



Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)



Second Year (Semester-IV) B. Tech. Information Technology

BIT32421:-Programming in Modern C++

Teaching Scheme		Examination Scheme	
Theory	3 Hrs/week	CT-I	15 Marks
Tutorial	-	CT-II	15 Marks
Total Credits	3	CA	10 Marks
		ESE	60 Marks
		Total	100 Marks
		Duration of ESE: 3Hrs	

Course Objectives:

1. **To Illustrate** and use fundamental C++ syntax and control flow structures.
2. **To Understand** and use references to pass variables to functions efficiently.
3. **To Implement** object-oriented programming concepts including classes, inheritance, and polymorphism.
4. **To analyze** virtual functions to achieve runtime polymorphism in object-oriented applications.
5. **To Utilize** modern C++ features such as smart pointers, move semantics, and lambda expressions.

Course Contents

Unit I	C++ Fundamentals & Control Flow: Structure of C++ program, Basic syntax, data types, variables, Input/Output (cin, cout), Operators: arithmetic, relational, logical, assignment, increment/decrement, Decision-making statements: if, if-else, nested if, else-if ladder, switch, Looping statements: for, while, do-while
Unit II	Functions, Arrays & Memory Management: Functions: declaration, definition, scope, Function overloading, Call by value and call by reference, Arrays (1D, 2D) and basic string handling, Pointers: declaration, initialization, dereferencing, References, Dynamic memory allocation (new, delete)
Unit III	Object-Oriented Programming (OOP): Classes and objects, Access specifiers: public, private, protected, Encapsulation and data hiding, Constructors: default and parameterized, Destructors, this pointer
Unit IV	Inheritance & Polymorphism: Inheritance: single and multiple, Base and derived classes, Advantages: code reuse, modularity, maintainability, Polymorphism concepts, Function overloading, Operator overloading, Virtual functions (runtime polymorphism)

Unit V	Advanced C++ Features: Type casting in C++: static_cast, dynamic_cast, const_cast, reinterpret_cast, Exception handling (try, catch, throw), Introduction to STL (containers like vector, basic operations), Streams (basic file I/O), Overview of modern C++ concepts
Text Books	
T.1	C++ Primer (5th Edition) by Stanley B. Lippman, Josée Lajoie, Barbara Moo.
T.2	C++ How to Program by Paul Deitel & Harvey Deitel.
Reference Books	
R.1	Effective Modern C++ by Scott Meyers.
R.2	The C++ Programming Language 4th Edition by Bjarne Stroustrup
Useful Links	
1	https://nptel.ac.in/courses/106105234

	Course Outcomes	CL	Class Sessions
BIT32421.1	Illustrate basic C++ syntax, data types, operators, and control flow statements.	2	(9)
BIT32421.2	Classify functions, pointers, references, and dynamic memory management in C++ programs.	2	(9)
BIT32421.3	Express object-oriented concepts using classes, objects, constructors, and encapsulation.	2	(9)
BIT32421.4	Analyze and implement inheritance and polymorphism in C++ applications.	4	(9)
BIT32421.5	Apply modern C++ features and exception handling for error management.	3	(9)