BHAGWAN MAHAVIR UNIVERSITY

Effective From (2025-2026)

MASTER OF COMPUTER APPLICATION

Semester: I

Subject Code	Subject Title	Teaching Scheme					
		(Hours/Week)		Credits	Examination Marks		Total Marks
		Theory	Tutorial		Internal	External	
3050302101	Programming in Java	3	0	3	40	60	100

Duration of Exam: 2:30 Hours

Objective of the course:

- To develop proficiency in Java programming by understanding fundamental and object-oriented concepts, and by implementing console-based and file-handling applications.

Course Outcomes:

After completion of the course, student will able to:

Sr. No.	CO Statement	Marks % weightage
CO-1	Understand the syntax, structure, data types, operators, and control statements of Java.	15
CO-2	Apply object-oriented programming concepts using classes, objects, methods, and constructors.	25
CO-3	Implement arrays and string operations using Java library classes and methods.	15
CO-4	Develop and debug Java applications using inheritance and exception handling concepts.	25
CO-5	Create and manage packages and perform console/file I/O operations using Java's built-in libraries.	20

Detail Content:

Sr. No.	Topic	Total Hrs.
1	**Introduction to Java** **Fundamentals of Java Programming** • Introduction to Java: History, Features, and Architecture (JVM, JDK, JRE), The Java Buzzwords • Java's Magic: The Bytecode, Object-Oriented Programming Properties • Java Program Structure and Syntax, The Java Keywords • Identifiers in Java, The Java Class Libraries • A First Simple Program, Handling Syntax Errors **Introducing Data Types and Operators:** • Why Data Types Are Important, Java's Primitive Types • Literals (Hexadecimal, Octal, and Binary Literals, Character Escape Sequences, String Literals) • Variables, Types of variables in JAVA, Constants, The Scope and Lifetime of Variables • Operators (Arithmetic Operators, Relational and Logical Operators, Short Circuit Logical Operators, The Assignment Operator, Shorthand Assignments, Ternary) • Type Conversion and Type Casting • Operator Precedence, Expressions • A Second Simple Program, Create Blocks of Code, Semicolons and Positioning, Indentation Practices **Program Control Flow Statements:** • Conditional/Branching Statements, Looping: (Entry control loop, Exit Control loop), Jump Statements: break, continue, return • Input/Output: Using Scanner	**10**
2	**Class Fundamentals** **Introducing Classes, Objects, and Methods:** • Class and Object creation (The General Form of a Class, defining a Class, How Objects Are Created) • The new Operator, Controlling Access to Class Members (Java's Access Modifiers: Private, Protected, Public, Default) • Reference Variables and Assignment, Returning Objects **Function in Java:** • Functions in java, Types of functions, • Polymorphism (compile time-Method Overloading and Run Time - Method Overriding)	**12**

	• Mutator and Accessor methods • Returning from a Method, returning a Value, Using Parameters • Pass Objects to Methods, Recursion • Constructors: Default, Parameterized, Constructor Overloading • Garbage Collection, • Understanding static (Static Blocks) • Introducing Nested and Inner Classes • this and super keywords • static fields and methods	
3	**Working with Arrays and Strings** **Array in Java:** • Introduction to Arrays, Types of Arrays in Java (1-D Array, 2-D Array) • Declaring and Initializing Arrays (Static and Dynamic Initialization) • Accessing Array Elements, Traversing Arrays • Common Array Operations, Arrays and Methods **String in Java:** • Introduction to String Class, Definition of String • String as a class in java.lang, String is immutable, Creating Strings • String Methods: Basic Methods, Searching & Extraction, Modification, String Comparison, String Concatenation • String Arrays	**08**
4	**Java Inheritance & Exception Handling:** **Inheritance:** • Inheritance Basics: Definition of Inheritance, Need and Importance of Inheritance, Reusability and Extensibility, Syntax of Inheritance in Java • super classes and subclasses • Access Modifiers and Inheritance • Types of Inheritance (Single, Multilevel, Hierarchical, Hybrid Inheritance (via interfaces), Multiple Inheritance using Interfaces) • Constructor Behaviour in Inheritance, calling parent constructors explicitly, calling parent class constructor using super () • Final and Inheritance (final keyword with methods and classes) **Exception Handling** • Introduction, Difference between errors and exceptions, Importance of exception handling • Types of Exceptions (Checked exceptions, Unchecked exceptions, Common built-in exceptions and when they occur) • Types of errors: Compile-time vs Runtime	**10**

	• Basic Exception Handling with try-catch and finally Block • Purpose of the finally block • The throw and throws Keywords, throwing exceptions using throw • Declaring exceptions using throws, Difference between throw and throws • Nested Try Blocks • Handling inner and outer exceptions separately, Multiple Catch Blocks • Catching multiple exception type	
5	**Java Packages, and Input/Output Handling:** **Packages** • Packages, Defining a Package, • Packages and Member Access (A Package Access Example) • Understanding Protected, Members, Importing Packages, • Java's Class Library Is Contained in Packages **Input and Output** • Introduction to I/O in Java, Types of I/O: Console I/O and File I/O • Console Input in Java (Using Scanner class), Console Output in Java • File Input and Output (File I/O) • Working with Files: Input/Output Streams, Reading and Writing Files Using Byte Streams • Automatically Closing a File, Reading and Writing Binary Data • Text Input and Output: write text output, read text output • creating files and directories	**08**

CO-PO Mapping Matrix with Bloom's Levels

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	-	-	-	-	-	-	2	-	2
CO-2	3	-	3	-	-	-	-	-	-	-	-	2
CO-3	3	-	2	-	-	-	-	-	-	-	-	2
CO-4	3	2	3	2	-	-	-	-	-	-	-	3
CO-5	3	-	3	2	3	-	-	-	-	2	2	2

Scale: 3 = Strong, 2 = Moderate, 1 = Slight, - = No relation

Text Books:

1. **Programming with Java: A Primer** – E. Balagurusamy – McGraw Hill
2. **Java: The Complete Reference** – Herbert Schildt – McGraw Hill
3. **Core Java Volume I – Fundamentals** – Cay S. Horstmann – Pearson
4. **Head First Java** – Kathy Sierra, Bert Bates – O'Reilly Media

Reference Books:

1. **Effective Java** – Joshua Bloch – Addison-Wesley
2. **Java: How to Program** – Paul Deitel & Harvey Deitel – Pearson
3. **Beginning Programming with Java for Dummies** – Barry Burd – Wiley
4. **Object Oriented Programming through Java** – P. Radha Krishna – Universities Press

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