***Chandigarh University***

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| ***20CST151*** | ***Object Oriented Programming Using C++*** | ***L*** | ***T*** | ***P*** | ***S*** | ***C*** | ***CH*** |
| *Version 1.00* | | *0* | *2* | *0* | *0* | *2* |  |
| *Pre-requisites/ Exposure* | *Basic knowledge of Computer Programming* | | | | | | |
| *Co-requisites* |  | | | | | | |

# COURSE OBJECTIVES

1. *To enable the students to understand various stages and constructs of C++ programming language and relate them to engineering programming problems.*
2. *To improve their ability to analyze and address variety of problems in programming domains.*

# COURSE OUTCOMES

After studying this course student will be able to

1. *provide the environment that allows students to understand object-oriented programming Concepts.*
2. *demonstrate basic experimental skills for differentiating between object-oriented and procedural programming paradigms and the advantages of object-oriented programs.*
3. *demonstrate their coding skill on complex programming concepts and use it for generating solutions for engineering and mathematical problems.*
4. *develop skills to understand the application of classes, objects, constructors, destructors, inheritance, operator overloading and polymorphism, pointers, virtual functions, exception handling, file operations and handling.*

***COURSE DESCRIPTION***

The course begins with the introduction to features of object-oriented programming and its applications in numerous fields. After covering fundamentals, students will learn how to apply the more complex concepts including Inheritance, Polymorphism and File Handling in order to solve the complex real-world problems.

# TEXT BOOKS

**T1** E Balagurusamy., “Object Oriented Programming in C++”, Tata McGraw-Hill.

***T2*** *Robert Lafore, “Object Oriented Programming in C++”, Waite Group.*

# REFERENCE BOOKS

**R1** Herbert Schildt , “C++- The Complete Reference”, Tata McGraw-Hill 2003, New Delhi.

**R2** Bjarne Stroustrup: “The C++ Programming Language” (4th Edition). Addison-Wesley.

**R3** Ravichandran , “Programming with C++”,Tata McGraw-Hill Education.

**R4** Joyce M. Farrell,” Object Oriented Programming Using C++”, Learning.

**R5** Programming Languages: Design and Implementation (4th Edition), by Terrence W. Pratt, Marvin V. Zelkowitz, Pearson.

# R6 Programming Language Pragmatics, Third Edition, by Michael L. Scott, Morgan Kaufmann.

***CU Institute of Engineering***

***COURSE CONTENT***

# Unit I: Fundamentals of C++ 10 Contact Hours

***Fundamentals of C++:*** *Features of object-oriented programming, Difference between object oriented and procedure-oriented programming, Difference between structure and class, Data types. Input and output streams (cin, cout), introduction to namespace.*

***Classes and Objects:*** *Specifying a class, creating objects, accessing class members, defining a member function inside and outside class, access specifiers, inline function, static data members & member functions. Objects as function arguments, friend function, returning objects to functions.*

**Constructors and Destructors:** Need for constructors, types of constructors: default, parameterized, copy constructor, order of execution of constructors, destructors and their need.

# Unit II: Inheritance, Polymorphism, Pointers & Virtual Functions 10 Contact Hours

***Inheritance:*** *Defining derived class, modes of inheritance, types of inheritance, ambiguity in inheritance, virtual base class, Function overriding, Member Classes: Nesting of Classes.*

***Polymorphism:*** *Introduction & types of polymorphism, Function overloading, operator overloading, rules for overloading operators, overloading of unary & binary operators, Constructor Overloading.*

***Pointers, Virtual Functions:*** *Declaring & initializing pointers, pointer to objects, this pointer, pointer to derived classes, static and dynamic binding.*

# Unit III: Exception Handling, DMA & Files 10 Contact Hours

**Exception Handling:** Try, Throw, Catch, Throwing an Exception, Catching an Exception.

***Dynamic memory allocation:*** *Dynamic memory allocation using new and delete operator.*

***Files:*** *Introduction to File streams, Hierarchy of file stream classes, File operations, File I/O, File opening Modes, Reading/Writing of files, Random-access to files.*

# Mode of Evaluation: The performance of students is evaluated as follows:

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|  | ***Theory*** | |
| ***Components*** | ***Continuous Internal Assessment (CAE)*** | ***Semester End Examination (SEE)*** |
| ***Marks*** | *40* | *60* |
| ***Total Marks*** | *100* | |

***Relationship between the Course Outcomes (COs) and Program Outcomes (POs)***

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| ***Mapping Between COs and POs*** | | |
| ***SN*** | ***Course Outcome (CO)*** | ***Mapped Programme Outcome (PO)*** |
| *1* | *Provide the environment that allows students to understand object-oriented programming Concepts.* | *1, 2, 5, 8, 12* |
| *2* | *Demonstrate basic experimental skills for differentiating between object-oriented and procedural programming paradigms and the advantages of object-oriented programs.* | *1-3, 5, 8, 11, 12* |
| *3* | *Demonstrate their coding skill on complex programming concepts and use it for generating solutions for engineering and mathematical problems.* | *1-3, 5, 8-12* |
| *4* | *Develop skills to understand the application of classes, objects, constructors, destructors, inheritance, operator overloading and polymorphism, pointers, virtual functions, exception handling, file operations and handling.* | *1-3, 5, 7-12* |

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|  |  | *Engineering Knowledge* | *Problem analysis* | *Design/development of solutions* | *Conduct investigations of complex* | *Modern tool usage* | *The engineer and society* | *Environment and sustainability* | *Ethics* | *Individual or team work* | *Communication* | *Project management and finance* | *Life-long Learning* |
|  |  | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *1*  *0* | *1*  *1* | *12* |

*B.Tech. Computer Science Engineering – Curriculum and Syllabi 20*

***Chandigarh University***

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| ***20CST151*** | ***Object Oriented Programming Using C++*** |  |  |  |  |  |  |  |  |  |  |  |  |

1=addressed to small extent 2= addressed significantly 3=major part of course