PROGRAMME: BCA (Bachelor of Computer Applications)

SEMESTER – II

Teaching-Learning & Evaluation Plan

Course Information: Core Course

Course Code: **23BCA2C03** Course Title: **JAVA PROGRAMMING**

Credits Units: **03** Contact Hours: **45** L-T-P: **3-0-0**

IA: UE Weightage - **50: 50** UE Pass Marks (IA & UE)- **0 and 35%** Aggregate Pass Marks: **40**

Question Paper Marks: **50** Special Examination Fees: **NA**

Pre-requisite (if any):

- Students should know the programming languages such as C/C++ and Algorithms.

Course Facilitator (s): Prof Jayashree. M Kudari, Associate Professor, School of CS & IT,
Dr. Pushpa J, Associate Professor, School of CS & IT,
Dr. Ramkumar Krishnamoorthy, Assistant Professor, School of CS & IT,
Dr. Mahesh V, Associate Professor, School of CS & IT.
Dr. Shantalaxmi, Associate Professor, School of CS & IT
Dr. Sivakumar, Assistant Professor, School of CS & IT,
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Dr. Boopathiraja, Assistant Professor, School of CS & IT

Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

At the end of the programme, students will be able to	
PO 1	**Computational Knowledge:** Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems.
PO 2	**Problem Analysis:** Ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.
PO 3	**Design / Development of Solutions:** Ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies.
PO 4	**Conduct Investigations of Complex Computing Problems:** Ability to devise and conduct experiments, interpret data and provide well-informed conclusions.
PO 5	**Modern Tool Usage:** Ability to select modern computing tools, skills and techniques necessary for innovative software solutions.

PO 6	**Professional Ethics:** Ability to apply and commit professional ethics and cyber regulations in a global economic environment.
PO 7	**Life-long Learning:** Recognize the need for and develop the ability to engage in continuous learning as a Computing professional.
PO 8	**Project Management:** Ability to understand management and computing principles with computing knowledge to manage projects in multidisciplinary environments.
PO 9	**Communication Efficacy:** Communicate effectively with the computing community as well as society by being able to comprehend effective documentation and presentations.
PO 10	**Societal & Environmental Concern:** Ability to recognize economical, environmental, social, health, legal, ethical issues involved in the use of computer technology and other consequential responsibilities relevant to professional practice.
PO11	**Individual & Team Work:** Ability to work as a member or leader in diverse teams in a multidisciplinary environment.
PO12	**Innovation and Entrepreneurship:** Identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.

Program Specific Outcomes (PSO)

PSO 01	Pertain current knowledge and adapting to emerging applications of Mathematics, Science fundamentals in the field of Computer science and its applications.
PSO 02	Exhibit proficiency in identifying, formulating and analyzing complex problems in the computer environment.
PSO 03	Ability to create, select and apply appropriate modern techniques for solving complex issues.
PSO 04	Explore technical knowledge in diverse areas of Computer Applications and experience a conductive environment in nurturing skills for a successful career and higher studies.

Course Objectives:

COB1: To understand the fundamental concepts of Java Programming Constructs.

COB2: To emphasize the skills in OOPs Concepts.

COB3: To develop Reusability techniques using Inheritance and Exception in Java.

COB4: To Learn in working with database connections, servlet and JSP

Course Outcomes:

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

Sl. No.	Course Outcome	Description	Bloom's Taxonomy Level
1	CO1	Describe the fundamental features of Java Language.	Understand (L2)
2	CO2	Discuss the Object-Oriented Concepts in Java	Understand (L2)
3	CO3	Demonstrate the Inheritances and handles the exceptions in Java Language	Apply (L3)
4	CO4	Examine Multithreading Concepts in Java	Analyze (L4)
5	CO5	Design Java Applications using Advanced Java Programming Concepts JDBC, Servlet and JSP	Create (L6)

CO-PO/PSO Mapping:

Course Outcome	BTL	Program Outcomes (PO)												Program Specific Outcomes (PSO)			
		PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3	PSO4
CO1	L2	3	2	2	2	3	2	-	-	-	-	-	-	1	2	1	1
CO2	L3	3	3	2	1	2	2	2	-	-	-	2	1	2	3	2	2
CO3	L3	2	3	2	2	2	1	2	-	-	-	1	2	2	2	3	2
CO4	L4	3	2	3	2	3	2	1	3	-	2	2	2	3	2	3	2
CO5	L6	3	3	3	3	3	2	2	2	-	3	2	2	3	2	2	3
Total		14	13	12	10	13	7	7	5	-	-	7	7	11	11	11	10
Average		2.8	2.6	2.4	2	2.6	1.75	1.75	2.5	-	-	1.75	1.75	2.2	2.2	2.2	2

Course Contents:

Module	Details	Contact Hours
I	Language Fundamentals: Evolution of Java, Features of Java, Object-Oriented Programming Concepts, Creating, Compiling, and Executing a Simple Java Program, Data types, Variables, Reading Input from the Console using Scanner class, Operators & Expressions, Type conversion and casting, Control structures: if, if-else, nested if, switch, while, do while, for, nested loop, Jump Statements; Arrays: defining and creating arrays, array processing, multidimensional arrays.	9
II	**Objects and Classes:** Defining Classes, Access modifiers, Objects & Methods, Array of Objects, Passing objects to methods, Constructors, "this" keyword, Accessing Objects via reference variables, Accessor & Mutator Methods, Method Overloading and Constructors Overloading, Static variables, constants and static methods, Packages, Wrapper classes, Class Relations: dependency, association, aggregation.	9
III	**Inheritance:** Inheritance, and Exceptions Handling: Inheritance: single and multiple inheritance, method overriding, use of super and final keywords, dynamic binding, abstract class, Interfaces. Exception Handling: Exception types, uncaught exceptions, multiple catch clauses, built-in exceptions, creating your own exceptions.	9
IV	**Multi-Threading:** Multithreading and String Handling: Multithreading: Java thread model, creating multiple threads, thread priorities, synchronization, inter-thread communication, suspending, resuming and stopping threads. String Handling – string operations, character extraction, string comparison, searching and modifying strings, String Buffer, String Builder, StringTokenzier; File I/O: Reading from and Writing to File.	9
V	Database and Web Programming: JDBC programming: JDBC Drivers, Creating connection, Creating and executing JDBC statements, PreparedStatement, Handling SQL exceptions, Accessing ResultSet; Web Applications, Client-Server model, Servlet Overview, Servlet Life Cycle, Writing simple programs using Servlet, Retrieving information from Request object, Overview of JSP, JSP Elements, JSP Comments, Scripting in JSP, Directives, Implicit Objects, Action Tags, JSP and Java Beans.	9

Text Books:	
TB1	The Complete reference java-2: XI Edition by Herbert Scheldt Pub. TMH
References Books:	
RB1	Sams Teach Yourself Java 6 in 21 Days, 5th edition by Rogers Cede head and Leura Lemay Pub. Pearson Education.
RB2	Learning Java, 5th Edition by Released May 2020 Publisher(s): O'Reilly Media, Inc. ISBN:9781492056270

Video Links: VL:

VL-1	**Module-1**	https://onlinecourses.nptel.ac.in/noc21_cs56/preview
VL-2	**Module-2**	https://onlinecourses.nptel.ac.in/noc21_cs56/preview
VL-3	**Module-3**	https://onlinecourses.nptel.ac.in/noc21_cs56/preview
VL-4	**Module-4**	https://onlinecourses.nptel.ac.in/noc21_cs56/preview
VL-5	**Module-5**	https://onlinecourses.nptel.ac.in/noc21_cs56/preview

Relevant Website (RW):

RW1-1	**Module-1**	https://docs.oracle.com/javase/tutorial/getStarted/index.html
RW2-2	**Module-2**	https://www.tutorialspoint.com/java/index.htm
RW3-3	**Module-3**	https://www.javatpoint.com/java-tutorial
RW4-4	**Module-4**	https://www.w3schools.com/java/java_intro.asp
RW5-5	**Module-5**	https://www.geeksforgeeks.org/java-programming-basics

MOOC Courses (MC):

Sr. No.	Platform	Topic	CO	Link	Duration
MC-1	LinkedIn Learning	Learning Java	C01	https://www.linkedin.com/learning/learning-java-4/welcome-to-learning-java?autoplay=true&u=92695330	2 hours 37 min
MC-2	LinkedIn Learning	Functional Programming	CO1 CO3	https://www.linkedin.com/learning/functional-programming-with-java/functional-programming-a-new-way-to-organize-code?autoplay=true&u=92695330	2 hour 39 min
MC-3	LinkedIn Learning	Java Essential Learning	CO3 CO4	https://www.linkedin.com/learning/java-essential-training-for-students/whatyou-should-know?u= 92695330	2 hour 39 min
MC-4	LinkedIn Learning	Java object Oriented programming	CO3 CO4	https://www.linkedin.com/learning/java-object-oriented-programming-2/why-learn-about-object-oriented-programming-in-java?autoplay=true&u=92695330	1 hour 59 min

MC-5	LinkedIn Learning	Java-Syntax and Structure	CO1 CO3 CO4 CO5	https://www.linkedin.com/learning/java-17-essential-training-syntax-and-structure/learn-the-essentials-of-java-17?autoplay=true&u=92695330	3 hours 12 min
Total MOOC Course integration with Certification					**12 hours**

Session-Wise Plan:

Pedagogy/Activity planned		Mode of Delivery	
P1	PPT presentation & Classroom interaction	M1	Synchronous – PPT
P2	Blended Learning with Hands-on	M2	Asynchronous/synchronous
P3	Flip Class & Module Quiz	M3	Synchronous - Hands-on
A1	Activity-1	M4	Synchronous - Discussion
A2	Activity-2		

Module	Session	Topic	TB/RB/RW/VL	Pedagogy / Activity planned	CO	Mode of delivery
01	1-2	Language Fundamentals: Evolution of Java, Features of Java, Object-Oriented Programming Concepts, Creating, Compiling, and Executing a Simple Java Program, Data types, Variables,	TB1 RB1	P1	CO1	M3
	3	Operators & Expressions, Reading Input from the Console using Scanner class,	VL-1 RW1-1	P1		M3
	4-5	Type conversion and casting, Control structures: if, if-else, nested if, switch,		P1		M3

	6-7	while, do while, for, nested loop, Jump Statements;		P1		M3
	8	Arrays: defining and creating arrays,		P2		M3
	9	Array processing, multidimensional arrays.		P1		M3
	8-9	Control Statements: if, if else Selection Statement: loops Module Quiz		P1		M3
02	10-11	Objects and Classes: Defining Classes, Objects & Methods,	TB1 VL-2	P1	CO2	M3
	12-13	Constructors, "this" keyword, Accessing Objects via reference variables,		P1		M3
			RB1 RW2			

	14-15	Accessor & Mutator Methods, Access modifiers, Constructors and Method Overloading.	VL-2 RW2	P1		M3
	16-18	Static variables, constants and methods, Passing objects to methods, Array of Objects, Packages, Wrapper classes, Class Relations: dependency, association, aggregation		P1		M3
	19-20	Inheritance, and Exceptions Handling: Inheritance: single and multiple inheritance,	TB1 RB2	P1	CO3	M3
	21-22	method overriding, use of super and final keywords,		P1		M3

	23-24	dynamic binding, abstract class, Interfaces.	VL-3 RW3	P3		M4
	26	Exception Handling: Exception types, uncaught exceptions,		P1		M3
	27	multiple catch clauses, built-in exceptions,		P1		M3
03	27	creating your own exceptions.		P1		M3
	28-29	Multithreading and String Handling: Multithreading: Java thread model, creating multiple threads, thread priorities, synchronization,	TB1 RB1 VL-4	P1	CO4	M3
	30-31	inter-thread communication, suspending, resuming and stopping threads.	RW-4	P1		M3
	32-33	String Handling – string operations, character extraction, string comparison, searching and modifying strings,		P1		M3
04	34-35	String Buffer, String Builder,		P1		M3
	36	StringTokenzier; File I/O: Reading from and Writing to File.		P2		M4
	37-38	JDBC programming: JDBC Drivers, Creating connection, Creating and executing JDBC statements,	TB1 RB1 VL-5 RW5-5	P1	CO5	M3
05	39-40	PreparedStatement, Handling SQL exceptions, Accessing ResultSet;		P1		M3

	41-42	Web Applications, Client-Server model, Servlet Overview, Servlet Life Cycle,		P1		M3
	43	Writing simple programs using Servlet, Retrieving information from Request object,		P1		M3
	44	Overview of JSP, JSP Elements, JSP Comments, Scripting in JSP,		P1		M3
	45	. Directives, Implicit Objects, Action Tags, JSP and Java Beans		P2		M4

Assessment Scheme: IA: UE - 50:50

Sl. No.	Assessment Instrument	Formative/ Summative	Frequency	Weightage (%)	CO
1.	Skill Enhancement Linkedin or MOOC courses - Activity 1	Formative	1	15	CO1, CO2, CO3
2.	**Content Improvement Activity-2 -Mini Project** on Java with Database Connectivity		1/3	15	CO1, CO2, CO4,CO5
3.	Class participation	**Continuous**	-	5	-
4.	Periodic Test	Formative	1	5	CO1, CO2, CO3, CO4, CO5
5	Preparatory Exam	**Formative**	1	10	CO1, CO2, CO3, CO4, CO5
6.	End Semester Examination	Summative	1	50	CO1, CO2, CO3, CO4,CO5
	Total			100	

Assessment Sheet with Rubrics for Grading & Evaluation

A1 - Activity-1: Online Linked-In Certification

Students have to complete this online LinkedIn course in the given timeline.

Sr. No.	USN No.	Student Name	On-time Submission	Learning Outcomes	Report with details	Viva-Voce	Total	Conversion
			10 Marks	15 Marks	15 Marks	10 Marks	50 Marks	15 Marks

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A2 - Activity-2: Mini Project

Students have to build their own real-time project using java and oracle.

Sr. No.	USN No.	Student Name	On-time Submission	Abstract Submission	Implementation	Viva - Voce	Report	Total	Conversion
			5 Marks	10 Marks	20 Marks	5 Marks	10 Marks	50 Marks	15 Marks