differentiation and integration: Differentiation formulae, Integration by trapezoidal rule, Simpson's 1/3 rule and 3/8 rule.

Numerical solution of Ordinary Differential Equation:
Euler's method, modifications of Euler's method, Runge-Kulta methods of the third and fourth order, Predictor-corrector methods.

Module 4:
Miscellaneous topics: Determination of eigen values and eigen vectors of a matrix by iteration, Inverse of a matrix.

Books:

1. Numerical Methods for Engineers – S.C. Chopra and R.P. Canole
2. Elementary Numerical Analysis – S.D. Conte and C:de Boor
3. Applied Numerical Analysis – C.F. Gerald, P.O.Wheatley
4. Numerical Methods for Scientific and Engineering Computation by M.K.Jain, S.R.K. Iyengar and R.K. Jain.

2nd SEMESTER M C A

F.M.- 70

MCA-110 **BUSINESS COMMUNICATIONS IN ENGLISH (2-0-0)Cr.-2**

Objectives: The objectives are to prepare the student to

a) Produce written communication of different forms such as paragraph, report, letter, etc.
b) Make notes/ Summarize from a given passage
c) Organise Meetings, prepare agenda, draft resolutions and write minutes.
d) Make presentations and face interviews.
e) Document sources and prepare bibliographies.
f) The objectives of managerial oral communication; Improving the facility of oral communication. Both Transmission and reception in six managerial situations such as,
   (i) Information sharing (ii) Conversation (iii) Interview (iv) Committee (v) Negotiation (vii) Presentation.

Module - 1 : WRITING – I

1.1 Paragraph writing – topic sentence, cohesion and coherence – sentence linkers (so, but, however etc.)

1.2 Preparation of a business report – writing a business proposal – format, length, structure

Module - 2 : WRITING –II

Preparing notes – writing business letters and E-Mail messages

Documentation: References, notes and bibliographies

Module - 3 : WRITING – III

Writing a curriculum vitae (both chronological and functional) along with an application for a job.

Public relations – concept and relevance – PR in a business organization – handling the media.

Module - 4 : Meeting and presentation

1.1 Organising a meeting, preparing an agenda, chairing a meeting drafting resolutions, writing minutes.

1.2 Making an oral Presentation.

1.3 Facing an intervgiew

Books:

1. John Sealy, Oxford Guide to Writing and Speaking English, OUP.
2. Bovee et al, Business Communication Today Pearson Education.
3. Rovi and Eai, Business Communication.
4. J.V. Cilanilam, More Elective Communication, Sage Publications.
5. J.K. Chand and B.C. Das, A Millennium Guide to Writing and Speaking, (Friencs Publishers)
6. The Chicago manual of style (Part 2 Section 15) Prentice Hall of India.
7. Sushi Bahl, Business Communication Today, Sage Publications.

2nd SEMESTER M C A

SESSIONAL

MCA-194 COMMUNICATIVE PRACTICE LABORATORY – II (0-0-2)

Some Tasks:

i. Write a paragraph with the topic sentence "Protection of environment should not be at the cost of development". Identify the supporting details and sentence connectors.
ii. Make a notes from a given passage.
iii. Prepare a short bibliography on the list of books prescribed in this course.
iv. Write a letter complaining to a firm, which supplied deflective computers.
v. Write a functional CV of your own.
vi. Prepare an agenda of Mock meeting.
vii. Imagine that you are chairing the meeting. How would you go about it?
viii. How would you propose a vote of thanks?
ix. Make an oral presentation on a new product your company has brought out/make a seminar presentations.
x. Make a checklist for preparing for an interview.
xi. Hold a mock job interview.
xii. Prepare the agenda for a meeting you are organizing.

a. (The list is only illustrative and not exhaustive).

2nd SEMESTER M C A

MCA-195 DATA STRUCTURE IN 'C' LABORATORY (0-0-3)

Stack: Problems of stack, evaluation of Arithmetic expressions in Infix, prefix, post fix forms.
Queue: Problems of queue, circular queues, insertion and deletion on queues.
List: Problems on single linked list, doubly linked list with list operations, circular list
Trees: Creation of Binary trees, determination of depth of binary tree, counting nodes, tree traversals, balanced tree
Graphs: Problems on graphs, Breadth First Search, Depth First Search
Heap: Problems on Heaps, Operations on heaps, Heap Sort, Priority Queues
Searching and Sorting Algorithm: Problems on Binary Sarch, selection sort, Quick sort, Bubble sort, merger sort.

2nd SEMESTER M C A

MCA-196 **OOP WITH C++ LABORATORY (0-0-6)**

Concept of classes and objects Programs using inheritance and polymorphism. Use of operator overloading, memory management etc.
Exception handling, use of templates. File handling in C++

Design problems – stock, and accounting of a small organization, Railway reservations pay roll preparation, Optimization problems.