

## UEI623 OBJECT ORIENTED PROGRAMMING AND APPLICATIONS

L	T	P	Cr
2	1	2	3.5

**Introduction:** Need of Object Oriented Programming (OOP), Advantages of OOP, Characteristic of Object Oriented Languages, C++ and C.

**C++ Programming:** Data Types, Operators and Statements, Writing a Program in C++: Declaration of variables, Statements, Simple C++ programs, Features of iostream.h, Manipulator functions, Input and Output Stream Flags.

**Control Statements:** Conditional expressions, Switch statement, Loop Statements, Breaking control statements.

**Functions AND Program Structures:** Introduction, Defining a function, return statement, Types of functions, Actual and formal arguments, Local and global variables, Default arguments, Multifunction program, Storage class specifiers, recursive function, Preprocessors, Header files.

**Arrays:** Array notation, Array declaration, Array initialization, Processing with array, Arrays and functions, Multidimensional arrays, Character array.

**Pointer:** Pointer declaration, Pointer arithmetic, Pointers and functions, Pointers and arrays, Pointers and arrays, pointer and strings, Array of pointers, Pointers to Pointers.

**Structures, Unions and Bit Fields:** Declaration of structures, Initialization of a Structure, Functions and Structures, Arrays within a Structures, Nested Structure, Pointers and Structures, Unions, Bit Fields, Typedef, Enumerations.

**Classes and Objects:** Introduction, Structures and Classes, Declaration of Class, Member functions, Defining the Object of a Class, Accessing a member of class, Array of class objects, Unions and classes, Nested class.

**More on Classes:** Constructors, Destructors, Inline member functions, Static class members, Friend functions, Dynamic memory allocations, This pointer.

**Inheritance:** Introduction, Single inheritance, Types of base classes, Types of derivation, Ambiguity in single heritance, Array of class objects and single heritance, Multiple heritance, Container classes, Member access control.

**Overloading:** Function overloading, Operator overloading, Overloading of binary operators, Overloading of unary operators.

**Polymorphism:** Introduction, Early binding, Polymorphism with pointers, Virtual functions, Late binding, Pure virtual functions, Abstract base classes, Constructors under inheritance, Destructors under inheritance, Virtual Destructors, Virtual base classes,.

**Templates and Exception Handling:** Function Template, Class template, Exception handling.

**Data File Operations:** Opening and Closing of Files, Stream state member functions, Reading/Writing a character from a file, Binary file operations, Classes and file operations, Array of class objects and file operations, Nested classes and file operations, Random access file processing.

**Application of OOP in Data Structure:** Data Structures - Sparse matrices, Stacks, Queues, recursion, Applications of recursion, linked lists (singly linked, Doubly linked and circular linked lists). General graph features, Trees, Binary trees and their applications, Traversal algorithms for binary trees, Threaded binary tree, breadth first search, Depth first search and heuristic search algorithms, B trees and Game trees.

**Laboratory Work:**

Programing skills and applications based on various concepts of OOP.

**Text Books:**

1. Aho, A.V., Hopcraft ,J.E. and Ullman, J.D., *Data Structures and Algorithms*, Addison Wesley (2004).
2. Langsam, Y., Augenstein, M. J. and Tenenbaum, A. M., *Data Structures with C and C++*, Prentice–Hall of India Private Limited (2000).
3. Tremblay,J.P. and Sorenson,P.G. *Data Structures Organization and Architecture – Designing for Performance* , Prentice–Hall of India Private Limited (2004).

**Reference Books:**

1. Patric, N., *The C++ Complete Reference*, McGraw–Hill (1982).

**Evaluation Scheme:**

Sr. No.	Evaluation Elements	Weightage (%)
1	MST	20
2	EST	40
3	Sessionals (May include Assignments/Projects/Tutorials/Quizzes/Lab Evaluations)	40