Semester	2
Program	B.Sc. Computer Science (Hons.)
Course	OBJECT ORIENTED PROGRAMMING CONCEPTS
Paper Code	C1CS230122T C1CS230122P
No. of Credits	4
Hours / week	Theory: 3, Practical: 2
Category: Core/MDC/SEC/VAC	Core
Theory/ Practical / Composite	Composite
Number of Modules	One
Course Overview: This is an introductory course on the principles and practices of a programming paradigm called Object-Oriented Programming (OOP) with a comparative study with Procedure Oriented Programming approach. Students are expected to learn how to design, implement and maintain software systems using OOP concepts with real world modeling using objects. The course is taught using C++ language.	
Course Outcomes	**CO1.** Explain fundamental concepts and characteristics of Object-Oriented Programming and compare them with procedural programming **CO2.** Implement classes, objects, constructors, destructors, memory management and static members **CO3.** Apply core OOP principles such as encapsulation, abstraction, polymorphism and inheritance in the design of a program **CO4.** Use OOP features such as friend functions, friend classes **CO5.** Use advanced features like template and exception handling

Syllabus

Unit/Module	Content	Hours	CO Mapping	Cognitive Level
1	Concepts and Characteristics of OOPS, Differences with Procedural Programming	2	CO1	K2, K4 (Understand, Analyze)
2	Encapsulation, Abstraction, Polymorphism, Classes, Messages Association, Interfaces	7	CO1, CO3	K2, K3, K4, K6 (Understand, Apply, Analyze, Create)

3	Constructor, Destructor, Copy constructor, Structures and classes objects and memory static class data	4	CO2	K3, K4 (Apply, Analyze)
4	Friend function, friend class, 'this' pointer	4	CO4	K3, K4 (Apply, Analyze)
5	Function overloading	2	CO4	K3, K4 (Apply, Analyze)
6	Overloading unary operators, Overloading binary operators, data conversion	5	CO4	K3, K4 (Apply, Analyze)
7	Concept of inheritance, Base and Derived classes, Types of Inheritance, Aggregation	8	CO3	K3, K6 (Apply, Create)
8	Dynamic Polymorphism	3	CO3	K3, K6 (Apply, Create)
9	Function templates, Class templates	2	CO5	K3, K6 (Apply, Create)
10	Exception Handling	2	CO5	K3, K6 (Apply, Create)

Text Books

1. Object Oriented Programming in C++ by Robert Lafore, Sams Publishing
2. C++ The Complete Reference by Herbert Schildt, McGraw Hill Publication
3. Object Oriented Programming with C++ by Saurav Sahay, Oxford University Press
4. Object Oriented Programming and C++ by R. Rajaram, New Age International Publishers
5. Object Oriented Programming with C++ by E. Balaguruswamy, McGraw Hill Publication

Suggested Readings

1. The C++ Programming Language by B. Stroustrup, Addison-Wesley

Web Resources

1. NPTEL course on Programming in C++ by Dr. Partha Pratim Das, IIT Khargpur; course link: https://youtu.be/LZFoktwiars

Evaluation	Theory CIA: 12	Practical CA: 38

	Attendance: 3 Semester Exam: 45	Attendance: 2
Paper Structure for Theory Semester Exam Module: Answer 3 out of 5 of 15 marks each		

Course outcomes (COs) and Cognitive Level Mapping

COs	CO Description	Cognitive Levels
CO1	Explain fundamental concepts and characteristics of Object-Oriented Programming and compare them with procedural programming	K2, K4 (Understand, Analyze)
CO2	Implement classes, objects, constructors, destructors, memory management and static members	K3, K4 (Apply, Analyze)
CO3	Apply core OOP principles such as encapsulation, abstraction, polymorphism and inheritance in the design of a program	K3, K6 (Apply, Create)
CO4	Use OOP features such as friend functions, friend classes	K3, K4 (Apply, Analyze)
CO5	Use advanced features like template and exception handling	K3, K6 (Apply, Create)