GUJARAT TECHNOLOGICAL UNIVERSITY

MECHATRONICS ENGINEERING (20)

PROGRAMMING METHODOLOGY USING C++

SUBJECT CODE: 2142005

B.E. 4th Semester

Type of course: Engineering Science

Prerequisite: NA

Rationale: This course is useful for generating basic programming skill to the engineering students. It can be useful to the various engineering applications.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	2	5	70	20	10	20	10	20	150

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

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Principles of Object-Oriented Programming:Tokens, Expressions and sequences, Functions with C++. Classes and objects, Constructors and destructors, Operator overloading and type conversions. Function overloading and copy constructor.	7	17.5
2	Inheritance: Extending classes, pointers, Virtual functions and polymorphism Managing Console I/O operations, Working with files.	6	15
3	C++ I/O Systems:C++ I/O basics, Formatted I/O, Manipulators, User defined inserters, Extractors and Manipulators.	6	15
4	Templates and Exception handling:Generic functions, Generic Classes, Understanding exception handling.	5	12.5
5	Runtime Identification and Casting Operators:Understanding RTTI, Dynamic cast, Constant cast, Reinterpret cast and static cast.	6	15
6	Standard template library: Introduction and overview, Container classes, Algorithms and Iterators.	6	15
7	Object Oriented system development: Simple Case study.	4	10

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
35	40	5	10	10

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)

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

References Books:

1. Teach yourself C++ by Herbert Schidlt, Tata McGraw Hill.
2. Object Oriented Programming with C++ by E Balaguruswamy, Tata McGraw Hill.
3. The Complete Reference C++ by Herbert Schidlt, Tata McGraw Hill
4. C++ Black bookby Steven Holzner, Coriolis Group Publisher

Course Outcomes:

After learning the course the students should be able to

1. Compare the difference between procedural oriented programming and object oriented programming.
2. Represent real-life entities of problem in system design.
3. Design system with open interfaces.
4. Apply the concept of objects, classes, Data abstraction and encapsulation, Inheritance, polymorphism, dynamic binding and message passing.
5. Achieve reusability and extensibility of modules through the concepts mentioned in CO: 4.
6. Design, develop, test, and debug programs using object oriented principles in C++.

List of Practical:

1. Develop Programs which demonstrates the use of classes like class Student, class String etc.
2. Develop programs which demonstrate the use of constructor, destructor and dynamic memory allocation. Use class Area, class Bank etc.
3. Develop programs which demonstrate the use of Friend function and function overloading
4. Develop programs which overload operators like addition, multiplication and subtraction using operator overloading.
5. Develop programs which overload operators like %,^ , &, |, <<, >>, =, +=, -=, *=, /=, %=, ^=, &=, |=, >>=, <<=, ==, !=, <, >, <=, >=, &&, ||, ++, --, [] using operator overloading.
6. Develop programs which demonstrate the use of Inheritance
7. Develop programs which demonstrate the use of multiple and hybrid Inheritance.
8. Develop programs which demonstrate the use of Virtual Function and run time Polymorphism
9. Develop programs which demonstrate the use of Files.
10. Develop programs which demonstrate the use of Generic classes and generic functions.

Design based/open ended problem
Student may be given a task to run some the relevant programmes studied during the year.

Major Equipments / Softwares:
Turbo C++ software

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.