



# राष्ट्रीय प्रौद्योगिकी संस्थान जमशेदपुर NATIONAL INSTITUTE OF TECHNOLOGY JAMSHEDPUR

(An Institution of National Importance under MHRD, Government of India)

## Department of Computer Applications

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**Spring Semester 2019-20**

### Course File

Course Code	: CA3201
Course Title	: Object Oriented Programming using C++
Batch	: MCA II Semester
Faculty In-charge	: Dr. Alekha Kumar Mishra
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**Course Description:** This course is to provide students an in-depth knowledge of object oriented programming (OOP). The transition from structured programming to OOP by highlighting the concepts viz. encapsulation, inheritance and polymorphism. Students will be given good exposure to the concept of class and data binding. The programming concepts will be implemented using C++ language.

### Course Objectives:

- i) To understanding the principles of object oriented programming.
- ii) To introduce the object oriented way of problem solving.
- iii) To gain familiarity with the syntax, class hierarchy, environment and simple application construction for an object-oriented programming language.

### Course Outcomes:

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

- i) Acquire a full Object Oriented perspective for analysing, defining, implementing and evaluating real world problems.
- ii) Apply and use the object oriented concepts/ techniques, tools in modelling computer based/ software system.

### Students Outcomes:

- i) An ability to analyse a problem, identify and define the computing requirements appropriate to its solution.
- ii) An ability to design, implement and evaluate a system / computer based system process, component or program to meet desired needs
- iii) Design and conduct experiments as well as analyse and interpret data.
- iv) An ability to use current techniques, skills and tools necessary for computing and engineering practice.
- v) An ability to apply design and development principles in the construction of software systems.

### Text / Reference Books:

- 1) Deitel & Deitel : “C++ : How to Program”, 3rd Ed., Pearson Education Pvt. Ltd.
- 2) Schildt : “C++ : The Complete Reference”, 3rd Ed., Tata McGraw Hill Publication.
- 3) Object Oriented Programming with C++ - E. Balagurusamy, McGraw-Hill Education (India)
- 4) Lafore R., “Object Oriented Programming in Turbo C++”, Galgotia Publication, New Delhi, 1995.

### Course Plan:

Lecture No	Learning Objectives	Topics to be covered	Refer to Chapters (References)
1-4	Recap of structured programming language	Review of C	
5	Introduction	Introduction to Object Oriented Paradigm: Overview Structured programming vs Object Oriented Programming	T2 – Chapter 1
6	OOPS Concepts	Benefits of OOP, Object Modelling- Association, Aggregation and Generalization.	T1 – Chapter 2,3 T2 – Chapter 2,3
7	Get familiarity with the OOPS environment	The Main Function, Function Prototyping, Passing arguments to a function	
8	Functions	Inline Functions, Default Arguments	T1 – Chapter 6
9		Function Overloading	T2 – Chapter 4
10	Class, Object and related concepts	Storage Classes	T1 – Chapter 9,10
11		Class Declaration, Defining Member Functions	T2 – Chapter 5
12		Nesting of Member Functions, Private Member Functions	
13		Arrays within a class, Creating Objects	
14		Arrays of Objects	
15	How to pass object as parameters?	Objects as Function Arguments	T2 – Chapter 5
16	Pointers to members	Pointers to Members	
17	Comparative study between structures and classes	Difference between Structures and Classes	T1 – Chapter 10 T2 – Chapter 6
18	Constructors and various types of constructors	Constructors, Constructors with arguments	T1 – Chapter 9 T2 – Chapter 6
19		Multiple Constructors, Constructors with Default Arguments	
20		Dynamic Initialization of Objects	
21		Copy Constructor, Destructors Friend functions and classes	
22		Overloading	Defining Operator Overloading, Overloading of Unary and Binary Operators
23		Manipulation of Strings Using Operators	
24		Rules for Over loading Operators, Type	

		Conversions	
25	Inheritance	Introduction to inheritance, Base and Derived Classes	T1 – Chapter 12 T2 – Chapter 8
26		Different forms of Inheritance	
27		Constructors in inheritance	
28	Polymorphism	Virtual Base Classes, Abstract Classes	T1 – Chapter 13 T2 – Chapter 9
29		Overriding Base Class Members	
30		Introduction to Virtual Functions and Polymorphism	
31-32		Virtual Functions, Pure Virtual Functions	
33	This pointer	Pointers to Derived Classes	T2 – Chapter 9
34		Pointers to objects, this Pointer	
35	Streams	Files and Streams: Stream Classes	T2 – Chapter 10
36		Opening and Closing of files, File of arrays	
37		File of structures, File pointers and their manipulations	
38		Error handling during file operations	
39		Command Line arguments	
40-42	Templates	Class Templates and Function Templates	T2 – Chapter 12 T1 – Chapter 14
43		Member function templates	
44	Exception Handling	Concepts of Exception Handling	T2 – Chapter 13
45		Different types of exception	
46		Throwing exception from a function	
47		Multiple Catch statements	
48-50		Revision	

### Evaluation Scheme:

S.No.	Evaluation Component	Weightage	Nature of Component
1	Mid-term Examination	30%	Closed book
2	End-term Examination	50%	Closed book
3	Teacher's Assessment	20%	Assignment(s) , Programming/ Development Tasks & Attendance.

**Consultation Hours:** Monday 2 PM - 4 PM and Thursday 1 PM to 3 PM

**Dr. Alekha Kumar Mishra.**