GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM
COURSE TITLE: OBJECT ORIENTED PROGRAMMING
(Code:3341602)

Diploma Programme in which this course is offered	Semester in which offered
Information Technology	**4th Sem**

1. RATIONALE

By the end of the course, students will be able to understand the **Object Orinted Programming** and able to write C++ programs using the Object oriented design, and use the standard C++ library, exploit C++ techniques. Also aware with pure Object Oriented concept.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency:

- **Develop program using Object Orinted concept.**

3. COURSE OUTCOMES

- **Understand Object Oriented Programming.**
- **Develop programs in 'C++'.**
- **Aware different techniques of 'C++'.**
- **Learn the basic JAVA programming.**

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE**	**PA**	**200**
3	0	4	7	70	30	40	60	

Legends: L - Lecture; **T -** Tutorial/Teacher Guided Student Activity; **P -** Practical; **C -** Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

5. COURSE DETAILS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I **Introduction of object oriented programming**	1a. Object oriented programming	1.1 Object oriented programming and procedure oriented programming 1.2 Basic concept of Object oriented programming 1.3 Advantages of Object oriented programming 1.4 Application of Object oriented programming
	1b. Basic of 'C++'	1.5 Basic structure of C++ 1.6 Library files in C++ 1.6.1 ios, conio, math, stdlib 1.7 Input /Output operators
	1c. Data types and Variables	1.8 Data types 1.8.1 Basic data type 1.8.2 User defined data type 1.8.3 Derived data type 1.9 Declaration of variable with memory concept 1.10 Variables 1.10.1 Reference variable 1.10.2 Dynamic variable
	1d. Operators	1.11 Basic operators in C++ 1.12 Scope resolution operator 1.13 Memory management operator and manipulators 1.14 Memory reference operator 1.15 Type casting
Unit – II **Class and Object**	2a. Introduction of class and object	2.1 Difference between class and structure 2.2 Implementation of class 2.3 Creating object of class 2.4 Memory allocation for object 2.5 Data member and member function 2.6 Access modifier 2.6.1 Public 2.6.2 Private 2.6.3 Protected 2.7 Static data member and function 2.8 Array of object 2.9 'this' keyword 2.10 Namespaces

Unit	Major Learning Outcomes	Topics and Sub-topics
	2b. Function concepts	2.11 Function Return type 2.12 Function prototype 2.13 Call by value 2.14 Call by reference 2.15 Call by address 2.16 Different types of function 2.16.1 Inline function 2.16.2 Recursive function 2.16.3 Friend function 2.17 Types of argument 2.17.1 Default argument 2.17.2 Constant value as a argument
Unit – III **Constructor and destructor**	3a. View of constructor and destructor	3.1 Constructor with its characteristic 3.2 Types of constructor 3.2.1 Parameterized constructor 3.2.2 Copy constructor 3.4 Implement destructor 3.5 Comparison between constructor and destructor
Unit – IV **Inheritance**	4a. Introduction of Inheritance	4.1 Concept of Inheritance 4.2 Utilities of Inheritance 4.3 Declaration of inheritance 4.4 Protected Access Specifier 4.5 Types of inheritance 4.5.1 Single Inheritance 4.5.2 Multiple Inheritance 4.5.3 Multi level Inheritance 4.5.4 Hirerchical Inheritance 4.5.5 Hybrid Inheritance 4.6 Function overridding
	4b. constructor in sub class	4.7 Concept of constructor in sub class 4.8 Virtual base class 4.9 Abstract class
Unit – V **Polymorphism and Virtual function**	5a. Explain Polymorphism	5.1 Concept of polymorphism 5.2 Use of polymorphism 5.3 Types of polymorphism 5.3.1 Function overloading 5.3.2 Operator overloading

Unit	Major Learning Outcomes	Topics and Sub-topics
	5b. Understand the Virtual function	5.4 Utility of Virtual function 5.5 Virtual function characteristics 5.6 Pure virtual function.
Unit – VI **Managing Input/Output Stream**	6a. Introduction of stream in 'C++'	6.1 File stream classes 6.2 Formatted Input/Output operations 6.3 Unformatted Input/Output operations 6.4 Managing output with manipulators
Unit- VII **Introduction of Pure OOP**	7a. Introduction of Java	7.1 Introduction of JAVA 7.2 Compare with OOP and Pure OOP(JAVA) 7.3 Advantages of JAVA 7.4 Application of JAVA
	7b. Structure of JAVA	7.5 Basic structure of JAVA Program 7.6 Simple java programs with Input/Output Operators

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction of object oriented programing	8	4	4	2	14
II	Class and Object	8	2	4	4	14
III	Constructor and destructor	4	2	4	4	07
IV	Inheritance	8	4	4	6	14
V	Polymorphism and Virtual function	7	2	4	6	07
VI	Managing Input /Output stream	3	2	2	2	07
VII	Introduction of Pure OOP	4	2	2	4	07
Total		**42**	**18**	**24**	**28**	**70**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as only general guideline for students and teachers. The actual distribution of marks in the question paper may vary from above table.

7. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills **(Course Outcomes in psychomotor and affective domain)** so that students are able to acquire the competencies (Programme Outcomes). Following is the list of practical exercises for guidance.

Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of **Programme Outcomes/Course Outcomes in affective domain** as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain.

Sr. No.	Unit No.	Practical/Exercise	Apprx. Hrs. Required
1	I	Develop programs using Input/Output operators.	2
2	I	Develop programs using Control structure.	4
3	I	Develop programs using array of object.	4
4	II	Develop programs using call by value ,call by reference and function overloading	4
5	II	Develop programs on default arguments, constant arguments	4
6	II	Develop programs on function overloading	4
7	II	Develop programs using different classes such as student, distance, shape, employee, feet, time, data etc. with data member & member functions.	4
8	II	Develop Programs using array of objects and static member functions.	4
9	II	Develop programs using Friend function.	2
10	III	Develop programs using various types of constructors and destructor.	4
11	IV	Develop programs using single, multilevel, multiple Inheritance	2
12	IV	Develop programs using inheritance and constructors.	2

Sr. No.	Unit No.	Practical/Exercise	Apprx. Hrs. Required
13	IV	Develop programs using Virtual base class.	2
14	V	Develop programs using 'this' key word.	4
15	V	Develop programs using virtual function.	2
16	VI	Develop programs using unformatted input/output functions.	2
17	VI	Develop programs using formatted input/output functions.	2
18	VII	Develop programs in JAVA using input/output operators.	4
Total			56

8. SUGGESTED LIST OF STUDENT ACTIVITIES

Following is the list of proposed student activities like:

i. Power point Presentation
ii. Chart Preparation

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

The course activities include Lectures, Supervised Tutorials and Practical Exrecises as above teaching scheme.

i Develop a program with real life application
ii Develop Mini Projects

10. SUGGESTED LEARNING RESOURCES

(A) List of Books:

Sr.No.	Title of Books	Author	Publication
1	Object Oriented Programming with C++ (Second edition)	Sourav Sahay	Oxford
2	JAVA programming	E.Balagurusamy	TMH
3	Object Oriented Programming with C++	E.Balagurusamy	McGrawHill
4	Object Oriented Programming in C++	Robert Lafore	SAMS
5	Mastering C++	Venugopal	Tata McGrawHill
6	Programming in c++	Ashok Kamthane	Pearson

(B) List of Major Equipment/Materials with Major Specifications.

Hardware : Desktop Computer P-IV processor or higher

Software : Turbo C++/ Borland C++/ any other higher software

JDK 1.4 and Higher Version

(C) List of Learning Websites.

1) C++ Fundamentals:http://www.oupinheonline.com
2) C++ Tutorials: http://www.tutorialspoint.com/cplusplus/cpp_overview.htm
3) Video tutorials :
   i. http://nptel.iitm.ac.in/video.php?subjectId=106106093
4) Java tutorials : http://www.tutorialspoint.com/java/

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- Miss. Priti.N.Parikh , Lecturer (I.T), Government Polytechnic,Ahmedabad
- Mr. Sandeep Modi , Lecturer (I.T), K.P.T.I.T.SOKLI

Coordinator and Faculty Members from NITTTR Bhopal