

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	BTech CSE, Integrated BTech (CSE)-MBA, BTech CSE (Artificial Intelligence & Machine Learning)
Course Code:	XXXX
Course Title:	Advanced Java
Course Type:	Department Elective-I
Year of Introduction:	2024-25

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. interpret the basics of Java technologies (BL2)
2. apply the concepts of Java technologies to design console-based, GUI-based, and web-based applications (BL3)
3. develop applications using various Java frameworks (BL6)
4. design multi-tier and enterprise-level Java applications. (BL6)

Unit	Contents	Teaching Hours (Total 45)
Unit-I	Introduction to Swing: Basics of Swing, Key Swing Features, Components and Containers, Event Handling, Various Swing components, Writing Swing Application, Database access	10
Unit-II	Java database Programming: Basics of Java database, JDBC, Different Types of Drivers of JDBC	03
Unit-III	Java Servlet Programming: Servlet: Basics of Servlet, Types of Servlets, Servlet Life Cycle, Form data processing, HTTP request, HTTP response, Servlet init parameters, ServletRequest, Servlet Collaboration, ServletConfig, ServletContext, Attribute, Session Tracking, Filter, Exception Handling, Database Handling	08
Unit-IV	Java Server Pages (JSP): Basics of JSP, Life cycle of JSP, Scripting elements, Implicit Objects, Directive Elements, JSP actions: include and forward, HTTP Status Codes, Form data processing, Session Tracking, Filter, Page redirection, Auto refresh, Database Handling	08
Unit-V	Java Web Framework– Spring: Overview of Spring, Spring Architecture, bean basics and life cycle, Dependency Injection, XML Configuration on Spring, Event handling in Spring, Aspect – oriented Spring, Managing Database, Managing Transaction	10
Unit-VI	Introduction to Distributed Applications, Spring Boot, Spring Cloud.	03
Unit-VII	Introduction to Hibernate framework: Basics of Hibernate framework, Hibernate configuration, Life cycle and applications.	03

Self-Study: The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study content.

Suggested Readings/ References:

1. Bryan Basham, Kathy Sierra, Bert Bates, Head First Servlets and JSPs, O'Riley Media.
2. Jim Keogh, Complete Reference J2EE, Tata McGraw-Hill
3. Core and Advanced Java, BlackBook, Dreamtech Press
4. Ivan Bayross, Sharanam Shah, Cynthia Bayross, and Vaishali Shah, The Team X (SPD), Java Server Programming for professionals, The X Team/Shroff Publishers.
5. Kumar Santosh, Spring and Hibernate, McGraw-Hill
6. Savaliya, Advanced Java, Dreamtech Press India Pvt. Ltd

Laboratory Work:

Laboratory work will be based on the above syllabus with a minimum of 10 experiments to be incorporated. The students in a suitable group size will design and perform one experiment as a part of Laboratory work.

Sr. No.	List of Experiments/Exercises	Hours
1	Create a basic swing application of a calculator that incorporates frame and event handling	02
2	Exemplify Swing Concepts of layout designing using the following applications: a. Create a Swing program that displays a window containing four buttons and a label. The first button says "Click here", and the other three buttons say "Not here". If one of the "Not here" buttons is clicked, the label displays the message "Wrong, try again". If the "click here" button is clicked, then the label displays "Good job. Do it again". Also, each time the "Click here" button is clicked, a new button is randomly chosen and given the text "Click here", and the other three buttons are given the text "Not here". The application quits when the user clicks 10 the "Click here" button. b. Create a swing application for a stopwatch. That contains one push button and one label. The push button is used to start and stop the stopwatch. The label displays the elapsed time.	04
3	Create a Swing Application which includes the following necessary functionalities: - Menu Driven Home Page which allows redirecting to Insert Data Frame, Update Data Frame, View Data Frame, and Delete Data Frame - Use Appropriate Swing Components like textfields, buttons, table, list, dialog box, and others with event handling Use a database for data storage	04
4	Create a Java application that demonstrates the communication with JDBC using all different types of Statements like Simple, Prepared, and Callable Statement	04
5	Create a web application using a servlet that allows users to log in with correct credentials, enter the details that get stored in the database, view the details, and request the user to log in again if the credentials are wrong.	04

6	Create a Servlet application that uses Servlet Init, Servlet Config, and Session Tracking mechanism for a Student Portal. The home page gets refreshed every 5 seconds and shows visitor count [JSP can be used].	02
7	Design an application that interacts with a JSP Page using Java Reusable Component – Java Beans for Student Information Management.	02
8	Design a Spring application for Employee Data Handling	02
9	Write an annotation-based Spring Application for Employee Data Management and use an interface-based concept for a multi-level hierarchy	02
10	Study and implement Hibernate and Generative AI for Java code generation.	04

