INTRODUCTION TO C++
(OPEN ELECTIVE for Non-CSE/IT)

Course Code: 19IT11P2

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Prerequisites: Problem Solving using C

Course Outcomes: At the end of the Course the student shall be able to
CO1: Apply the concepts of operators, Inline functions and function overloading to solve problems.
CO2: Analyze software problem in terms of objects and classes.
CO3: Classify inheritance types and illustrate code reusability in solving problems.
CO4: Develop programs to solve real time problems using virtual functions and generic templates.
CO5: Integrate files in programming development.

UNIT-I **12 Lectures**

Introduction To C++:
Structure of C++ program, tokens, keywords, identifiers, basic data types, derived data types, constants, dynamic initialization, reference variables, scope resolution operator, type modifiers, type casting, operators and control statements, input and output statements in C++, Function prototyping and components, Passing parameters: Call by reference, Return by reference, Inline function, Default arguments, Overloaded function.

Learning Outcomes: At the end of the module, students will be able to
1. Describe the basic data types, operators and control statements (L2)
2. Describe the syntax and semantics of the C++ programming language. (L2)
3. Solve problems by writing programs using inline functions for efficiency and performance. (L3)

UNIT-II **10 Lectures**

Principles Of OOP:
Object Oriented Technology- Basic concepts and benefits of OOP.
Classes And Objects:
Class specification, Member functions, access qualifiers, static data members and member functions. Instance creation - Array of objects - Dynamic objects - Static Objects – Objects as arguments -Returning objects
Constructors And Destructors:
Constructors- Parameterized constructors, Overloaded Constructors, Constructors with default arguments, copy constructors, Destructors.

Learning Outcomes: At the end of the module, students will be able to
1. Describe object oriented programming concepts. (L2)
2. Demonstrate the usage of copy constructors and class member functions.(L3)
3. Illustrate Overloading of constructors in C++. (L4)

UNIT-III **10 Lectures**

Operator Overloading: Operator function-overloading unary and binary operators, overloading the operator using Friend function, Data conversion.
Inheritance: Defining derived classes. Single Inheritance - Protected data with private

inheritance,Types of Inheritance-Multiple Inheritance, Multilevel Inheritance, Hierarchical Inheritance, Hybrid Inheritance, and Multipath Inheritance. Constructors in derived and base Class,

Learning Outcomes: At the end of the module, students will be able to
1. Explain how the operator can be overloaded. (L2)
2. Describe how inheritance promotes code reuse in C++ with example programs. (L2)
3. Classify types of inheritances and select suitable type in solving problem.(L4)

UNIT-IV **10 Lectures**

Virtual functions and polymorphism:

Virtual Functions, Dynamic polymorphism, Virtual constructors &destructors, Abstract classes.

Templates In C++:

Generic Programming with Templates-Introduction, function templates, overloaded function templates, function templates with user defined types, class templates, class templates and Inheritance.

Learning Outcomes: At the end of the module, students will be able to
1. Illustrate the use of function templates. (L4)
2. Demonstrate the use of class templates. (L2)
3. Develop programs which illustrate how virtual functions can be used for implementation of dynamic binding. (L6)

UNIT-V **8 Lectures**

Files:

File stream classes, file open and close sequential input and output functions, file pointer and manipulators-file pointer handling functions.

Learning Outcomes: At the end of the module, students will be able to
1. Describe the storage of the data through files. (L2)
2. Develop programs which illustrate the use of predefined file I/O functions to perform operations on files. (L2)
3. Develop programs which illustrate the use of file pointer handling functions. (L6)

Text Books:
1. Herbert Schildt , "*C++: The Complete Reference*", 4th Edition, McGraw Hill Education, 2017.
2. John R Hubbard, Programming with C++, Third edition, McGraw Hill Education, 2017

References:
1. Ashok N Kamthane, "*Programming in C++*", 2nd Edition, Pearson Education India, 2013.
2. BjarneStroustrup, "*The C++ Programming Language*", 1e: third edition, Pearson Education India, 2002.
3. E. Balagurusamy, "*Object Oriented Programming with C++*", Seventh Edition, McGraw Hill Education, 2017.
4. Reema Thareja, "*Object Oriented Programming with C++".*Revised First Edition , Oxford Higher Education, 2018.

Web References:
1. https://nptel.ac.in/courses/106/105/106105151/
2. https://nptel.ac.in/courses/106/101/106101208/