



**SARDAR VALLABHBHAI PATEL EDUCATION SOCIETY'S**  
**R. N. G. PATEL INSTITUTE OF TECHNOLOGY - RNGPIT**

An Autonomous Institute u/s UGC Act 1956

Approved by AICTE & affiliated to Gujarat Technological University

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**Program Name: Int. M.Sc. (I.T.)**

**Level: Post Graduate**

**Branch: Information Technology**

**Subject Code: 2BS204**

**Subject Name: Object Oriented Programming**

w. e. f. Academic Year:	2025-26
Semester:	02
Category of the Course:	Major Course

<b>Prerequisite:</b>	C Programming
<b>Rationale:</b>	This course covers fundamentals of C++ programming.

**Teaching and Examination Scheme:**

Teaching Scheme (in Hours)			C Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR		C	Theory		Tutorial / Practical	
					SEE (TH)	IAT	CCE	SEE (P)
2	0	4	4	70	30	20	30	150

Where SEE: Semester End Examination, IAT: Internal Assessment Test, CCE: Continuous and Comprehensive Evaluation

**Course Content:**

<b>Unit No.</b>	<b>Content</b>	<b>No. of Hours</b>	<b>% of Weightage</b>	<b>Corresponding CO(s)</b>
<b>Section A</b>				
<b>1</b>	<b>Object-Oriented Programming Concepts</b> 1.1 Basic concepts of Object-Oriented Programming 1.2 Procedure Oriented Vs Object Oriented Programming 1.3 Benefits of OOP 1.4 Basics of C++ 1.4.1 Data types 1.4.2 Identifiers and constants 1.4.3 Operators, Scope Resolution Operator 1.4.4 Expressions 1.4.5 Control Statements and Iteration	6	20%	<b>CO1</b>
<b>2</b>	<b>Class and Object</b> 2.1 Access Modifiers 2.2 Declaring simple class, member variables and member functions. 2.3 Inline function 2.4 Concepts of Data hiding, abstraction and encapsulation 2.5 Constructors and Destructors	6	20%	<b>CO2</b>
<b>3</b>	<b>Inheritance</b> 3.1 Concept of Inheritance 3.2 Types of inheritance:  Single, Multiple, Multilevel, Hierarchical, and Hybrid inheritance	3	10%	<b>CO3</b>
<b>Section B</b>				
<b>4</b>	<b>Polymorphism</b> 4.1 Concepts of Polymorphism 4.2 Types of Polymorphism 4.3 Concepts of Overloading and Overriding 4.4 Concepts of Friend Function 4.5 Concepts of virtual function and pure virtual function	6	20%	<b>CO4</b>

<b>5</b>	<b>Exception Handling</b> 5.1 Concept of exception handling 5.2 Try-catch-throw 5.3 Multiple catch 5.4 User-Defined Exceptions	3	10%	<b>CO5</b>
<b>6</b>	<b>Templates and STL</b> 6.1 Class Templates 6.2 Function Templates 6.3 Overloading of Template Functions 6.4 STL: Introduction 6.4.1 Components of STL 6.4.2 Containers 6.4.3 Application of Container Classes	6	20%	<b>CO6</b>
	Total	<b>30</b>	<b>100</b>	

**Course Outcome:**

After Completion of the Course, the Student will able to:

No	Course Outcomes	Bloom's Taxonomy Alignment
01	Explain the fundamental concepts of Object-Oriented Programming and C++.	U
02	Describe the structure and use of classes and objects.	A
03	Apply the principles of inheritance to develop modular programs.	A
04	Implement polymorphism concepts using C++.	A
05	Use exception handling techniques to manage runtime errors.	U
06	Utilize templates and STL components for generic programming.	A

**Suggested Specification Table with Marks (Theory):**

Distribution of Theory Marks (%)					
R Level	U Level	A Level	N Level	E Level	C Level
30	40	30	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

**References/Suggested Learning Resources:**

**(a) Text Books:**

1. Lippman, S. B., Lajoie, J. and Moo, B. E. (2024). *C++ Primer*. 6th edn. Pearson Education.
2. Balagurusamy, E. (2023). *Object Oriented Programming with C++*. 8th edn. McGraw-Hill Education.
3. Schildt, H. (2022). *C++: The Complete Reference*. 5th edn. McGraw-Hill Education.

**(b) Reference Books:**

1. Stroustrup, B. (2022). *The C++ Programming Language*. 4th edn. Addison-Wesley.
2. Josuttis, N. M. (2021). *The C++ Standard Library*. 2nd edn. Addison-Wesley.
3. Meyers, S. (2014). *Effective Modern C++*. O'Reilly Media.
4. Gaddis, T. (2023). *Starting Out with C++*. 9th edn. Pearson Education.

**Suggested Course Practical List:**

Sr. No.	Name of Practical
1.	Write a C++ program to display student details.
2.	Write a C++ program to Calculate Fahrenheit to Celsius.
3.	C++ Program to Make a Simple Calculator to Add, Subtract, Multiply or Divide Using switch...case
4.	C++ programs that demonstrate the concept of constructors.
5.	Create a class <b>product</b> with the following data members pid, price, qty, total_price Write member functions for each of the following a. To get the data b. To display the data c. To calculate the total price of the product
6.	C++ program to illustrate the implementation of Single Inheritance.
7.	C++ program to illustrate the implementation of Multiple Inheritance.
8.	C++ program to illustrate the implementation of Hybrid Inheritance.
9.	Write a C++ program for function overriding.
10.	Write a C++ program to find volume of cube, cylinder, sphere by function overloading.
11.	Write a C++ program to swap private data members of classes named as class1, class2 using friend function.
12.	C++ program to illustrate concept of Virtual Functions.
13.	Write a C++ program to implement the exception handling with multiple catch statements.
14.	Write a C++ program to swap two numbers using template function.
15.	Write a C++ program to sum array using template function.

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