SUBJECT	**EC-204 Data Structures and Object Oriented Programming**
CREDIT HOURS	**3-1**
CONTACT HOURS	6 Hours
TEXT BOOKS	1. Mark Allen Weiss, "Data Structures and Problem Solving Using C++", 3rd Ed, Addison Wesley, 2009. 2. Dietel and Deitel, "C++ How to Program", 7th Ed, Prentice Hall 2009
REFERENCES BOOKS	1. Michael T. Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", Wiley, 2004. 2. Frank M. Carrano, "**Data Abstraction and Problem solving with C++",** 3rd Ed., Addison Wesley, 2004. 3. Adam Drozdek, "Data Structures and Algorithms in C++", 3rd Ed., Thomson, 2005. 4. Robert Lafore, "Object Oriented Programming with C++", Sams, 2002. 5. Booch and Rumbaugh, "The Unified Model Language User Guide", 2nd Ed, Addison Wesley, 05.

COURSE OBJECTIVES: To teach students different data structures that are required to design and implement various software projects. The course also aims to teach the implementation of data structures using object-oriented language C++. It will familiarize the students with practical applications of data structures. The students will also be taught basic techniques for analysis of algorithms.

COURSE OUTCOMES: At the completion of the course, students will be able to..

1. Apply moderately advanced problem solving techniques by creating and applying algorithms
2. Apply moderately advanced concepts of structured programming by task partitioning (functions)

3. The student will use multidimensional arrays, stacks, queues and linked lists, and apply to simple problem solving
4. Use object oriented programming and apply it to data structure design (classes)
5. Implement moderately advanced data organization and manipulation in software.
6. Understand better the software development process via numerous homework assignments
7. Perform software troubleshooting (debugging) skills via numerous homework assignments

TOPICS COVERED:

1. Introduction to Data Structures and C++
2. Linked Lists, Stacks and Queues
3. Recursion
4. Trees, Sorting and Searching
5. Introduction to Object Oriented Programming
6. Classes, Objects, Access Specifiers, Data Members, Member Functions, Abstract Data Types (ADT), Information Hiding, Encapsulation and Reference Variables.
7. Constructors and Destructors, Overloaded Constructors, Default Constructors,
8. Function Overloading and Operator Overloading
9. Inheritance, Types of Inheritance, Derived Classes and Method Overriding

List of Practicals

Ser	Practical Title	Equipment
1.	Class for the manipulation of complex numbers	**Software:** Microsoft Visual Studio 6.0
2.	Implement a Class: 'Date' and overload operator to apply on instances of Date class, modify the Date Class with more overload functions	**Software:** Microsoft Visual Studio 6.0
3.	Create a class Vector3 for 3-D vector calculations, create a class for dynamic array of integers	**Software:** Microsoft Visual Studio 6.0
4.	Create a class 'List' for a dynamic-memory-allocated link-list, add templates and sorting	**Software:** Microsoft Visual Studio 6.0
5.	Modify Lab 4 to make a double-link-list and	**Software:** Microsoft Visual Studio

	then a circular link-list	6.0
6.	Implement a Stack (as a dynamic link-list) and solve the problem for mismatching brackets in an equation using the stack.	**Software:** Microsoft Visual Studio 6.0
7.	Search a Keyword in a files	**Software:** Microsoft Visual Studio 6.0
8.	Make a simulation of scheduling by using objects of a queue class	**Software:** Microsoft Visual Studio 6.0
9.	Create a class implementing a binary tree.	**Software:** Microsoft Visual Studio 6.0
10.	Implement a Binary Search Tree using dynamic memory allocation.	**Software:** Microsoft Visual Studio 6.0
11.	Getting Started with Object Oriented Development	**Software:** Microsoft Visual Studio 6.0
12.	Implementing Classes with Properties and Methods	**Software:** Microsoft Visual Studio 6.0
13.	Implementing Inheritance and Abstraction	**Software:** Microsoft Visual Studio 6.0
14.	Implementing Interfaces	**Software:** Microsoft Visual Studio 6.0
15.	Designing Object Oriented Structures	**Software:** Microsoft Visual Studio 6.0
16.	Implementing Delegates, Events and Exceptions	**Software:** Microsoft Visual Studio 6.0
17.	Designing Object Oriented Collaboration	**Software:** Microsoft Visual Studio 6.0
18.	Deploying Components and Class Libraries	**Software:** Microsoft Visual Studio 6.0