Program	BACHELOR OF TECHNOLOGY (B.Tech)	**Semester - 2**
Type of Course	Engineering Science Course	
Prerequisite	None	
Rationale	Understanding Core OOP Concepts, Enhancing Code Reusability and Maintainability, Designing Modular and Scalable Systems, Improving Problem Solving and Software Design Skills, Working with OOP in Programming Languages, Developing Efficient and Robust Applications, Realizing the Benefits of OOP in Software Development	
Effective From A.Y.	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	**Tutorial**	**Lab**	**Credit**	**Theory Marks**		**Practical Marks**		**Total Marks**
				SEE TH	**IAT**	**SEE P**	**CCE**	
3	-	2	4	70	-	30	-	180

*SEE - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Content		**T** - Teaching Hours	**W** - Weightage

Sr.	Topics	T	W
1	**Fundamental of Object-Oriented Concepts**	4	10
	Basic concepts of OOP, features and design components, Features of Java, byte code, Java Development Kit (JDK), Java Virtual Machine (JVM), Data Types, Variables and Operators.		
2	**Control structures and Arrays**	8	20
	Control structure:Selection statements: if, if-else, nested if, else-if ladder, switch case; Iteration statements: while, do while, for loop, for-each loop, nested loops; jump statements: break, continue. Arrays: One-dimensional array, multi-dimensional array.		
3	**Classes, Methods and String class**	10	20
	Classes and Methods: Class, objects, methods in class, Method overloading, constructors, this keyword, garbage collection, finalize method, static keyword, nested and inner classes, command line arguments, variable length arguments. String Handling: String class, Basics of String handling in Java, String class methods, String Buffer Class and methods.		
4	**Inheritance and Interfaces**	10	20
	Inheritances: Basics, types of inheritance, method overriding, super keyword, final keyword, Polymorphism, Abstraction: abstract class, abstract method, inheritance of abstract class. Interfaces: Defining interfaces, implementation of interface, variables in interfaces, extending interfaces.		
5	**Exception Handling and Multithreading**	8	20
	Exception handling: Exception, exception types, try, catch, throw, throws, finally, multiple catch clauses, nested try statements, user-defined exception. Multithreading: Thread, Life cycle of thread. Implementation of thread: Thread class, Runnable interfaces; Naming thread, thread priorities, Methods of thread, synchronization.		
6	**Packages and File handling**	5	10
	Packages: Defining a package, finding packages and CLASSPATH, access protection, importing packages. File Handling: Streams, Byte Streams and Character Streams, Predefined Streams, InputStream classes, OutputStream classes.		
	Total	**45**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	10	40	40	10	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

	At the end of this course, students will be able to:
CO1	Describe the basic concepts of object-oriented programming and the various data types, variables and operators in Java.
CO2	Demonstrate control structure and array to solve programming problems efficiently.
CO3	Apply classes, methods, and string handling techniques to develop structured and efficient Java programs.
CO4	Analyze inheritance, polymorphism, abstract classes, and interfaces in Java for abstraction and code reuse.
CO5	Examine exception handling and multithreading with synchronization in Java to understand program flow, thread coordination, and error handling behavior.
CO6	Implement packages and file handling concepts to perform input/output operations using streams.

CO PO Mapping

CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PO - 1						
PO - 2						
PO - 3						
PO - 4						
PO - 5						
PO - 6						
PO - 7						
PO - 8						
PO - 9						
PO - 10						
PO - 11						

Reference Books

1.	**Java - The Complete Reference (TextBook)** By Herbert Schildt | Tata McGraw Hill
2.	**Programming with Java - A primer** By Balaguruswamy | Tata McGraw Hill
3.	**David Flanagan, Student Workbook Java in a Nutshell O'Reilly** By David Flanagan
4.	**Cay S. Horstmann Core Java (TM), Volume I-Fundamentals Prentice Hall**

List of Practical	
1.	Write a program to demonstrate data types, conditional statements and looping structure available in Java.
2.	Write a program to implement a recursion function in Java.
3.	Write a Java program to demonstrate some in-built functions on Strings.
4.	Write a program to demonstrate concepts of Class, Object, and methods in Java.
5.	Write a Java program for Method overloading and Constructor overloading.
6.	Write a program to demonstrate inheritance in Java.
7.	Write a Java program to demonstrate multiple inheritance using interface.
8.	Write a program to demonstrate exception handling in Java.
9.	Write a program to demonstrate multithreading in Java.
10.	Write a Java program to read, write, and append data in files.