

B.C.A. (Honours) & B.C.A. (Honours with Research)
(Semester - 5 and Semester - 6)
To be effective from June – 2025
Saurashtra University

CS-29: Advance Java Programming (J2EE)		
<p>Objectives:</p> <ul style="list-style-type: none"> • Gain a deep understanding of the principles of J2EE architecture, including servlets, JSP. • Proficiency in frameworks and technologies like spring framework, hibernate, spring boot. • Learn about the Model-View-Controller (MVC) design pattern and its application in J2EE development. <p>Prerequisites:</p> <ul style="list-style-type: none"> • Core Java Knowledge 		
Unit No.	Topic	Detail
1	Introduction to J2EE and JDBC	<ul style="list-style-type: none"> • Introduction to J2EE • Enterprise Architecture Styles: <ul style="list-style-type: none"> ▪ Two-Tier Architecture ▪ Three-Tier Architecture ▪ N-Tier Architecture • Enterprise Architecture • The J2EE Platform • Introduction to J2EE APIs (Servlet, JSP, EJB, JMS, JavaMail, JSF, JNDI) • Introduction to Containers • Tomcat as a Web Container
		<ul style="list-style-type: none"> • JDBC Architecture, • Types of JDBC Drivers, • Introduction to major JDBC Classes and Interface, • Creating simple JDBC Application, • Types of Statement (Statement Interface, PreparedStatement, CallableStatement), • Creating CRUD Application
2	Servlet	<ul style="list-style-type: none"> • Servlet Introduction • Architecture of a Servlet • Servlet API (Javax.servlet and Javax.servlet.http) • Servlet Life Cycle • Servlet Configuration with Deployment Descriptor • Developing and Deploying Servlets • Handling Servlet Requests and Responses • Reading Initialization Parameters • Session Tracking Approaches (URL Rewriting, Hidden Form Fields, Cookies, Session API)

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3	JSP	<ul style="list-style-type: none"> ● Introduction to JSP and JSP Basics ● JSP vs. Servlet ● JSP Architecture ● Life cycle of JSP ● JSP Elements: <ul style="list-style-type: none"> ▪ Directives Elements (page, include, taglib) ▪ Scripting Elements (Declaration, scriptlet, expression) ▪ Action Elements (jsp:param, jsp:include, jsp:Forward, jsp:plugin, jsp:useBean, jsp:setAttribute, jsp:getAttribute) ● JSP Implicit Objects (request, response, out, session, application, pagecontext) ● JSP Scope ● Including and Forwarding from JSP Pages <ul style="list-style-type: none"> ▪ include Action ▪ forward Action ● Working with Session & Cookie in JSP ● Error Handling and Exception Handling with JSP ● JSP EL (Expression Language), JSP Standard Tag Libraries (JSTL)
4	EJB, Introduction of MVC Architecture, Hibernate	<ul style="list-style-type: none"> ● Introduction to EJB ● Types of EJB <hr/> <ul style="list-style-type: none"> ● Introduction to MVC ● Implementation of MVC Architecture <hr/> <ul style="list-style-type: none"> ● Introduction to Hibernate ● Features of Hibernate ● Exploring Hibernate Architecture ● Object Relation Mapping (ORM) with Hibernate ● Hibernate Configuration file ● Hibernate Mapping file ● Hibernate Annotation ● Hibernate Query Language (HQL) ● Hibernate Sessions
5	Introduction to Spring Framework & Spring Boot	<p>Introduction to Spring Framework</p> <ul style="list-style-type: none"> ● What is Spring Framework? ● Importance and Benefits of Spring ● Spring Architecture Overview (Core Container, Modules) <p>Core Concepts of Spring</p> <ul style="list-style-type: none"> ● Dependency Injection (DI) and Inversion of Control (IoC) ● Bean Lifecycle in Spring ● Spring ApplicationContext and BeanFactory <p>Spring MVC Basics</p> <ul style="list-style-type: none"> ● Overview of MVC Pattern ● Spring MVC Architecture and Request Flow ● Controllers, Models, Views ● Simple Spring MVC Application Example

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		<p>Aspect-Oriented Programming (AOP) in Spring</p> <ul style="list-style-type: none"> • Introduction to AOP • Concepts: Advice, Join Point, Pointcut, Aspect • Simple Logging Aspect Example <p>Spring Boot Fundamentals</p> <ul style="list-style-type: none"> • What is Spring Boot? • Features and Advantages of Spring Boot • Architecture of Spring Boot • Auto-Configuration and Starter Dependencies • Embedded Servers (Tomcat, Jetty) • Important Spring Boot Annotations (@SpringBootApplication, @RestController, @RequestMapping) <p>Spring Boot Data Access</p> <ul style="list-style-type: none"> • Introduction to Spring Boot JDBC • Using JdbcTemplate for database operations • Overview of Spring Boot Data JPA • Basic CRUD operations with Spring Boot Data JPA and Hibernate <p>Exception Handling in Spring Boot MVC</p> <ul style="list-style-type: none"> • Handling exceptions using @ExceptionHandler • Using @ControllerAdvice for global exception handling
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Reference Books:

- (1) Java Complete Reference 11th Edition - Herbert Schildt, Oracle Press
- (2) Java Server Programming For Professionals, Ivan Bayross, Sharanam Shah – Shroff publication
- (3) Developing Java Servlets – Techmedia
- (4) JSP Beginner’s Guide – Tata McGraw Hill by Gary Bolling, Bharathi Nataragan
- (5) Spring and Hibernate, K. Santosh Kumar, - Tata McGraw-Hill
- (6) Hibernate Made Easy: Simplified Data Persistence with Hibernate and JPA (Java Persistence API) Annotations by Cameron Wallace McKenzie, Kerri Sheehan
- (7) Spring Framework: A Step by Step Approach for Learning Spring Framework – Create Space Independent Publishing Platform
- (8) Beginning Hibernate Second Edition By Jeff Linwood, Dave Minte – Apress

Course Outcomes:

- Students should gain a comprehensive understanding of the architecture of J2EE, including its various tiers such as presentation, business logic, and data tiers.
- Students should be able to develop enterprise applications using J2EE technologies, including the ability to design and implement user interfaces, business logic, and data access layers.
- Students should be proficient in using various Java EE APIs for developing enterprise applications, including Servlets, JavaServer Pages (JSP).
- Understands and implements JSP and frameworks like Spring, Spring Boot etc.
- Understand and apply the concepts of MVC and tag libraries.