

DEPARTMENT OF INFORMATION TECHNOLOGY				CLASS: I B.Sc. Information Technology				
Sem.	Course Type	Course Code	Course Title	Credits	Contact Hours/week	CIA	Ext	Total
II	Major Core – 3	20U2FMC3	Object Oriented Programming with C++	2	3	25	75	100

Course Objective:

1. To introduce the C++ programming and its use in Object oriented environment, learn how to write Inline functions for efficiency & performance.
2. To learn how to implement types of Constructors and class member functions.
3. To demonstrate types of inheritance and applied in various applications.
4. To create & process data in files using file I/O functions.
5. To learn how to design & implement generic classes with C++ templates.

Unit-I: Principles of Object-Oriented Programming

Basic Concepts of Object-Oriented Programming – Benefits of OOP – Structure of a C++ Program – Tokens – Operators in C++ – inline functions – Function overloading –classes and objects: specifying a class – Defining member functions – Making an outside function inline – Friendly functions –Object as function arguments – Returning objects.

Unit-II: Constructor

Constructors – Parameterized constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Destructors. Operator overloading: Defining operator overloading – Overloading unary operators – Overloading binary operators – Overloading binary operators using friend function – Rules for overloading operators

Unit-III: Inheritance

Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - Virtual base classes – Constructors in derived class – Member classes: Nesting of classes.

Unit-IV: I/O Operations and Files

C++ Stream classes – Unformatted I/O operations – Managing output with manipulators. Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function – File modes, File pointers and their manipulation – Sequential input and output operations – Command-line arguments.

Unit-V: Templates and Exception Handling

Class Templates - Class Templates with Multiple Parameters–Function Templates-Basics of Exception Handling– Exception Handling Mechanism.

Books for Study

1. E. Balagurusamy, Object Oriented Programming with C++, Sixth Edition-2013, McGraw Hill Education (India) Private Limited, New Delhi.

Chapters:

Unit I – 1.5,1.6,2.6,3.2,3.14,4.6,4.10,5.3,5.4,5.6,5.14-5.16

- Unit II – 6.2 to 6.7, 6.11, 7.2 – 7.5, 7.8
 Unit III – 8.2 – 8.9, 8.11-8.12
 Unit IV – 10.3, 10.4, 10.6, 11.2-11.7, 11.10
 Unit V – 12.2, 12.3, 12.4, 13.2, 13.3

Books for Reference

1. Herbert Schildt, C++ - The Complete Reference, 1998, TMH
2. Paul Deitel, Harvey Deitel, C++ How to Program, Ninth edition (2014) PHI
3. Ashok N. Kamthane, Object Oriented Prog., with ANSI & Turbo C ++, Pearson Education
4. Poornachandra Sarang, Object-Oriented Programming With C++ , 2nd Edition, PHI

Web Resources

1. <https://www.learncpp.com/>
2. <https://hackr.io/tutorials/learn-c-plus-plus>
3. <https://www.programiz.com/cpp-programming/examples>

Pedagogy

Chalk and talk , Materials, PPT, Assignment , Seminar , Problem solving , Group discussion , Interaction, and Demonstration.

Course Learning Outcomes:

On the successful completion of the course, students will be able to

CLO No.	Course Learning Outcomes	K - Level
CLO1	Explain keywords, tokens, variables constants and datatypes. Apply different types of operators, looping concepts and conditional statements for developing the code. Describe the concepts of oops and its benefits.	Up To K3
CLO2	Develop the constructor and destructor with their types in user defined Functions	Up To K4
CLO3	Illustrate the concepts of inheritance and its types.	Up To K3
CLO4	Discuss various IO Formatting.	Up To K3
CLO5	Utilize Exception for handling Run-Time errors.	Up To K4

Mapping of CLOs with POs:

CLOs/POs	PO1	PO2	PO3	PO4	PO5
CLO1	3	2	2	N/A	1
CLO2	2	1	N/A	N/A	1
CLO3	2	3	N/A	N/A	2
CLO4	3	3	N/A	N/A	3
CLO5	2	3	N/A	N/A	3

3- Advanced Application; 2- Intermediate Level; 1- Basic Level; N/A- Not Applicable

Mapping of CLOs with PSOs:

CLOs/PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	3	N/A	3	N/A	2	2
CLO2	3	3	2	2	1	N/A
CLO3	3	3	2	N/A	3	3
CLO4	3	3	3	N/A	3	3
CLO5	2	2	3	2	3	2

3- Advanced Application; 2- Intermediate Level; 1- Basic Level; N/A- Not Applicable

Learning Outcome Based Education & Assessment (LOBE)
Blue Print for Summative Examination - Object Oriented Programming with C++
Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Sl.No	CLOs	K – Level	Section A		Section B		Section C (Either / or Choice)	Section D (Open Choice)
			MCQs		Short Answer			
			No.of Questions	K - Level	No.of Questions	K - Level		
1	CLO 1	Up to K 2	2	K1 & K1	1	K2	2 (K1 & K1)	1(K2)
2	CLO 2	Up to K 4	2	K2 & K2	1	K2	2 (K4 & K4)	1(K2)
3	CLO 3	Up to K 3	2	K1 & K1	1	K3	2 (K3& K3)	1(K3)
4	CLO 4	Up to K 3	2	K2 & K2	1	K3	2 (K3 & K3)	1(K3)
5	CLO 5	Up to K 4	2	K4 & K4	1	K3	2 (K1 & K1)	1(K4)
No. of Questions to be asked			10		5		10	5
No. of Questions to be answered			10		5		5	3
Marks for each Question			1		2		5	10
Total Marks for each section			10		10		25	30

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 – Examining analyzing , presentation and make inferences with evidences

Distribution of Section – wise Marks with K Levels

K - Level	Section A (No Choice)	Section B (No Choice)	Section C (Either / or Choice)	Section D (Open Choice)	Total Marks	% of Marks without choice	Consolidated
K1	4	-	20	-	24	20	43 %
K2	4	4	-	20	28	23.3	
K3	-	6	20	20	46	38.3	39%
K4	2	-	10	10	22	18.3	18%
Total Marks	10	10	50	50	120	100.00	100 %

Lesson Plan:

Units	Topics to be covered	Hours	Mode
1	Basic Concepts of OOPs-Benefits of OOPs-Structure of a C++ Program - Tokens – Operators in C++ – inline functions – Function overloading	4	Lecture
	Specifying a Class–Defining member functions–Making an outside function inline–Static data member–Static member function–friendly function–Object as function arguments–Returning Objects	5	Lecture
2	Constructor and destructor-Parameterized Constructor –Multiple constructors in a class–Constructors with default arguments – Dynamic initialization of objects –Copy Constructor–Destructor	4	Lecture
	Defining operator overloading – Overloading unary operators – Overloading binary operators – Overloading binary operators using friend function–Rules for overloading operators.	5	Lecture
3	Defining Derived Class - Single inheritance – Making a private member inheritable – Multilevel inheritance –Multiple inheritance – hierarchical inheritance– hybrid inheritance–virtual base classes – Constructors in derived class– Member classes: Nesting of classes	9	Lecture
4	C++ Streams classes –Unformatted I/O operations – Managing output with manipulators– Classes for file stream operations – Opening and Closing a file– Detecting End -of -file–More about open () file modes	5	Lecture
	File pointers and their Manipulations– Sequential Input and Output Operations– Command line arguments.	4	Lecture
5	Class templates– Class templates with multiple parameters Function templates– Basics of Exception handling– Exception handling mechanism.	4 5	Lecture, GD Lecture, Assignment

Name of the Course Designers:

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