A. Course Handout

Institute/School/College Name	Chitkara University Institute of Engineering & Technology		
Department/Centre Name	Department of Computer Science & Engineering		
Programme Name	Bachelor of Engineering- Computer Science & Engineering (Artificial Intelligence)		
Course Name	Object Oriented Programming using Java	**Session**	2024-25
Course Code	22CS010	**Semester/Batch**	4th/2023
Lecture/Tutorial (Per Week)	2-0-4	**Course Credit**	04
Course Coordinator Name	Ms. Rakhi		

1. Objective of the Course:

The course provides a wide scope of learning & understanding of the subject. The main objectives of the course is:

- To apply the concepts of object-oriented paradigm to analyse real life problems.
- To develop efficient solutions for logical problems using JAVA language.
- Exercise and reinforce prior programming knowledge to effectively code standard problem.
- To identify and remove bugs in a JAVA program.

2. Course Learning Outcome

	CourseOutcome	POs	CL*	KC*	Sessions
CLO1	Implement the concept of object-oriented techniques and methodologies using Java.	PO1, PO2, PO3,PO4,PO11, PO12	K2	FactualConceptual	**6**
CLO2	Applying Exception Handling and multithreading concepts for implementing a Robust Application in Java.	PO1, PO2, PO3,PO4,PO11, PO12	K3	FundamentalConceptual	**16**
CLO3	Demonstrating an understanding of Java Input and Output	PO1, PO2, PO3,PO4,PO11, PO12	K3	ConceptualProcedural	**28**
CLO4	Implementing several Data structures using Collection Framework and using database connectivity for a complete java application.	PO1, PO2, PO3,PO4,PO11, PO12	K3	ConceptualProcedural	**15**
Total Contact Hours					**65**

Revised Bloom's Taxonomy Terminology

*CL = Cognitive Level

*KC = Knowledge Categories

CLO-PO-PSO Mapping grid |Program outcomes (POs) and Program Specific Outcomes (PSOs) are available as a part of Academic Program Guide

Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CLO1	H			M	L		M				M		H	L	
CLO2	M	M		H	M	H				M			M		L
CLO3	M		M	M	H		H				H		H		
CLO4		L	H	H	H		M			M			M	H	H

***H=High, M=Medium, L=Low

3. **ERISE Grid Mapping**

Feature Enablement	Level(1-5, 5 being highest)
Entrepreneurship	4
Research	2
Innovation	3
Skills	5
Employability	4

4. **Recommended Books (Reference Books/Textbooks):**

B01: Java The Complete Reference by Herbert Schildt9th Edition.
B02: Head First Java, O'Reilly Publication
B03:OCA Java SE 8 Programmer I Study Guide (Exam 1Z0-808) (Oracle Press) by Edward G. Finegan, Robert Liguori.
B04:OCA/OCP Java SE 7 Programmer I & II Study Guide (Exams 1Z0-803 & 1Z0-804) byKathy Sierra

5. **Other readings & relevant websites:**

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	http://www.w3schools.com/
2.	http://www.javatpoint.com/java
3.	https://www.tutorialspoint.com/java/
4.	http://www.nptelvideos.com/java
5.	https://www.geeksforgeeks.org/establishing-jdbc-connection-in-java/

6. **Recommended Tools and Platforms**

NetBeans, VS Code, Eclipse

7. Course Plan:

a. Lecture Plan

Lecture Number	Topics	Text Book/ Reference Book/ Other Reading Material
1-3	Introduction to JAVA: Java Introduction, History and goals of Java, Fundamentals of OOPs, Overview of JDK, JVM, Garbage Collection	B01
4-6	Java Basics: Identifiers, Keywords, Java Data Types &Operators	B01
7-10	Control Statements: Decision Constructs, Using Loop Constructs, Command Line Arguments	B01
11-14	Working with Arrays: Creating and Using Arrays (1D, 2D, Multidimensional) Jagged Arrays	B01
Formative Assessment-1 (1-14 lectures)		
15-18	Classes & Objects: Classes, objects and methods: defining a class, Access Control, Method overloading, constructors, constructor overloading, use of this and static. Practice Problems	B01
19-22	Inheritance: Working with Inheritance: Inheritance Basics & Types, using super, Method Overriding, Dynamic method dispatch, final keyword. Practice Problems	B01
23-26	Abstract Methods & Classes, Packages& Interfaces: Built-In Packages and User Defined Packages, Interfaces: Declaration, Implementation, Extending Classes and Interfaces	B01
Sessional Test-1 (1 – 26 Lectures)		
27-30	Strings, StringBuffer, StringBuilder&StringTokenizer: Introduction, Immutable String, Methods of String class, StringBuffer class &StringBuilder class, toString method, StringTokenizer class. Practice Problems	B01
31-34	Exception Handling: Exception handling fundamentals, Exception types, try and catch, multiple catch clauses, nested try, throw, throws and finally, Creating custom Exception. Practice problems.	B01
35-40	Multithreading: Java thread model, main thread, creating thread by implementing Runnable and extending thread class, creating multiple threads, using isAlive() and join(), thread priorities, Synchronization. Practice Problems	B01
Formative Assessment-2 (27-40)		
41-44	Generics: Introduction, Generic Example, Generic Class, Generic Method, Generic Constructor and Generic Interfaces. Practice Problems	B01

45-52	Collections Framework: Introduction, Collection Interfaces: List, Queue, *Set*,Collection Classes: ArrayList, LinkedList, HashSet, LinkedHashSet, TreeSet, PriorityQueue, ArrayQueue, Vector, Stack. *Working with Maps: The Map interfaces, The Map classes*, Comparable &Comparator, Arrays, Vector, Stack, Practice Problems	B01
Sessional Test-2 (27 – 52 Lectures)		
53-56	IO Streams: Stream Classes: Byte Streams, Character Streams, StreamTokenizer. Practice Problems	B01
57-60	JDBC Connectivity: Introduction, Architecture, Establishing JDBC Database Connection.	LINK 5
61-65	Problem Solving (Online)	
END-TERM EXAM (FULL SYLLABUS)		

8. Delivery/Instructional Resources

Lecture No.	Topics	PPT *(Link of ppts on the central server)*	Industry Expert Session *(If **yes**: link of ppts on the central server)*	Web References	Audio-Video
1-3	Introduction to JAVA: Java Introduction, History and goals of Java, Fundamentals of OOPs, Overview of JDK, JVM, Garbage Collection			https://www.scaler.com/topics/java/introduction-to-java/	
4-6	Java Basics: Identifiers, Keywords, Java Data Types &Operators			https://www.programiz.com/java-programming/keywords-identifiers	
7-10	Control Statements: Decision Constructs, Using Loop Constructs, Command Line Arguments			https://www.javatpoint.com/control-flow-in-java	
11-14	Working with Arrays: Creating and Using Arrays (1D, 2D, Multidimensional) Jagged Arrays			https://www.w3schools.com/java/java_arrays.asp	
15-18	Classes & Objects: Classes, objects and methods: defining a class, Access Control, Method overloading, constructors, constructor overloading, use of this and static. Practice Problems				https://youtu.be/L677QCBCuWk?feature=shared
19-22	Inheritance: Working with Inheritance: Inheritance Basics & Types, using super, Method Overriding, Dynamic method dispatch, final keyword.				https://youtu.be/dFuVh_Bzy9c?feature=sh

	Practice Problems				ared
23-26	Abstract Methods & Classes, Packages& Interfaces: Built-In Packages and User Defined Packages, Interfaces: Declaration, Implementation, Extending Classes and Interfaces			https://docs.oracle.com/javase/tutorial/java/IandI/abstract.html#:~:text=Abstract%20classes%20are%20similar%20to,protected%2C%20and%20private%20concrete%20methods	
27-30	Strings, StringBuffer, StringBuilder&StringTokenizer: Introduction, Immutable String, Methods of String class, StringBuffer class &StringBuilder class, toString method, StringTokenizer class. Practice Problems			https://www.geeksforgeeks.org/string-vs-stringbuilder-vs-stringbuffer-in-java/	
31-34	Exception Handling: Exception handling fundamentals, Exception types, try and catch, multiple catch clauses, nested try, throw, throws and finally, Creating custom Exception. Practice problems.			https://www.javatpoint.com/exception-handling-in-java	
35-40	Multithreading: Java thread model, main thread, creating thread by implementing Runnable and extending thread class, creating multiple threads, using isAlive() and join(), thread priorities, Synchronization. Practice Problems			https://www.geeksforgeeks.org/multithreading-in-java/	
41-44	Generics: Introduction, Generic Example, Generic Class, Generic Method, Generic Constructor and Generic Interfaces. Practice Problems			https://www.tutorialspoint.com/java/java_generics.htm	
45-52	Introduction, Collection Interfaces: List, Queue, *Set*,Collection Classes: ArrayList, LinkedList, HashSet, LinkedHashSet, TreeSet, PriorityQueue, ArrayQueue, Vector, Stack. *Working with Maps: The Map interfaces, The Map classes*, Comparable &Comparator, Arrays, Vector, Stack, Practice Problems.			https://www.geeksforgeeks.org/java-collection-tutorial/	

53-56	IO Streams: Stream Classes: Byte Streams, Character Streams, StreamTokenizer. Practice Problems			https://www.javatpoint.com/java-io	
57-60	JDBC Connectivity: Introduction, Architecture, Establishing JDBC Database Connection.			https://www.geeksforgeeks.org/establishing-jdbc-connection-in-java/	
61-65	Problem Solving (Online)				

9. Action plan for different types of learners

Slow Learners	Average Learners	Fast Learners
• Multiple Remedial Extra Classes • Encouragement for improvement using Peer Tutoring	• Doubt-sessions • Pre-coded algorithms to illustrate concepts and notions • E-notes and E-exercises to read in addition to pedagogic material	• More Practice assignments on real life problems • Engaging students to hold hands of slow learners by creating a Peer Tutoring Group • Participation in Hackathons, competitions.

10. Evaluation Scheme & Components:

Evaluation Component	Type of Component	No. of Assessments	Weightage of Component	Mode of Assessment
Component 1	Formative Assessments (FAs)	02*	20%	Offline
Component 2	Subjective Test/Sessional Tests (STs)	02**	30%	ST1: Offline ST2: Offline
Component 3	End Term Examinations	01	50%	Offline
Total		**100%**		

*Out of 02 FAs, the ERP system automatically picks the best of the 02 FAs Marks for evaluation of the FAs as final marks.

**Average of the 02 STs will be considered for the evaluation of the STs as final marks.

11. Details of Evaluation Components:

Evaluation Component	Description	Syllabus Covered (%)	Timeline of Examination	Weightage (%)
Component 01	Formative Assessment 01	Up to 20%	Week 6	20%
	Formative Assessment 02	41%-60%	Week 14	
Component 02	ST 01	Upto 40%	Week 7	30%
	ST 02	41% - 80%	Week 15	

Component 03	End Term Examination*	100%	To be notified by Dean Examination	50%

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

12. Evaluation Components

Type of Assessment	Timeline of Conduct	Total Marks	Question Paper Format			
			1 Mark MCQ	2 Mark MCQ/2 Mark Question	5 Mark Coding Question	10 Mark Coding Question
Formative Assessment 1	Week 6	20	10	0	2	0
Formative Assessment 2	Week 14	20	10	0	2	0
Sessional Test 1	Week 7	30	10	0	2	1
Sessional Test 2	Week 15	30	10	0	2	1
End Term Examination		50	10	5	4	1

13. Syllabus of the Course:

Subject: Object Oriented Programming using Java	**Subject Code:** 22CS010

S. No.	Topic (s)	No. of Lectures	Weightage %
1-3	Introduction to JAVA: Java Introduction, History and goals of Java, Fundamentals of OOPs, Overview of JDK, JVM, Garbage Collection	3	**5%**
4-6	Java Basics: Identifiers, Keywords, Java Data Types &Operators	3	**5%**
7-10	Control Statements: Decision Constructs, Using Loop Constructs, Command Line Arguments	4	**6%**
11-14	Working with Arrays: Creating and Using Arrays (1D, 2D, Multidimensional) Jagged Arrays	4	**6%**
15-18	Classes & Objects: Classes, objects and methods: defining a class, Access Control, Method overloading, constructors, constructor overloading, use of this and static. Practice Problems	4	**6%**
19-22	Inheritance: Working with Inheritance: Inheritance Basics & Types, using super, Method Overriding, Dynamic method dispatch, final keyword. Practice Problems	4	**6%**
23-26	Abstract Methods & Classes, Packages& Interfaces: Built-In Packages and User Defined Packages, Interfaces: Declaration, Implementation, Extending Classes and Interfaces	4	**6%**

27-30	Strings, StringBuffer, StringBuilder&StringTokenizer: Introduction, Immutable String, Methods of String class, StringBuffer class &StringBuilder class, toString method, StringTokenizer class. Practice Problems	4	**6%**
31-34	Exception Handling: Exception handling fundamentals, Exception types, try and catch, multiple catch clauses, nested try, throw, throws and finally, Creating custom Exception. Practice problems.	4	**6%**
35-40	Multithreading: Java thread model, main thread, creating thread by implementing Runnable and extending thread class, creating multiple threads, using isAlive() and join(), thread priorities, Synchronization. Practice Problems	6	**10%**
41-44	Generics: Introduction, Generic Example, Generic Class, Generic Method, Generic Constructor and Generic Interfaces. Practice Problems	4	**6%**
45-52	Collections Framework: Introduction, Collection Interfaces: List, Queue, *Set*,CollectionClasses:ArrayList, LinkedList, HashSet, LinkedHashSet, TreeSet, PriorityQueue, ArrayQueue, Vector, Stack. *Working with Maps: The Map interfaces*, *The Map classes*, Comparable &Comparator, Arrays, Vector, Stack, Practice Problems	8	**12%**
53-56	IO Streams: Stream Classes: Byte Streams, Character Streams, StreamTokenizer. Practice Problems	4	**6%**
57-60	JDBC Connectivity: Introduction, Architecture, Establishing JDBC Database Connection.	4	**6%**
61-65	Problem Solving (Online)	5	**8%**

This Document is approved by:

Designation	**Name**	**Signature**
Course Coordinator	Ms. Rakhi	
Head Academic Delivery	Dr. Kamal Deep Garg	
Dean (CSE - AI)	Dr. Sushil Kumar Narang	
Date	06-01-2025	