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**Department of Higher Education, Government of Madhya Pradesh**  
**Yearly Syllabus for Undergraduates**  
**As recommended by Central Board of Studies of Computer Science and**  
**Approved by H E the Governor of M.P.**

Session ~~2017-18~~ 21-22

**B.Sc. II YEAR COMPUTER SCIENCE**

**PAPER I: OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++**

**Max Marks : 50**

**Min Marks:17**

**UNIT I**

Introduction to C++: Programming paradigms, Key concepts of Object-oriented Programming, Advantages of OOP's. Input and Output in C++: Pre-defined streams, Unformatted console I/O operations, formatted console I/O operations.

**UNIT-II**

C++ Declarations: Parts of C++ Program, types of Tokens, Keywords, Identifiers, data types, constants, Operators, Precedence of operators, referencing and dereferencing operators, scope access operator. Control structures: Decision Making Statements, looping statement.

**UNIT-III**

Functions: main (), parts of function, passing arguments: value, address, reference, inline functions, function overloading: principles, precautions, library functions. Classes and objects: declaring classes and objects, accessing class members, keyword: public, private, protected, defining member functions: member function inside the class, member function outside the class, static member variables and functions, friend function, friend classes, overloading member functions.

**UNIT-IV**

Constructors and Destructors: characteristics, applications, constructors with arguments, overloading constructors, types of constructors. Operator overloading: overloading unary operator, binary operator. Inheritance: access specifiers: public inheritance, private inheritance, protected data with private inheritance, Types of inheritances: single, multiple, hierarchical, multilevel, hybrid, multipath, virtual base class.

**UNIT-V**

Pointers & arrays: pointer declaration, pointer to class & object, Array: declarations & initialization, arrays of classes. Polymorphism: Static(Early) binding, Dynamic (Late) Binding, virtual function, pure virtual function.

**Text books:**

Object-Oriented Programming with ANSI & Turbo C++ by Ashok N. Kamthane.

Object Oriented Programming in C++ by E. Balagurusamy

**Reference Books:**

C++ The complete Reference by Herbert Schildt, TMH publication.

Object Oriented Programming in C++ by Robert Lafore.

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**B.Sc. II YEAR COMPUTER SCIENCE**  
**PAPER II: DATA STRUCTURES**

Max Marks : 50

Min Marks:17

**UNIT-I**

Concept of data structure and analysis of algorithm, abstract data structure, introduction to stack and primitive operations on stack, stack as an abstract data type, stack application: infix, prefix, postfix and recursion, introduction to queues, primitive operation on queues, circular queue, dequeuc , priority queue and applications of queue.

**UNIT-II**

Introduction to linked list, basic operations on linked list, stacks and queues using linked list, doubly linked list, circular linked list, applications of linked list.

**UNIT-III**

Trees-basic terminology ,binary trees, tree representations as array and linked list, basic operations on binary tree, traversal of binary trees:- inorder, preorder, postorder. Applications of binary tree, threaded binary tree, AVL tree, binary tree representations of trees.

**UNIT-IV**

Sequential search, binary search, insertion sort, selection sort, quick sort, bubble sort, heap sort, comparison of sorting methods.

**UNIT-V**

Hash Table, Collision resolution technique, Introduction to graphs, Definition, Terminology, Directed, Undirected and Weighted Graph, Representation of Graph, Graph Traversal-Depth first, Breadth first search, Spanning tree, Minimum Spanning tree, Shortest path algorithm.

**Text Books-**

Data Structure: By Lipschultz (Schaums Outline Series)

Data Structures through C ( A Practical Approach) by G.S. Baluja

Data Structure: By Trembley & Sorrenson

**Reference Books-**

Fundamental of Data Structure By S.Sawhney & E. Horowitz

*Handwritten signatures and dates:*  
Sawhney, Baluja, Sorrenson  
AS 10/10/14, Jays, Nagar

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