

<b>Branch Name:</b>	<b>IMCA</b>
<b>Program Code:</b>	<b>CS301</b>
<b>Course Title:</b>	<b>Object Oriented Programming with C++</b>
<b>Course Code:</b>	<b>1CS3010301T</b>
<b>Pre-requisite Course:</b>	<b>Basic Knowledge of Procedural Programming</b>

**Course Objectives:**

1. This course is intended to make the students aware of Object Oriented Programming (OOP) concepts.
2. Students are expected to learn various terminologies related to OOP such as class, objects, inheritance, polymorphism, encapsulation, abstraction etc.
3. These objectives provide a comprehensive overview of what students should learn in an Object-Oriented Programming with C++ course, covering both theoretical concepts and practical implementation.

**Teaching and Examination Scheme:**

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				Total (Marks)
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
4	-	-	4	60	40	-	-	100

**Course Contents:**

Unit No	Topic	Total Hours	Weightage (%)
1	<p><b>Basic Concepts of Objects Oriented Programming:</b> Fundamentals of Programming Concept of Procedural and objects oriented programming .Basic Concepts of OOP.</p> <p><b>Introduction to C++:</b> History of C++,Structure of C++ Program, Output Operator (&lt;&lt;), Input Operator (&gt;&gt;), Basic Data types, Symbolic Constants, Reference Variable, Operator, Scope Resolution Operator, Manipulators. Control statements, Looping statements.</p> <p><b>Functions in C++:</b> Inline Function, Default Argument Function, Function Overloading.</p>	5	10
2	<p><b>Classes and Objects:</b> Specifying a Class, Creating Objects, Accessing Class Members, Defining Member Functions, Nesting of Member Function, Private Member Function and Friend Function.</p> <p><b>Static Members:</b> Static Data Member, Static Member Function, array of object.</p>	7	15
3	<p><b>Constructors and Destructors:</b> Introduction, Types of Constructor (Default Constructor, Parameterized Constructor), Multiple Constructors, constructors with default argument, Copy constructor, Destructors.</p>	12	25
4	<p><b>Operator Overloading:</b> Defining Operator overloading, Unary operator overloading, Binary operator overloading, Manipulates string using operator overloading.</p> <p><b>Type Conversions:</b> basic to class, class to basic, class to class.</p>	12	25

5	<b>Inheritance/Extending Classes:</b> Introduction, Defining Derived Classes. <b>Types of Inheritance :</b> Single Inheritance, Multilevel Inheritance, Multiple Inheritance ,Hierarchical Inheritance Hybrid Inheritance, ,Virtual base class, Abstract class <b>Pointers:</b> pointer to object, this pointer, virtual function and pure virtual function.	12	25
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**Text Books:**

1. ObjectOrientedProgrammingWithC++,ByEBalagurusamy,TataMcGraw-Hill.
2. ObjectOrientedProgrammingandC++,ByRajaram,NewAgeInternationalPublishers.

**Reference Books:**

1. TeachYourselfC++,ByHerbertSchildt,TataMcGraw-Hill.
2. LetUsC++,ByYashavantKanetkar,BPBPublications.

**List of Open-Source Software/learning website:**

- GeeksforGeeks C++ Programming
- W3schools.com /cpp
- tutorialspoint.com/cpp
- javatpoint.com/cpp
- programiz.com/cpp

**Course Learning Outcomes (CLO): On completion of this course, the students will be able to:**

CLO	Description	Bloom's Taxonomy Level
CLO1	<b>Understanding OOP Concepts:</b> <ul style="list-style-type: none"> <li>• Define and explain the fundamental concepts of Object-Oriented Programming, including encapsulation, inheritance, and polymorphism etc.</li> <li>• Identify and understand the importance of objects, classes, and methods in OOP.</li> </ul>	<ol style="list-style-type: none"> <li>1. Remember</li> <li>2. understand</li> </ol>
CLO2	<b>C++ Syntax and Language Features:</b> <ul style="list-style-type: none"> <li>• Demonstrate proficiency in C++ syntax and language features relevant to OOP.</li> <li>• Use data types, operators, control structures, and functions in the context of object-oriented programming.</li> </ul>	<ol style="list-style-type: none"> <li>1. Remember</li> <li>2. Understand</li> <li>3. Apply</li> </ol>
CLO3	<b>Classes and Objects:</b> <ul style="list-style-type: none"> <li>• Design and implement classes and objects in C++.</li> <li>• Understand the concept of constructors and destructors, and their role in object initialization and cleanup.</li> </ul>	<ol style="list-style-type: none"> <li>1. Remember</li> <li>2. Understand</li> <li>3. Apply</li> <li>4. create</li> </ol>
CLO4	<b>Operator Overloading:</b> <ul style="list-style-type: none"> <li>• Overload operators to provide custom behavior for user-defined types.</li> <li>• Recognize situations where operator overloading is beneficial.</li> </ul>	<ol style="list-style-type: none"> <li>1. Remember</li> <li>2. Understand</li> <li>3. Apply</li> <li>4. Create</li> <li>5. Evaluate</li> </ol>
CLO5	<b>Inheritance:</b> <ul style="list-style-type: none"> <li>• Create and use inheritance in C++ to establish relationships between classes.</li> <li>• Understand the concepts of base classes and derived classes</li> </ul>	<ol style="list-style-type: none"> <li>1. Understand</li> <li>2. Apply</li> <li>3. Create</li> <li>4. Evaluate</li> </ol>

CLO6	<b>Pointer and Object Relationships:</b> <ul style="list-style-type: none"> <li>Apply pointers in the context of object-oriented programming.</li> <li>Understand how pointers can be used to access and modify class members.</li> <li>Understand and apply virtual functions and pure virtual functions.</li> </ul>	<ol style="list-style-type: none"> <li>Understand</li> <li>Apply</li> <li>Analyze</li> <li>Create</li> <li>Evaluate</li> </ol>
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### Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CLO1	H	-	-	L	-	-	L-	-	L	M	-	-	M	L
CLO2	M	M	-	L	-	M	-	L	-	L	-	L	H	L
CLO3	M	-	M	-	L	-	H	-	M	-	H	-	M	L
CLO4	M	M	-	M		L	-	M	-	M	-	M	-	M
CLO5	H	-	L	-	M	-	M	-	H	-	L	-	L	M
CLO6	M	M	-	-	L-	H	-	M	-	L-	M-	L	-	M

**H: High, M: Medium, L: Low**