- **Sharma, V. (2017).** *PHP with MySQL: A Practical Approach.* BPB Publications.
- **Narayan, N. (2016).** *PHP & MySQL: Server-side Web Development.* McGraw Hill Education. **Zandstra, M. (2014).** *PHP Objects, Patterns, and Practice* (4th ed.). Apress.

SUBJECT NAME: Object Oriented Programming with Java Credit: 5 (3L +2P)
SUBJECT CODE: BCAC502

COURSE OBJECTIVE:
The primary objective of the Object-Oriented Programming (OOP) with Java course is to provide students with a comprehensive understanding of object-oriented programming principles and their application using Java. The course aims to equip students with the skills needed to design, develop, and maintain robust and scalable software systems. By covering fundamental OOP concepts such as classes, objects, inheritance, polymorphism, and encapsulation, as well as advanced topics like interfaces, abstract classes, and design patterns, students will learn to write efficient, maintainable, and reusable code. The course will also emphasize best practices in Java programming, problem-solving techniques, and real-world application development, preparing students for careers in software development or further studies in computer science.

Course Outcome	
CO1	Understand and apply the fundamental concepts of Java programming, including data types, operators, control structures, and basic syntax, to develop simple applications.
CO2	Demonstrate proficiency in object-oriented programming principles such as classes, objects, inheritance, polymorphism, encapsulation, and abstraction, to design and implement robust software solutions.
CO3	Implement interfaces and abstract classes to create flexible and reusable code, enabling the development of modular and maintainable applications.
CO4	Handle exceptions and errors in Java programs using try-catch blocks, custom exceptions, and other exception-handling mechanisms to ensure the reliability and robustness of software.
C05	Perform file I/O operations and implement serialization in Java to persist data, enabling the storage and retrieval of information across different sessions.
CO6	Understand and implement multithreading in Java to develop applications that perform multiple tasks concurrently, improving performance and responsiveness.

DETAILED SYLLABUS:

Module No:	NAME OF THE TOPIC	HOURS	MARKS
1	Introduction to Java: Overview of Java, its features, setting up the environment, and writing first Java program. PATH AND CLASS PATH VARIABLE, JVM architecture.	2	5
2	Basics of Java Programming: Data types, variables, operators, control structures, and loops. Storing of Big Integer. Use of Static variable, final variable, initialization of static and final variable.	8	10
3	Object-Oriented Programming Concepts: Access modifiers, encapsulation, and abstraction in Java. Classes, objects, methods, and different types of initialization. Calling a constructor from a constructor, constructor chaining.	6	8
4	Inheritance and Polymorphism: Inheritance, method overloading, method overriding, and polymorphism. Restriction on method overriding.	6	10
5	Arrays and Strings: Single-dimensional and multi-dimensional array. Use of Arrays class for printing, sorting, searching. string handling, and use of StringBuffer and StringBuilder.	6	8
6	Interfaces and Abstract Classes: Understanding interfaces, abstract classes, and multiple inheritance in Java.	4	7
7	Exception Handling: Checked and Unchecked Exception, Try-catch blocks, multiple catch blocks, finally, throw, throws, and custom exceptions.	4	8
8	File I/O and Serialization: File handling, reading and writing to files, and serialization in Java.	5	6
9	Multithreading: Basics of threads, thread lifecycle, synchronization, and inter-thread communication.	4	8
	INTERNAL EXAMINATION	3	30
	TOTAL	48	100