Name of the Programme: MSc Integrated
Course Code: IMC- 502
Title of the Course: Programming in C++
Number of Credits: 6(4L-0T-2P)
Effective from AY: 2022-23

Prerequisites for the course:	Nil	
Objective:	**The subject aims to provide the student with:** 1. An understanding of the concept of object oriented programming. 2. An understanding of the concepts of data hiding, data abstraction, polymorphism inheritance and exception handling. 3. Ability to understand the generic principles of object oriented programming using "C++". 4. An understanding of the use of templates in "C++". 5. An ability to plan, design, execute and document sophisticated object oriented programs to handle different computing problems.	
Content Theory:	Programming paradigm; procedural to object oriented, Basic concepts of Object-Oriented Programming: Objects, Classes, Data Abstraction and Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing. Benefits of Object-Oriented Programming. Structure of a C++ program, Data types, Constants, tokens, expressions, control structures, functions, recursion, arrays.	12 hours
	Classes and Objects, Constructors and destructors, Friend functions and friend classes, Concepts of polymorphism: Function overloading, operator overloading. Overloading types, & rules, explicit & implicit type conversion operators, Pointers.	12 hours
	Inheritance: Introduction, Single, Multilevel, Multiple, Hierarchical, Hybrid. Virtual Base Class, Abstract classes. 'this' pointer, pointers to deriver classes Virtual functions, pure virtual functions. I/O streams and classes, managing output with Manipulators, Classes for file streams, file I/O operations and functions. String processing.	12 hours
	Functions Templates and Class Templates, Exception handling: Basics of Exception Handling, Exception Handling mechanism, Throwing Mechanism, Throwing Mechanism, Catching mechanism, Re-throwing mechanism. Introduction to the Standard Template Library: Components of STL, Containers and Adapter: stack, queue, priority queue adapter algorithms, Iterators, Applications.	12 hours

Content Practical:	**Suggested Lab Assignments - with minimum duration of 4 hrs for each assignment.** 1. Assignment on Basics of C++ (input /output / control statements / array). 2. Assignment on Classes and objects. 3. Assignment on Function Overloading. 4. Assignment on Operator Overloading. 5. Assignment on Constructors and Destructors. 6. Assignment on Inheritance and Polymorphism. 7. Assignment on Console I/O and Files. 8. Assignment on Templates. 9. Assignment on Exception Handling. 10. Assignment on Standard Template Library. 11. Mini project using OOP paradigm (minimum 8 hours)	10 * 4 = 40 hours(for assignments) + 8 hours (for mini project) = 48 hours

Pedagogy:	Lectures/tutorials/practical assignments/self-study
References/Readings	1. C++ : from control structures through objects / Tony Gaddis. 2. Timothy Budd, —An Introduction to Object Oriented Programming, Pearson Education, 3rd Edition 3. Paul Deitel and HarreyDietel; C++, How to Program; seventh edition. 4. E Balaguruswamy; Object oriented programming with C++; Tata McGraw Hill.6th edition.
Course Outcomes	1. The various programming constructs in C++ and their usage 2. To write modular and readable code using C++ 3. To trace the execution of code fragments. 4. Learner will appreciate mapping real-world scenarios in the object-oriented world, understand object-oriented principles and design object oriented software