Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Electronics and Communication Engineering
BCS306 Objected Oriented Programming And Data Structures
Fourth Semester, 2015-16 (Even Semester)

Course (catalog) description

To provide a comprehensive introduction to Object Oriented Programming (OOP) uses C++ programming language. This course aims to teach OOP concepts, such as classes, interfaces, inheritance, and polymorphism. The course will also provide the techniques for analysis of complexity of the algorithms, and address the various algorithm design techniques. On completion of the course, the students would have gained Knowledge on Linear and Non-linear data structures , Techniques to design and analysis of algorithms to deploy the data structures.

Compulsory/Elective course : Compulsory for ECE students

Credit hours : 3 credits

Course Coordinator : Dr M.Sangeetha, Professor

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Dr .M.Sangeetha	Second year ECE	SA003		sang_gok@yahoo.com	9.00 - 9.50 AM
Mr. Karthik	Second year ECE	SA003		karthik.ece@bharathuniv.ac.in	12.45 - 1.15 PM

Relationship to other courses:

Pre –requisites : BCS101 Fundamentals of Computing and Programming
Assumed knowledge : Basic knowledge in C Programming
Following courses : JAVA

Syllabus Contents

UNIT I DATA ABSTRACTION & OVERLOADING 9 HOURS

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 HOURS

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 HOURS**

Abstract Data Types(ADTs)–ListADT–array-base dimplementation– linked list implementation– singly linked lists–Polynomial Manipulation-Stack ADT – Queue ADT

UNIT IV NON-LINEAR DATA STRUCTURES **9 HOURS**

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 SORTINGANDSEARCHING **9 HOURS**

Sorting algorithms:Insertion sort-Quick sort -Mergesort-Searching:Linear search –Binary Search

TOTAL : 60 HOURS

TEXT BOOK(S) AND/OR REQUIRED MATERIALS

Reference Books:

R1. Deitel and Deitel, —C++,How-to Program , Fifth Edition, Pearson Education, 2005.

R2. Bhushan Trivedi,—Programming with ANSIC++,A Step-By-Step approach , Oxford University Press, 2010.

R3. Goodrich, Michael T., Roberto Tamassia, David Mount, —Data Structures and Algorithms in C++ ,7th Edition, Wiley. 2004

R4. Thomas H. Cormen, CharlesE. Leiserson, RonaldL. Rivest andClifford Stein, "Introduction to Algorithms", Second Edition, McGraw Hill, 2002.

R5. BjarneStroustrup,—TheC++ProgrammingLanguage ,3rdEdition,Pearson Education,2007

R6. EllisHorowitz,SartajSahniandDineshMehta,—Fundamentals ofDataStructures inC++ , GalgotiaPublications, 2007.

Computer usage: Dev C++

Professional component

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	100%

Broad area : Communication| Signal Processing**|** Electronics | VLSI| **Embedded**

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	Feb 2nd week	Session 1 to 14	2 Periods
2	Cycle Test-2	Mar 2nd week	Session 15 to 28	2 Periods
3	Model Test	Apr 3rd week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

This course is to develop a strong foundation in programming of C++. This course discusses class object concepts, inheritance and polymorphism. And also learn basic data structures and its operations.	Correlates to program outcome		
	H	**M**	**L**
1. Develop solutions to a given problems using class object concepts	b	a,f	
2. Illustrate overloading, inheritance and polymorphism concepts with example	d	a,e,i	
3. Explain the basic data structures and its operations		a,b,e	
4. Make use of basic data structures to solve problems		g	a
5. To develop programs using C++ which forms the basic for advanced programming	a,b	d,g,i,j	
6. Outline various searching and sorting algorithms	f	a	

H: high correlation, M: medium correlation, L: low correlation

Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I			
1.	OverviewofC++–Structures	No	[R1]Chapter-9 [R1]Chapter-10 [R1]Chapter-6 [R1]Chapter-11
2.	Class Scope and Accessing Class Members –Reference Variables	No	
3.	Initialization–Constructors	No	
4.	Destructors	No	
5.	Member Functions and Classes	No	
6.	Friend Function – Dynamic Memory Allocation	No	
7.	Static Class Members	No	
8.	Overloading: Function overloading	No	
9.	Operator Overloading	No	
UNIT II			
10.	Base Classes and Derived Classes–	No	[R2]Chapter-9,10
11.	Protected Members–Overriding –Public,Protected and Private	No	
12.	Inheritance –Constructors and Destructors in derived Classes–	No	
13.	Implicit Derived– Class Object To Base–	No	
14.	Class Object Conversion–	No	
15.	Virtual functions–This Pointer–	No	
16.	Abstract Base Classes	No	
17.	Concrete Classes– Virtual Destructors–	No	
18.	Dynamic Binding	No	

UNIT III			
19.	Abstract Data Types(ADTs)	No	[R3]Chapter-3,6
20.	ListADT	No	
21.	array-base dimplementation	No	
22.	linked list implementation	No	
23.	singly linked lists	No	
24.	Polynomial Manipulation	No	
25.	Stack ADT	No	
26.	Queue ADT	No	
UNIT IV			
27.	Trees	No	[R3]Chapter-7
28.	BinaryTrees	No	
29.	Binary tree representation and traversals**.**	No	
30.	The Search Tree ADT	No	
31.	Graph and its representations	No	
32.	Graph Traversals	No	
33.	Breadth-first search	No	
34.	Depth-first search	No	
35.	Bi-connectivity	No	
UNIT V			
36.	Sorting algorithms:	No	[R1]Chapter-7,8,19,20
37.	Insertion sort-	No	
38.	Quick sort -	No	
39.	Mergesort- h	No	
40.	Searching:Linear search –	No	
41.	Binary Search	No	

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

Cycle Test – I	-	10%
Cycle Test – II	-	10%
Model Test	-	25%
Attendance	-	5%
Final exam	-	50%

Prepared by: Dr M.Sangeetha Professor , Department of ECE **Dated : 10 -5-2016**

Addendum

ABET Outcomes expected of graduates of B.Tech / ECE / program by the time that they graduate:

(a) an ability to apply knowledge of mathematics, science, and engineering fundamentals.
(b) an ability to identify, formulate, and solve engineering problems
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to design and conduct experiments, as well as to analyze and interpret data
(e) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
(f) an ability to apply reasoning informed by a knowledge of contemporary issues
(g) an ability to broaden the education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(h) an ability in understanding of professional and ethical responsibility and apply them in engineering practices
(i) an ability to function on multidisciplinary teams
(j) an ability to communicate effectively with the engineering community and with society at large
(k) an ability in understanding of the engineering and management principles and apply them in Project and finance management as a leader and a member in a team.an ability to apply knowledge of mathematics, science, and engineering

Program Educational Objectives

PEO1: To provide strong foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems in the field of Electronics And Communication Engineering.
PEO2: To enhance the skills and experience in defining problems in Electronics And Communication Engineering design and implement, analyzing the experimental evaluations, and finally making appropriate decisions.
PEO3: To enhance their skills and embrace new Electronics And Communication Engineering Technologies through self-directed professional development and post-graduate training or education
PEO4: To provide training for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.
PEO5: Apply the ethical and social aspects of modern communication technologies to the design, development, and usage of electronics engineering.

Course Teacher	Signature
DR M.SANGEETHA	
MR KARTHIK	

Course Coordinator	**Academic Coordinator**	**Professor In-Charge**	**HOD/ECE**
(Dr M.Sangeetha)	( )	(Dr.)	(Dr.M.Sundararajan)