

**STRUCTURE AND SYLLABUS APPROVED IN THE BOARD OF STUDIES
MEETING ON 2001 TO BE EFFECTIVE FROM THE
ACADEMIC YEAR 2000-2001.**

MCA – II SEMESTER

	Scheme of Evaluation							
	Max. Marks					Min. Marks to pass		
	L	P	C	Int.	Ext.	Total	Ext.	Total
Object oriented programming through C++	4	-	8	40	60	100	24	50
Data Structures	4	-	8	40	60	100	24	50
Business Data Processing	4	-	8	40	60	100	24	50
Operating Systems	4	-	8	40	60	100	24	50
Organization Structure and Personal Management	4	-	8	40	60	100	24	50
Data Structures lab through C++	-	4	4	40	60	100	24	50
Cobol Lab	-	4	4	40	60	100	24	50

MC2.1 OBJECT ORIENTED PROGRAMMING THROUGH C++

1. Basics Of object oriented Programming (OOP):
Introduction to OOP – Differences between OOP and procedure oriented Programming – classes, objects and methods – overview of inheritance and polymorphism.
2. Object Oriented Design:
Trends in software design – Notation for objects – Hybrid design methods – separation of responsibilities – Responsibility driven design – design phases and tools – step by step design – Grady Booch approach
3. Fundamentals of C & C++:
Structure of a C/C++ program – preprocessor directives – data types and declaration – expressions and operator precedence – program flow control – functions – scope of variables – default arguments – dynamic allocation – new and delete operators.
4. Data Abstraction:
Class definition – controlling access to other functions – different types of constructors – destructor – objects and classes – Dynamic creation and destruction of objects.
5. Polymorphism
Overloading functions and operators – Run time polymorphism – overloading new and delete operators.
6. Inheritance:
Derived classes – syntax of derived classes – access to the base class – overloading inherited member functions – multiple inheritance – virtual base class.
7. Virtual functions and polymorphism:
Static and Dynamic bindings – virtual functions – pure virtual functions – dynamic binding through virtual functions – virtual function call mechanism – implications of polymorphic use of classes – virtual destructors – calling virtual functions in a base class constructor.
8. C++ I/O:
Standard I/O Using C functions – stream I/O in C++ - manipulators – formatted I/O – Overloading << and >> operators – File I/O
9. Generic Classes in C++:
Necessity of Templates – generic classes using Macros – class templates – Function Templates – Advantages of Templates.
10. Exception Handling in C++:
Benefits of exception handling – troubles with standard C functions (set jmp and long jmp) – proposed exception handling mechanism for C++.

Text Book:

Barkakati – Object Oriented Programming, PHI.

MC2.2 DATA STRUCTURES

1. Arrays and Records – Storage structures for arrays, strings, string operations, sparse matrices representation, records.
2. Linear data structures – Linear lists, operation on linear lists, sequential allocation and linked allocation, linked lists – singly linked lists, doubly linked lists, insertion and deletion operations, simple applications of linked lists., multilinked structures.
3. Stacks and Queues – Stack operations, array and pointer implementation of stacks, simple applications of stacks – infix to postfix expression conversion, postfix expression evaluation, recursion, queue operations, array and pointer implementations of queues, circular queues, insertion and deletion operations on circular queues, simple applications of queues.
4. Non linear Data Structures – Trees and Graphs – Tree Terminology, Binary trees, representations of binary trees, recursive and non recursive traversals of binary trees, binary search trees, insertion and deletion of operations, threaded binary trees, binary tree representation of forest.
5. Graphs – Terminology, representation of graphs, depth first and breadth first search of graphs.
6. Searching – Linear search, binary search, hashing, collision resolution techniques in hashing.
7. Sorting – Bubble sort, selection sort, insertion sort, quick sort, heap sort, merge sort.
8. Time and space complexity: Definition, time complexity of simple algorithms (elementary treatment only).

Text Books:

Tremblay and Sorenson – “An introduction to Data Structures with applications, MGH.

Reference: Horowitz and Sahni, “Data Structures in Pascal” Galgotia Pub.

MC2.3 BUSINESS DATA PROCESSING SYSTEMS

1. Introduction to data processing, data collection, preparation, editing and checking.
2. Overview of COBOL
3. Identification Division
Format and functions of the different paragraphs.
Program-ID, author, installation, Data-written, Data-compiled, security.
4. File Handling
Basic file concepts, Organization/access, Sequential indexed and relevant file handling in COBOL.
5. Environment Division:
Configuration section, Input-Output section.
6. Data Division:
Level structure (including special level Nos. 66, 77 and 88, picture clause, concept of qualification of names, file section, file entry, record structure, working storage section: VALUE clause, REDEFINES clause, RENAME clause, USAGE clause, SIGN clause.
7. Procedure division:
Organization of a COBOL program: Section, paragraph, sentence, statement, syntax and function of the different COBOL verbs.
 - (a) Elementary verbs: add, subtract, multiply, divide, compute.
 - (b) Input-Output verbs: Accept, display, open, close, read, write, rewrite, delete, start.
 - (c) Data movement: move verb, editing in COBOL.
 - (d) Conditional expressions: types of conditions – condition name, condition, relation condition, class condition, sign condition, Relational operators, Logical operators, if and nested if statements, complex conditions, evaluation roles, abbreviated, compound conditions, EVALUATE statements.
 - (e) Miscellaneous verbs: GOTO, STOP, RUN, EXIT, CONTINUE
 - (f) Perform verb: In-line and Out-Line PERFORM, Types of Out-line, PERFORM: PERFORM, PERFORM-UNTIL, PERFORM-VARYING, PERFORM-THRU, PERFORM-TIMES, Usage of TEST BEFORE and TEST AFTER clauses.
 - (g) Table handling: basic concepts, OCCURS, clause, single, multiple dimensional table, INDEX/SUBSCRIPT, SET verb: indexed by clause, usage in index clause, SEARCH concepts, SEARCH verb, serial/binary searching in COBOL, Handling sorted/unordered tables.
 - (h) String handling in COBOL: STRING statement, EXAMINE statement, INSPECT statement, UNSTRING statement.
 - (i) Compiler directing verb: Copy.
 - (j) Sorting and Merging: Basic concepts, SORT verb, MERGE verb.
 - (k) Inter-program communication: Basic concepts, Linkage section, call verb, call by address and call by content, procedure division using.

Text Books:

1. Phillipakis & Kazmier – “Structured COBOL”, MGH.
2. D. Ghosh Dasthidar & M. K. Roy – “COBOL Programming”, TMGH.

MC 2.4 OPERATING SYSTEMS

1. Operating System Introduction, Structures – Simple Batch, Multi programmed, time-shared, Personal computer, Parallel, Distributed Systems, Real time systems, System components, Operating-System services, System calls, virtual machines, system Design and Implementation.
2. Process and CPU scheduling – Process concepts and scheduling, operation of processes, cooperating processes, threads and interposes communication – scheduling criteria, Scheduling Algorithm, Multiple-Processor scheduling, Real-Time scheduling.
3. Memory Management and Virtual memory – Logical versus Physical address, space, swapping, contiguous allocation, paging, segmentation, segmentation with paging, demand paging, performance of demanding, paging, page replacement, page replacement algorithm, allocation of frames, trashing.
4. File system, interface and Implementation – Access methods, directory structure, protection, file system structure, allocation methods, free-space management, directory management, directory implementation, efficiency and performance.
5. Process Management and Synchronization – The critical section problem, synchronization hardware, semaphores, and classical problems of synchronization, critical regions, monitors.
6. Deadlocks – System Model, Dead locks characterization, Methods for Handling Dead locks Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Text Books:

1. Operating Systems concepts – Abraham Silberschatz and Peter Baer Galvin – John wiley & sons, Inc., 5th Edition.

MC2.5 ORGANIZATIONAL STRUCTURE & PERSONNEL MANAGEMENT

1. Classical theories of organization: Functional approach, classical theories of organization, division of labor, levels of authority, span of control, authority and responsibility, efficiency of management.
2. Behavioral theories of organization, limitations of formal organization, human relation, group behavior, committee and group making, motivation and morale.
3. Decision Process approach: Parts of Organization system, development of corporate strategy, dynamics of decision, role of system, types models, mathematical planning models, deterministic and probabilistic models.
4. Personnel function: Evaluation, objectives, principles, philosophies and policies, duties & responsibilities of the manager, position of the Personnel Department in the Organization, line and staff relationship & the changing concept of personnel management in India.
5. Manpower Planning: Uses benefits problems and limitations, manpower inventory, manpower forecasting, job description, recruitment, job specification and job selection, interviewing techniques, transfers, promotion and its policies.
6. Training and Development: Objectives and policies planning, Organizing the training department, training manager and his job, on and off the job training, techniques, career planning, objectives of performance appraisal.
7. Strategic management: Objectives, importance policies, concept of core competence capability of organizational learning.
8. Communication: Importance of communication, interpersonal communication barriers of communication, communication in organizations, using communication skills to manage conflicts.

Text Books:

1. Rudrabasavaraj M. N. : Dynamic Personnel Administration 2nd edition, Himalaya Publishing House, Bombay, 1979.

MC 2.6 DATA STRUCTURES THROUGH C++ LAB

1. Operations on Sparse matrices.
2. Implementing stacks, queues and circular queues and applications like infix, postfix, conversion post fix expression evaluation, reverse string finding prime factors of a given number.
3. Implementing multiple stacks and queues (using arrays and pointers).
4. Applications of linked lists i.e. polynomial arithmetic.
5. Binary tree creation, deletion of a node, traversal.
6. Graph representation and traversal using BFS & DFS.
7. Sorting methods: selection sort, bubble sort, heap sort, merge sort, quick sort, Radix sort.
8. Searching Methods – Linear search, Binary search, Hashing.

MC2.7 COBOL LAB

COBOL

1. Using Display and Accept Verbs.
2. Input/Output through files.
3. Using GOTO... DEPENDING ON verb.
4. Using condition names clause.
5. Using sort & merge verbs.
6. Table-Handling.
7. Using Screen-section.
8. Transaction Processing.