A. Course Handout (Version 1.0)

Institute/School Name	Chitkara University Institute of Engineering and Technology		
Department Name	Department of Computer Science & Engineering		
Programme Name	Bachelor of Engineering (B.E.), Computer Science & Engineering		
Course Name	Advanced Programming Concepts	Session	2025-2026
Course Code	23CS007	Semester/Batch	5th/2023
L-T-P (Per Week)	2-0-4	Course Credits	04
Pre-requisite	Programming	NHEQF Level	5.5
Course Coordinator	Dr. Shivani Wadhwa	SDG Number	4,8,9

CLO01	Understand the features of Java such as operators, classes, objects, inheritance, packages and exception handling
CLO02	Learn latest features of Java like garbage collection, Abstract methods, Network interface
CLO03	Get exposure to advance concepts of Database connectivity like JDBC
CLO04	Effectively apply Full Stack Java Development with Spring MVC, Hibernate, jQuery, and Bootstrap

1. Objectives of the Course

This course will introduce Cloud computing to attendees from basic concept and will take them to hand-on journey. The main objectives of the course are:

- Provide a comprehensive understanding of Java's syntax, structure, and fundamental.
- Build an understanding of analysing and evaluating real-world problems.
- Inculcate the skill in students to design, implement, and test Java applications efficiently.
- Equip students with the knowledge and skills necessary to create efficient, robust, and scalable software solutions.

2. Course Learning Outcomes

After completion of the course, student should be able to:

	Course Learning Outcome	*Pos	**CL	***KC	Sessions
CLO01	Understand the features of Java such as operators, classes, objects, inheritance, packages and exception handling	PO1, PO2, PO4, PO3, PO5, PO6, PO11	K2	Conceptual Procedural	**15**
CLO02	Learn latest features of Java like garbage collection, Abstract methods, Network interface	PO1, PO4, PO5, PO12	K3	Conceptual Procedural	**20**
CLO03	Get exposure to advance concepts of Database connectivity like JDBC	PO1, PO2, PO3, PO4, PO5, PO10,	K3	Conceptual Procedural	**20**

		PO11			
CLO04	Effectively apply Full Stack Java Development with Spring MVC, Hibernate, jQuery, and Bootstrap	PO3, PO4, PO5, PO9, PO10, PO11	K4	Conceptual Procedural	**20**
Total Contact Hours					**75**

Revised Bloom's Taxonomy Terminology

* PO's available at (shorturl.at/cryzF)

**Cognitive Level =CL

***Knowledge Categories = KC

Course Learning Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CLO01	H	H	H	H	H	M					H	
CLO02	H			H	H						H	H
CLO03	H	H	H	H	H					M		
CLO04			H	H	H				M	M	H	

H=High, M=Medium, L=Low

3. ERISE Grid Mapping

Feature Enablement	**Level (1-5, 5 being highest)**
Entrepreneurship	1
Research	3
Innovation	4
Skills	5
Employability	5

4. Recommended Books (Reference Books/Textbooks)

B01: "JAVA: THE COMPLETE REFERENCE" by Herbert Schildt McGraw Hill Education7TH EDN, 2017
BO2: "Java for Programmers " by P.J.Deitel and H.M.Deitel, PEA (or) Java, Prentice Hall, 2009.
BO3: "Full Stack Java Development with Spring MVC, Hibernate, jQuery, and Bootstrap" by Mayur Ramgir, Wiley, 2020.

5. Other readings & relevant websites

S.N.	Link of Journals, Magazines, Websites, and Research Papers
1	https://www.youtube.com/watch?v=SEGEbGoH4LI
2	https://www.youtube.com/watch?v=pDTNUS8mgc0
3	https://www.youtube.com/watch?v=WldMTtUWqTg

6. Recommended Tools and Platforms

Testpad

7. Course Plan

Lecture Number	Topics	Recommended Books
1-8	Java Essentials- Exception Handling, Lambda Expressions, Annotations, Modules, Optionals, Dependency Injection, I/O Operations and File Operations	BO1, BO2
9-20	Java Collection- Array vs ArrayList, Set Map, Queue, Stack, Dequeue, Iterator, Collections	BO1
21-25	Concurrency- volatile keyword, Java Memory Model, Threads and Virtual Threads, Synchronization	BO2
26-30	Build Tools- Maven	BO1
31-34	Functional Programming- High Order Functions	BO2
	ST-1 (Syllabus covered from Lecture 1 to 34)	
35-40	Database Access- JDBC	BO2
41-48	Spring Core- Introduction - Terminology and Architecture, Configuration, Dependency Injection, Spring IOC, Spring AOP and MVC, Spring Bean Scope	BO3
49-52	Hibernate- Transactions, Relationships, Entity Lifecycle	BO3
53- 58	Spring Boot- Spring Boot Starters, Autoconfiguration, Actuators, Embedded Server	BO3
59- 62	Spring Data- Spring Data JPA, Spring Data MongoDB, Spring Data JDBC	BO3
63- 67	Microservices- Spring Cloud Gateway, Cloud Config, Spring Cloud Circuit Breaker, Spring Cloud OpenFeign	BO3
	ST-2 (Syllabus covered from Lecture 35 to 67)	BO3
68-71	Spring MVC- Servlet, JSP Files, Architecture, Components	BO2, BO3
72-75	Testing- Junit, JMeter	BO1, BO2
END TERM – FULL SYLLABUS		

8. Delivery/Instructional Resources

Lecture No.	Topics	Web References	Audio-Video
1-8	Java Essentials- Exception Handling, Lambda Expressions, Annotations, Modules, Optionals, Dependency Injection, I/O Operations and File Operations	https://www.geeksforgeeks.org/java/file-handling-in-java/	https://www.youtube.com/watch?v=SEGEbGoH4LI
9-20	Java Collection- Array vs ArrayList, Set Map, Queue, Stack, Dequeue, Iterator, Collections	https://www.geeksforgeeks.org/java/collections-in-java-2/	https://www.youtube.com/watch?v=pDTNUS8mgc0
21-25	Concurrency- volatile keyword, Java Memory Model, Threads and Virtual Threads, Synchronization	https://codesignal.com/learn/courses/java-concurrency-foundations/lessons/java-memory-model-and-the-volatile-keyword	https://www.youtube.com/watch?v=WldMTtUWqTg
26-30	Build Tools- Maven	https://maven.apache.org/	https://www.youtube.com/watch?v=tyLSFciTU-s
31-34	Functional Programming- High Order Functions	https://dev.to/dipakkr/wtf-is-higher-order-function--3lfo	https://m.youtube.com/watch?v=1cGPmdcQ2p8
35-40	Database Access- JDBC	https://www.geeksforgeeks.org/java/introduction-to-jdbc/	https://www.youtube.com/watch?v=7v2OnUti2eM
41-48	Spring Core- Introduction - Terminology and Architecture, Configuration, Dependency Injection, Spring IOC, Spring AOP and MVC, Spring Bean Scope	https://www.geeksforgeeks.org/introduction-to-spring-framework/	https://www.youtube.com/watch?v=y4WS8OvIapU
49-52	Hibernate- Transactions, Relationships, Entity Lifecycle	https://www.geeksforgeeks.org/hibernate-lifecycle/	https://www.youtube.com/watch?v=vypAqz4MEus
53- 58	Spring Boot- Spring Boot Starters, Autoconfiguration, Actuators, Embedded Server	https://docs.spring.io/spring-boot/how-to/webserver.html	https://www.youtube.com/watch?v=CCMAhpVvpyk
59- 62	Spring Data- Spring Data JPA, Spring Data MongoDB, Spring Data JDBC	https://spring.io/projects/spring-data-mongodb	https://www.youtube.com/watch?v=oE3h-YNlqss
63- 67	Microservices- Spring Cloud Gateway, Cloud Config, Spring Cloud Circuit Breaker, Spring Cloud OpenFeign	https://nirajtechi.medium.com/circuit-breaker-in-microservices-and-spring-boot-example-4ad76c7a33e6	https://www.youtube.com/watch?v=Hw2KC7ecY_A
68-71	Spring MVC- Servlet, JSP Files, Architecture, Components	https://www.geeksforgeeks.org/spring-mvc-framework/	https://www.youtube.com/watch?v=g2b-NbR48Jo

72-75	Testing- Junit, JMeter	https://artoftesting.com/jmeterjunit	https://www.youtube.com/watch?v=kL-WVJt_2h0

9. Lab Plan

Lab Number	Practical	Learning Resources
1-8	Java Essentials- Exception Handling, Lambda Expressions, Annotations, Modules, Optionals, Dependency Injection, I/O Operations and File Operations	https://www.youtube.com/watch?v=SEGEbGoH4LI
9-20	Java Collection- Array vs ArrayList, Set Map, Queue, Stack, Dequeue, Iterator, Collections	https://www.youtube.com/watch?v=pDTNUS8mgc0
21-25	Concurrency- volatile keyword, Java Memory Model, Threads and Virtual Threads, Synchronization	https://www.youtube.com/watch?v=WldMTtUWqTg
26-30	Build Tools- Maven	https://www.youtube.com/watch?v=tyLSFciTU-s
31-34	Functional Programming- High Order Functions	https://m.youtube.com/watch?v=1cGPmdcQ2p8
35-40	Database Access- JDBC	https://www.youtube.com/watch?v=7v2OnUti2eM
41-48	Spring Core- Introduction - Terminology and Architecture, Configuration, Dependency Injection, Spring IOC, Spring AOP and MVC, Spring Bean Scope	https://www.youtube.com/watch?v=y4WS8OvIapU
49-52	Hibernate- Transactions, Relationships, Entity Lifecycle	https://www.youtube.com/watch?v=vypAqz4MEus
53- 58	Spring Boot- Spring Boot Starters, Autoconfiguration, Actuators, Embedded Server	https://www.youtube.com/watch?v=CCMAhpVvpyk
59- 62	Spring Data- Spring Data JPA, Spring Data MongoDB, Spring Data JDBC	https://www.youtube.com/watch?v=oE3h-YNlqss
63- 67	Microservices- Spring Cloud Gateway, Cloud Config, Spring Cloud Circuit Breaker, Spring Cloud OpenFeign	https://www.youtube.com/watch?v=Hw2KC7ecY_A
68-71	Spring MVC- Servlet, JSP Files, Architecture, Components	https://www.youtube.com/watch?v=g2b-NbR48Jo
72-75	Testing- Junit, JMeter	https://www.youtube.com/watch?v=kL-WVJt_2h0

10. Action plan for different types of learners

Slow Learners	Average Learners	Fast Learners
● Remedial Classes ● Encouragement for improvement using Peer Tutoring ● Use of Audio and Visual Materials ● Use of Real-Life Examples	● Expert Lecture ● Formative Exercises used to highlight concepts and notions ● E-notes and E-exercises to read ahead of the pedagogic material.	● Engaging students to hold hands of slow learners by creating a Peer Tutoring Group ● Design solutions for complex problems ● Design solutions for complex problems ● Presentation on topics beyond those covered in CHO

11. Evaluation Scheme & Components

Evaluation Component	Type of Component	No. of Assessments	Weightage of Component	Mode of Assessment
Component 2	Sessional Tests (STs)	02*	40%	Offline
Component 3	End Term Examination	01	60%	Offline
Total		**100%**		

* Out of 02 STs, best 1 ST for final marks evaluation of STs will be considered.

* Makeup Examination will compensate for either ST-1 or ST-2 (Only for genuine cases, based on the Dean's approval).

**As per Academic Guidelines, a minimum of 75% attendance is required to become eligible for appearing in the End Semester Examination.

12. Syllabus of the Course

Subject: Advanced Programming Concepts	**Subject Code:** 23CS007	
Contents	**Lectures**	**Weightage (%)**
Java Essentials- Exception Handling, Lambda Expressions, Annotations, Modules, Optionals, Dependency Injection, I/O Operations and File Operations, Java Collection- Array vs ArrayList, Set Map, Queue, Stack, Dequeue, Iterator, Collections, Concurrency- volatile keyword, Java Memory Model, Threads and Virtual Threads, Synchronization, Build Tools- Maven	37	40%
Functional Programming- High Order Functions, Database Access- JDBC	10	10%

Spring Core- Introduction - Terminology and Architecture, Configuration, Dependency Injection, Spring IOC, Spring AOP and MVC, Spring Bean Scope, Hibernate- Transactions, Relationships, Entity Lifecycle, Spring Boot- Spring Boot Starters, Autoconfiguration, Actuators, Embedded Server, Spring Data- Spring Data JPA, Spring Data MongoDB, Spring Data JDBC, Microservices- Spring Cloud Gateway, Cloud Config, Spring Cloud Circuit Breaker, Spring Cloud OpenFeign	20	30%
Spring MVC- Servlet, JSP Files, Architecture, Components	4	10%
Testing- Junit, JMeter	4	10%
End Term 100% Syllabus		

This document is approved by

Designation	**Name**	**Signature**
Course Coordinator	Dr. Shivani Wadhwa	
Head Academic Delivery	Dr. Susheela Hooda	
Dean	Dr. Rupali Gill	
Date (DD/MM/YYYY)	25/06/2025	