UG Programme: B. Tech (Honours) Computer Science and Engineering (Data Science)

Course: OBJECT ORIENTED PROGRAMMING USING JAVA
Regulation: 2021 CBCS

Course Code:	**Semester: III**
Credits: 03	**L: T: P: 3:0:0**
CIE: UE: 50:50	**Maximum Marks:100**
	Contact Hours: 45

Prerequisite: DESIGN AND ANALYSIS OF ALGORITHMS

Course Objectives:

The objective of the course is
1. This course aims at imparting expertise in development of Object Oriented Concepts using JAVA JDK.
2. As part of the course, students will implement GUI applications using JAVA swings and create custom packages and interfaces.

Course Outcomes:

At the end of the course, students will be able to:

Course Outcomes	Description	Bloom's Taxonomy Level
CO1	**Explain** the concepts of Object Oriented programming	Understanding (2)
CO2	**Demonstrate** the identification of classes, objects and members of a class through examples	Applying(3)
CO3	**Use** the concepts of inheritance to achieve reusability and demonstrate exception handling mechanisms with real world examples	Applying(3)
CO4	**Demonstrate** the working of applets to perform different events	Applying(3)
CO5	**Illustrate** with real world examples, the working of Java Swings components	Applying(3)
CO6	**Demonstrate** the working of Java Database Connectivity (JDBC) applications	Applying(3)

Course Contents:

Module -1   **9 hours**

JAVA Basics-1: The History and Evolution of Java: Java and its applications, Byte code, Java Development Kit (JDK), Java Buzzwords, Java Virtual Machine (JVM), The evolution of Java.

An overview of java: Object Oriented Programming, Simple Java Programs, Two control Statements, Lexical Issues.

Data Types, Variables, and Arrays: Java is a strongly typed Language, The primitive types (Integers, Floating Point, Characters, Booleans), A closer Look at literals (integers, Floating point, Boolean, Characters, String), Variables, Type Conversion and Casting, Automatic type Conversions, Arrays.

Operators: Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The assignment operator, the? Operator, Operator Precedence

Module -2   9 hours

Defining your own classes, Objects and Methods: Class Fundamentals, How Objects are Created, Reference Variables and Assignment, Methods, Returning from a Method, Returning Value, Using Parameters, Constructors, Parameterized Constructors, new operator, Overloading Methods and Constructors, controlling access to class members, Call-By-Value and Call-By-Reference, Returning Objects, Recursion, static keyword, Introducing Nested and Inner Classes, Garbage Collection and Finalizers, this Keyword.

Inheritance, Polymorphism, Abstraction: Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Using super to Call Superclass constructors, Using super to Access Superclass Members, Creating a Multilevel Hierarchy, When are Constructors Executed, Superclass References and Subclass Objects, Method Overriding, Overridden Methods support polymorphism, why Overridden Methods, Using Abstract Classes, Using final, The Object Class.

Module -3   9 hours

String Handling: Mutable and Immutable Strings, String class, String Constructors, Operations on strings, StringBuffer class, StringBuffer constructors, Operations on StringBuffer, Programming examples.

Exception Handling: The Exception Hierarchy, Exception Handling Fundamentals, The Consequences of an Uncaught Exception, using Multiple catch clauses, Catching subclass Exceptions, try blocks can be nested, Throwing an Exception, using finally, using throws clause.

Module -4   9 hours

Interfaces: Interface Fundamentals, Creating an Interface, Implementing an Interface, Using Interface References, Implementing Multiple Interfaces, Constants in Interfaces, Interfaces can be extended, Nested Interfaces.

Packages: Package Fundamentals, Packages and Member Access, Importing Packages, Static Import.

Multithreaded Programming: Multithreading fundamentals, Creating threads using Thread Class and Runnable Interface, Creating Multiple Threads, Determining When a Thread Ends, Thread Priorities, Synchronization, using Synchronization Methods, The Synchronized Statement, Thread Communication using notify(), wait() and notify All(), suspending, Resuming and stopping Threads.

Module -5   **9 hours**

Swing Fundamentals: The origin and design philosophy of swing, components and containers, layout managers, simple swing Example, event handling, exploring Swing Controls.

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; Result Set; Transaction Processing; Metadata, Data types; Exceptions.

Text Books:

1. JAVA fundamentals, a comprehensive introduction by Herbert Schildt, Dale Skrien. Tata McGraw Hill Edition,2017.
2. Object Oriented Programming and Java by Danny Poo, Derek Kiong, Swarnalatha Ashok, Springer,2nd Edition,2009

References:

1. O'Reilly Head First JAVA, by Kathy Sierra and Bert Bates, 3rd Edition,2020.
2. JAVA 6 programming, Black Book, KoGenT, Dreamtech,2007.