

<b>Course Number and Name</b>												
BCS406-OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES												
<b>Credits and Contact Hours</b>												
3 and 45												
<b>Course Coordinator's Name</b>												
Mr.B.Karthik												
<b>Text Books and References</b>												
<b>References:</b>												
1. Deitel and Deitel,—C++,How To Program ,Fifth Edition, Pearson Education, 2005.												
2. BhushanTrivedi,—Programming withANSIC++,AStep-By-Stepapproach , Oxford University Press, 2010.												
3. Goodrich, Michael T., Roberto Tamassia,DavidMount, —Data Structuresand Algorithms in C++ , 7th Edition, Wiley. 2004												
4. Thomas H. Cormen, CharlesE. Leiserson, RonaldL. Rivest andClifford Stein, "Introduction to Algorithms", Second Edition, McGraw Hill, 2002.												
5. BjarneStroustrup,—TheC++ProgrammingLanguage ,3rdEdition,Pearson Education,2007												
6. EllisHorowitz,SartajSahniandDineshMehta,—Fundamentals ofDataStructu In C++ , GalgotiaPublications, 2007.												
<b>OtherReferences:</b>												
1. <a href="http://users.cis.fiu.edu/~weiss/">http://users.cis.fiu.edu/~weiss/</a>												
2. <a href="http://www.youtube.com/watch?v=x3aC8F1X8ao">www.youtube.com/watch?v=x3aC8F1X8ao</a>												
<b>Course Description</b>												
<ul style="list-style-type: none"> <li>To develop solutions to given problems using class object concepts.</li> <li>To understand the concepts of loading, inheritance and polymorphism</li> <li>To learn the basic data structures and its operations.</li> </ul>												
<b>Prerequisites</b>						<b>Co-requisites</b>						
Fundamentals of Computing and Programming						Nil						
required, elective, or selected elective (as per Table 5-1)												
required												
<b>Course Outcomes (COs)</b>												
CO1: Develop solutions to a given problems using class object concepts.												
CO2 : Illustrate overloading, inheritance and polymorphism concepts with example.												
CO3 : Explain the basic data structures and its operations												
CO4 : Make use of basic data structures to solve problems.												
CO5: To develop programs using C++ which forms the basic for advanced programming?												
CO6 : Outline various searching and sorting algorithms.												
<b>Student Outcomes (SOs) from Criterion 3 covered by this Course</b>												
COs/SOs	a	b	c	d	e	f	g	h	i	j	k	
CO1	M	H				M						
CO2	M			H	M				M		M	
CO3	M	M			M							
CO4	L						M				M	
CO5	H	H	L	M			M		M	M	M	
CO6	M					H					H	

## List of Topics Covered

### **UNIT I DATA ABSTRACTION & OVERLOADING**

**9**

Overview of C++ – Structures – Class Scope and Accessing Class Members – Reference Variables – Initialization – Constructors – Destructors – Member Functions and Classes – Friend Function – Dynamic Memory Allocation – Static Class Members – Overloading: Function overloading and Operator Overloading.

### **UNIT II INHERITANCE & POLYMORPHISM**

**9**

Base Classes and Derived Classes – Protected Members – Overriding – Public, Protected and Private Inheritance – Constructors and Destructors in derived Classes – Implicit Derived – Class Object To Base – Class Object Conversion – Virtual functions – This Pointer – Abstract Base Classes and Concrete Classes – Virtual Destructors – Dynamic Binding.

### **UNIT III LINEAR DATA STRUCTURES**

**9**

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation – singly linked lists – Polynomial Manipulation – Stack ADT – Queue ADT

### **UNIT IV NON-LINEAR DATA STRUCTURES**

**9**

Trees – Binary Trees – Binary tree representation and traversals – The Search Tree ADT – Graph and its representations – Graph Traversals – Breadth-first search – Depth-first search – Bi-connectivity.

### **UNIT V SORTING AND SEARCHING**

**9**

Sorting algorithms: Insertion sort – Quick sort – Merge sort – Searching: Linear search – Binary Search .