Name of the Course: JAVA Programming

Sr. No.	Heading	Particulars
1	**Description the course:**	**Introduction:** Java is one of the most widely-used, robust, and versatile programming languages in the software industry. It follows the object-oriented programming paradigm and is known for its platform independence, thanks to the Java Virtual Machine (JVM). This course introduces students to the foundational and advanced features of Java, covering core concepts, GUI development, multithreading, exception handling, web application development using Servlets and JSP, and database connectivity through JDBC. **Relevance:** In today's software-driven world, Java is a fundamental language that underpins many enterprise-level, web-based, mobile, and desktop applications. Its syntax and concepts are not only essential for programming in Java but also form the basis for understanding other languages such as C#, Kotlin, and Scala. Java's relevance is further reinforced by its use in Android development, big data (via tools like Hadoop), and large-scale enterprise applications. **Usefulness:** This course builds strong foundational skills in programming and software design. It enables students to construct modular programs using classes, interfaces, and packages. They also learn to handle exceptions, manage concurrent threads, design user-friendly graphical interfaces, and create dynamic, database-connected web applications using technologies like Servlets and JSP. **Application:** The practical aspect of the course allows students to build desktop tools, interactive GUI applications, and basic web portals. By working with JDBC, Swing, and multithreading, students gain hands-on experience in areas that mirror real-world software development scenarios. **Interest:** Java's simplicity, combined with its rich libraries and real-time problem-solving approach, makes learning

		engaging and rewarding. Students enjoy working on mini-projects, interactive applications, and seeing the immediate impact of their code, which deepens their interest and confidence in programming. **Connection with Other Courses:** The skills acquired in this course directly support and enhance learning in related subjects like Data Structures, Database Management Systems, Operating Systems, Web Development, and Software Engineering. It also forms a foundation for advanced electives in Mobile App Development and Enterprise Computing. **Demand in the Industry:** Java developers are in steady demand across industries such as finance, education, e-commerce, and healthcare. Its robustness, scalability, and extensive community support make it a preferred language for backend systems and enterprise-level applications. **Job Prospects:** After completing this course, students are well-prepared for internships and entry-level roles like Java Developer, Backend Developer, Software Engineer, Web Application Developer, and Android App Developer. Mastery of Java also positions students strongly for advanced certifications and competitive programming opportunities.
2	**Vertical:**	VSC
3	**Type:**	Practical
4	**Credits:**	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives (CO):** **CO 1.** Provide a strong foundation in Java programming concepts including object-oriented principles and core syntax. **CO 2.** Enable students to design and implement modular programs using classes, interfaces, packages, and exception handling. **CO 3.** Introduce multithreading and collections to manage concurrency and structured data efficiently. **CO 4.** Familiarize students with GUI development using Swing and event handling for desktop applications. **CO 5.** Train learners to build web-based applications using Servlets, JSP, and JDBC for database connectivity and dynamic content.	

8	**Course Outcomes (OC):** After successful completion of this course, students would be able to - **OC 1.** Apply object-oriented programming concepts to develop efficient and maintainable Java applications. **OC 2.** Implement exception handling and multithreading to build robust and concurrent programs. **OC 3.** Use Java Collection Framework to store, manipulate, and retrieve data effectively. **OC 4.** Design user interfaces using Swing components and handle user events in GUI applications. **OC 5.** Connect Java applications with databases using JDBC and perform CRUD operations. **OC 6.** Develop dynamic, session-managed web applications using Servlets and JSP.
9	**Modules:** **Module (30 hours):**
	Java Basics and OOP: History and Features of Java, JVM, JDK, JRE, Java Program Structure, Tokens, Data Types, Operators, OOP Principles: Class, Object, Constructor, this, static, Inheritance, Polymorphism (Overloading/Overriding), Abstraction, Encapsulation, Abstract Classes, Interfaces, Inner Classes, super, Anonymous Classes **Packages & Access Specifiers:** Predefined & user-defined packages, access specifiers **Exception Handling:** Pre-Defined Exceptions, try-catch-finally, throw, throws, custom (user defined) exceptions **Multithreading:** Thread creation, Thread life cycle, Synchronization, wait(), notify(), notifyAll() **Collection Framework:** java.util overview, Interfaces: List, Set, Map, Classes: ArrayList, LinkedList, HashSet, TreeSet, HashMap **Introduction to JSON:** Syntax, DataTypes, JSON with Java
	Module (30 hours):
	Java Foundation Classes & Swing: JFC Overview, Common Swing Components: JFrame, JPanel, JButton, JTextField, JLabel, Layouts, Event Handling using Delegation Event Model, Adapter classes, ActionListener **JDBC:** JDBC Architecture & Drivers, Connecting to DB, Statement, PreparedStatement, ResultSet, Navigating data, ResultSetMetaData, Transactions, Exception handling **Servlets:** Servlet Lifecycle & basic structure, Deployment Descriptor, ServletConfig, ServletContext, RequestDispatcher, Response redirection, Session tracking (Cookies, URL Rewriting, HttpSession), Introduction to Filter API

	Java Server Pages (JSP): JSP Lifecycle & Architecture, Scripting Elements, Directives, Implicit Objects, JSTL basics, Expression Language, CRUD operation overview using JSP **JSON:** Syntax, DataTypes, JSON with Java	
10	**Text Books** 1. Herbert Schildt, Java The Complete Reference, Eleventh Edition, McGraw-Hill Education, 2020 2. Bryan Basham, Kathy Sierra, Bert Bates, Head First Servlets and JSP, O'reilly (SPD), 2018 3. Ivan Bayross, Web Enabled Commercial Applications Development Using Java 2, BPB Publications 4. Java XML and JSON: Document Processing for Java SE by Jeff Friesen January 2019, Apress	
11	**Reference Books** 1. E. Balagurusamy, Programming with Java- A Primer, Tata McGraw-Hill Education India, 2023 2. Programming in JAVA, 2nd Ed, Sachin Malhotra & Saurabh Choudhary, Oxford Press, 2018 3. Joe Wigglesworth and Paula McMillan, Java Programming: Advanced Topics, Thomson Course Technology (SPD) 4. Eric Jendrock, Jennifer Ball, D Carson and others, The Java EE 5 Tutorial, Pearson Education 5. Java Parsing Collection XML JSON: Map List XML JSON Transform by Yang Hu, 2019	
12	**Internal Continuous Assessment: 40%**	**Semester End Examination: 60%**