

Course Type	Course Code	Name of Course	L	T	P	Credit
ESC	NCSE202	OBJECT ORIENTED PROGRAMMING USING JAVA	3	0	0	3
Course Objective						
To learn object oriented programming concepts using Java						
Learning Outcomes						
The ability for the following. <ul style="list-style-type: none"> Understanding the basic principles of OOP. Gain proficiency in Java programming. Developing skills in Multithreading and concurrency mechanisms. 						
Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome			
1	Introduction: Overview of Object-Oriented Programming and Java. History of Java, Advantages of using OOP, especially in the context of Java, OOP principles How to compile a Java program. Tools for Java, Java IDE, Java Packages	2	Learning the advantages of OOP over procedural programming language. Learning the basic toolkit of Java.			
2	Preliminaries: Data type, variables, array, Type conversion and Casting. Control statements.	2	Basic understanding of Java programming. Students will learn about data types, loops, and local variables.			
3	Classes and Objects, Encapsulation, Data & Method Binding, Access Modifiers (private, protected, public). Constructors, Argument passing.	4	Understanding the concepts of Class and Objects, the scope of variables and Methods, how to return objects, and Learning about constructors.			
4	Inheritance in Java: Superclass, Subclass. Various types of inheritance (Single, Multilevel, etc). Method overriding. Keywords like final and super. Inheritance vs Composition.	4	Learning about inheritance and its importance for code reusability.			
5	Polymorphism & Abstraction: Method Overloading & Overriding, Abstract Classes & Methods, Dynamic Method Dispatch, Use of keywords like final, abstract, and static, Run-time Polymorphism. Use of Interfaces for abstraction.	8	Learning Polymorphism and Abstraction in Java.			
6	Interface and Packages: Interfaces vs Abstract Classes, Multiple Inheritance via Interfaces. accessing implementations through interface references, extending interface, and inner class. packages- Defining, creating, and accessing a package, importing a package.	7	Learning Interfaces and how to create and export packages.			
7	Exception Handling: Exception Handling (throws, try, catch, finally), Nested try, Multiple catch Built-in exception, Custom Exceptions, Checked vs Unchecked Exceptions, Chained Exceptions	3	Learning about various kinds of Exception, and Exception Handling. Use of exceptions to prevent crashes and debugging.			
8	Generics & Java Collections Framework: Introduction to Generics, Generic Classes & Methods, Type Safety, Java Collection Classes (ArrayList, LinkedList, HashMap, HashSet), Streams and Lambda Expressions.	6	Understand Generics and Collections Framework in Java.			

9	Multithreading: Introduction to Threads, Creating Threads using Thread Class & Runnable Interface, Thread Lifecycle, Synchronization, Inter-Thread Communication, Deadlocks, Concurrency	6	Learning about multithreading and concurrency control for parallel execution of tasks.
			Total: 42

Text Books:

1. Herbert Schildt, "Java: The Complete Reference". Eleventh Edition, Oracle Press
2. E. Balagurusamy, "Programming with Java: A Primer", Fourth Edition, TMH.

Reference Books:

1. Kathy Sierra, Bert Bates, and Trisha Gee. Head, "First Java: A Brain-Friendly Guide", 3rd Edition, O'Reilly Media.