A. Course Handout | Prepared on 14th March, 2023

Institute/School Name	Chitkara University Institute of Engineering & Technology		
Department Name	Computer Science & Engineering		
Programme Name	Bachelor of Engineering, Computer Science & Engineering		
Course Name	Core JAVA	Session	2022-2023
Course Code	CS109	Semester/Batch	4th/ 2021
L-T-P (Per Week)	4-0-2	Course Credits	05
Course Coordinator	Dr. Shikha		

1. Objectives of the Course

The course provides a wide scope of learning & understanding of the subject. It has been designed to provide students the practical ability in Java language, which can be used for system programming and as an application language. The main objectives of the course are:

- 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 Outcomes

On completion of the course, students will be able to:

CLO1. Implement the concept of object-oriented techniques and methodologies using Java**.**

CLO2. Use Exception Handling concepts for a Robust Application in Java.

CLO3. Demonstrate an understanding of Java Input and Output.

CLO4. Develop applications using multithreading concept of Java.

CLO5. Use database connectivity for a complete Java application.

CLO-PO mapping grid |Program outcomes (POs) are available as a part of Academic Program Guide (APG)

Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO1		M			M			M				M
CLO2	M		M	M		M	M	M	M		M	M
CLO3						M	M		M			M
CLO4	M	M		M	M	M		H	H	M	H	H
CLO5	H	H	H	M	H		H	H			H	H

3. Recommended Books (Reference Books/Text Books):

RB1: Herbert Schildt, "Java the Complete Reference", 9th Edition.

RB2: Kathy Sierra, "OCA/OCP Java SE 7 Programmer I & II Study Guide", Oracle Press.

RB3: Introduction to Java programming, Y. Daniel Liang, Pearson Education

RB4: Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Pres

RB5: Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning**.**

4. Other readings and relevant websites:

S. 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/object-oriented-programming-oops-concept-in-java/
6.	https://www.geeksforgeeks.org/establishing-jdbc-connection-in-java/

5. Recommended Tools and Platforms:

- Java Development Kit (JDK)
- IDE (Netbeans or Eclipse)

6. Course Plan

Lecture Number	Topics	Recommended Book / Other reading material
1-4	Introduction To Java: Java Introduction, History and Goals of Java, Fundamentals of Java, Overview Of JDK, JVM, Garbage Collection.	RB1, RB2, RB3, RB4
5-8	Java Basics: Identifiers, Keywords, Java Data Types & Operators.	RB1, RB2, RB3, RB4
9-15	Control Statements: Decision Constructs, Using Loop Constructs, Command Line Arguments	RB1, RB2, RB3, RB4
16-21	Working with Arrays: Creating and Using Arrays (1-D, 2-D And Multi-Dimensional Arrays), Jagged Arrays	RB1, RB2, RB3, RB4
22-24	Bitwise Operators: Bitwise OR, Bitwise AND, Bitwise XOR, Bitwise Complement, Bit-Shift Operators.	RB1, RB2, RB3, RB4
25-31	Objects and Classes: Classes, Objects and Methods, Defining A Class, Access Control, Method Overloading, Constructors, Constructor Overloading, Use of This and Static.	RB1, RB2, RB3, RB5
32-39	Inheritance: Working with Inheritance, Inheritance Basics & Types, Using Super, Method Overriding, Dynamic Method Dispatch, Final Keyword.	RB1, RB2, RB3, RB4
40-47	Abstract Methods & Interfaces: Built-In Packages and User Defined Packages, Interfaces: Declaration, Implementation, Extending Classes and Interfaces.	RB1, RB2, RB3, RB4
48-53	Strings: Introduction, Immutable String, Methods of String Class, Stringbuffer Class & Stringbuilder Class, tostring Method, Stringtokenizer Class.	RB1, RB2, RB3, RB4
54-60	Exception Handling: Exception Handling Fundamentals, Exception Types, Try and Catch, Multiple Catch Clauses, Nested Try, Throw, Throws and Finally, Creating Custom Exception.	RB1, RB2, RB3, RB5
61-67	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.	RB1, RB2, RB3, RB4
68-72	Generics: Introduction, Generic Example, Generic Class, Generic Method, Generic Constructor and Generic Interfaces.	RB1, RB2, RB3, RB5
73-79	Collections Framework: Introduction, Collection Interfaces, List, Queue, Set (Overview), Collection Classes, Arraylist, Linkedlist,	RB1, RB2, RB3, RB4

	Iterator, Working With Maps (Overview), Comparable & Comparator, Arrays, Vector, Stack.	
80-84	IO Streams: Stream Classes, Byte Streams, Character Streams, Stream Tokenizer.	RB1, RB2, RB3, RB4
85-90	JDBC Connectivity: Introduction, Architecture, Establishing JDBC Database Connection.	RB1, RB2, RB3, RB4

7. Delivery/Instructional Resources

Lecture Number	Topics	Web References	Audio-Video
1-4	Introduction To Java: Java Introduction, History and Goals of Java, Fundamentals of Java, Overview Of JDK, JVM, Garbage Collection.	https://www.oracle.com/webfolder/technetwork/tutorials/obe/java/gc01/index.html	https://archive.nptel.ac.in/content/storage2/106/105/106105191/MP4/mod01lec03.mp4
5-8	Java Basics: Identifiers, Keywords, Java Data Types & Operators.	https://www.w3schools.com/java/java_ref_keywords.asp	https://nptelvideos.com/video.php?id=1466&c=15
9-15	Control Statements: Decision Constructs, Using Loop Constructs, Command Line Arguments	https://www.geeksforgeeks.org/decision-making-javaif-else-switch-break-continue-jump/ https://www.geeksforgeeks.org/command-line-arguments-in-java/	https://youtu.be/FEkceTEI5DA https://nptelvideos.com/video.php?id=1468&c=15 https://nptelvideos.com/video.php?id=1464&c=15
16-21	Working with Arrays: Creating and Using Arrays (1-D, 2-D And Multi-Dimensional Arrays), Jagged Arrays	https://www.geeksforgeeks.org/arrays-in-java/	https://youtu.be/0MIyqDtDs_M
22-24	Bitwise Operators: Bitwise OR, Bitwise AND, Bitwise XOR, Bitwise Complement, Bit-Shift Operators.	https://www.geeksforgeeks.org/bitwise-operators-in-java/	https://www.youtube.com/watch?v=JQeu0loR8Yo
25-31	Objects and Classes: Classes, Objects and Methods, Defining A Class, Access Control, Method Overloading, Constructors, Constructor Overloading, Use of This and Static.	https://www.w3schools.com/java/java_constructors.asp https://www.geeksforgeeks.org/classes-objects-java/	https://archive.nptel.ac.in/content/storage2/106/105/106105191/MP4/mod02lec07.mp4
32-39	Inheritance: Working with Inheritance, Inheritance Basics & Types, Using Super, Method Overriding, Dynamic Method Dispatch, Final Keyword.	https://www.w3schools.com/java/java_inheritance.asp https://www.geeksforgeeks.org/inheritance-in-java/	https://archive.nptel.ac.in/content/storage2/106/105/106105191/MP4/mod03lec13.mp4
40-47	Abstract Methods & Interfaces: Built-In Packages and User Defined Packages, Interfaces: Declaration, Implementation, Extending Classes and Interfaces.	https://www.w3schools.com/java/java_abstract.asp https://www.geeksforgeeks.org/packages-in-java/	https://archive.nptel.ac.in/content/storage2/106/105/106105191/MP4/mod04lec17.mp4
48-53	Strings: Introduction, Immutable String, Methods of String Class, Stringbuffer Class & Stringbuilder Class, tostring Method, Stringtokenizer Class.	https://www.w3schools.com/java/java_ref_string.asp https://www.geeksforgeeks.org/stringbuffer-class-in-java/?ref=lbp	https://www.youtube.com/watch?v=3xuJIaP3C4g

54-60	Exception Handling: Exception Handling Fundamentals, Exception Types, Try and Catch, Multiple Catch Clauses, Nested Try, Throw, Throws and Finally, Creating Custom Exception.	https://www.w3schools.com/java/java_try_catch.asp https://www.geeksforgeeks.org/exceptions-in-java/?ref=lbp	https://archive.nptel.ac.in/content/storage2/106/105/106105191/MP4/mod05lec23.mp4
61-67	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.	https://www.geeksforgeeks.org/multithreading-in-java/?ref=lbp https://www.javatpoint.com/thread-concept-in-java	https://archive.nptel.ac.in/content/storage2/106/105/106105191/MP4/mod06lec27.mp4
68-72	Generics: Introduction, Generic Example, Generic Class, Generic Method, Generic Constructor and Generic Interfaces.	https://www.geeksforgeeks.org/generics-in-java/	https://archive.nptel.ac.in/courses/106/105/106105225/
73-79	Collections Framework: Introduction, Collection Interfaces, List, Queue, Set (Overview), Collection Classes, Arraylist, Linkedlist, Iterator, Working With Maps (Overview), Comparable & Comparator, Arrays, Vector, Stack.	https://www.javatpoint.com/collections-in-java https://www.geeksforgeeks.org/collections-in-java-2/	https://www.youtube.com/watch?v=GdAon80-0KA
80-84	IO Streams: Stream Classes, Byte Streams, Character Streams, Stream Tokenizer.	https://www.javatpoint.com/java-io	https://archive.nptel.ac.in/content/storage2/106/105/106105191/MP4/mod06lec30.mp4
85-90	JDBC Connectivity: Introduction, Architecture, Establishing JDBC Database Connection.	https://www.javatpoint.com/java-jdbc	https://archive.nptel.ac.in/content/storage2/106/105/106105191/MP4/mod10lec50.mp4

8. Action plan for different types of learners

Slow Learners	Average Learners	Fast Learners
Remedial Classes	Doubt-sessions	Advance Practical assignments

9. Evaluation Scheme & Components

Evaluation Component	Type of Component	No. of Assessments	Weightage of Component	Mode of Assessment
Component 1	Subjective Test/Sessional Tests (STs)	03*	40%	Offline/Online
Component 2	End Term Examinations	01	60%	Offline/Online
Total		100%		

* Out of 03 STs, the ERP system automatically picks the average of best 02 ST marks for evaluation of the STs as final marks.

10. Details of Evaluation Components

Evaluation Component	Description	Syllabus Covered (%)	Timeline of Examination	Weightage (%)
Component 01	ST 01	Upto 40%	Week 4	40%
	ST 02	41% - 70%	Week 7	
	ST 03	71%-100%	Week 10	
Component 02	End Term Examination*	100%	To be notified by Dean Examination	60%
Total				100%

* A minimum 90% attendance is required to become eligible for appearing in the End Semester Examination.

11. Syllabus of the Course

S. No.	Topic	No. of Lectures	Weightage %
1	**Introduction to Java:** Java introduction, history and goals of Java, fundamentals of Java, overview of JDK, JVM, garbage collection. **Java Basics:** identifiers, keywords, Java data types & operators **Control Statements:** decision constructs, using loop constructs, command line arguments	15	16%
2	**Working with Arrays:** creating and using arrays (1-D, 2-D and multi-dimensional arrays), jagged arrays **Bitwise Operators**: Bitwise OR, Bitwise AND, Bitwise XOR, Bitwise Complement, Bit-Shift Operators. **Objects and Classes:** Classes, objects and methods, defining a class, Access Control, Method overloading, constructors, constructor overloading, use of this and static.	16	18%
3	**Inheritance:** working with inheritance, inheritance basics & types, using super, method overriding, dynamic method dispatch, final keyword. **Abstract Methods & Classes**, Packages & Interfaces: built-in packages and user defined packages, interfaces: declaration, implementation, extending classes and interfaces.	16	18%
4	**Strings**, StringBuffer, StringBuilder & StringTokenizer: introduction, immutable string, methods of String class, StringBuffer class & StringBuilder class, toString method, StringTokenizer class. **Exception Handling:** exception handling fundamentals, exception types, try and catch, multiple catch clauses, nested try, throw, throws and finally, creating custom exception.	13	14%
5	**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. **Generics:** introduction, generic example, generic class, generic method, generic constructor and generic interfaces.	12	14%
6	**Collections Framework**: introduction, collection interfaces, list, queue, set (Overview), Collection classes, Array List, LinkedList, Iterator, working with maps (Overview), comparable & comparator, arrays,	7	8%

	vector, stack.		
7	**IO Streams**: stream classes, byte streams, character streams, stream tokenizer. **JDBC Connectivity**: introduction, architecture, establishing JDBC database connection.	11	12%

This Document is designed and approved by:

Designation	**Name**	**Signature**
Course Coordinator	Dr. Shikha	
Head Academic Delivery	Dr. Vikas Khullar	
Dean	Dr. Rishu Chhabra	
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Date	**14.03.2023**	