School of Computing

COURSE PLAN

Department	Computer Science
Course Title	OBJECT-ORIENTED PROGRAMMING USING JAVA
Course Code	24CSA501
Programme and Section	MCA – C and D sec
Academic Year	2025
Semester	I semester
LTP/ hours per week- Credit	L: 03, T: 00 and P: 01 ,04 Credits
Course Instructor Detail(s)	Ms. Kanchana V v_kanchana@my.amrita.edu +91 8971379772 Dr. Priya Govindarajan priyagovindarajan@my.amrita.edu +91 9940775508

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Program Outcomes (PO's)

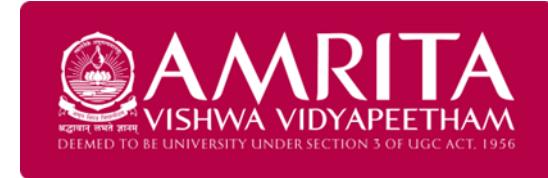|		
PO1	Computational Knowledge: Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.	
PO2	Problem Analysis: Identity, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.	
PO3	Design /Development of Solutions: Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.	
PO4	Conduct Investigations of Complex Computing Problems: Use research-based knowledge and research methods, including design of experiments, analysis, and interpretation of data, and synthesis of the information to provide valid conclusions	
PO5	Modern Tool Usage: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.	
PO6	Professional Ethics: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice	
PO7	Life-long Learning: Recognize the need and ability to engage in independent learning for continual development as a computing professional	
PO8	Project management and finance: Demonstrate knowledge and understanding of the computing and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	

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PO9	Communication Efficacy: Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
PO10	Societal and Environmental Concern: Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts and the consequential responsibilities relevant to professional computing practice.
PO11	Individual and Teamwork: Function effectively as an individual and as a member or leader in diverse teams and multidisciplinary environments.
PO12	Innovation and Entrepreneurship: Identify a timely opportunity and use innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large

Course Outcome (CO)

CO1	Demonstrate a solid understanding of object-oriented programming concepts.
CO2	Design, implement, and test Java applications.
CO3	Understand and employ concurrency concepts.
CO4	Apply Java programming skills to solve real-world problems. .
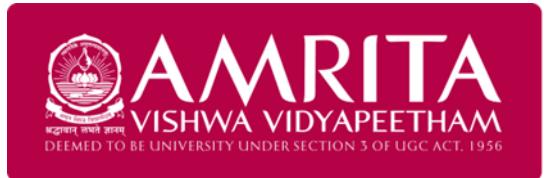
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CO-PO mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	2	3	3	2	3	1	-	-	-	-	2	2
CO3	2	2	2	2	2	-	-	-	-	-	-	-
CO4	2	3	3	2	3	1	-	-	-	-	2	2

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Theory Component:

Week	LectureNo.	Topics	Keywords	Teaching Aids	Text book with chapters	Course Outcomes
1	1	Object-Oriented Programming (OOP) Concepts - Abstraction, Encapsulation, Inheritance, Polymorphism	OOPs Abstraction – Basic Concepts	PowerPoint Slides / Blackboard	Textbook I Chapter 1	1
	2		Encapsulation – Concepts Inheritance – Basic Concepts	PowerPoint Slides / Blackboard		1
	3		Polymorphism - Basic Concepts	PowerPoint Slides / Blackboard		1
2	4	Introduction to Java (Characteristics of Java, Java Environment, Java Source File Structure, Compilation Process)	Explanation	PowerPoint Slides / Blackboard	Textbook I Chapter 2	1
	5		Structure and its explanation	PowerPoint Slides / Blackboard		1
	6		Demonstration of the compilation process	PowerPoint Slides / Blackboard		1
3	7	Fundamental Programming Constructs - Data Types, Variables, Operators	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 3, 4	1
	8		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		1
	9		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		1
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4	10	Control Flow (Conditional and Looping Statements) - Arrays, Strings	Syntax, Explanation, sample program	PowerPoint Slides / Blackboard	Textbook I Chapter 5	1
	11		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		1
	12		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		1
5	13	Classes and Objects - Defining Classes, Constructors, Methods, Access Specifiers,	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 6,7	1
	14		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		1
	15		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		1
6	16	Static Members, Protected Members, Final Methods and Classes, Comments	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 7	2
	17		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
	18		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
7	19	Inheritance - Superclasses and Subclasses	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 8	2
	20		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
	21		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2

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			Mid-Term Examinations				
8	22	Constructors in Subclasses, The Object Class, Abstract Classes and Methods,	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 8	2
	23		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
	24		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
9	25	Interfaces - Defining and Implementing Interfaces, Differences between Classes and Interfaces	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 9	2
	26		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
	27		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
10	28	Exception Handling - Exception Hierarchy, Throwing and Catching Exceptions	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 10	2
	29		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
	30		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2

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			Lab Test - I			
11	31	Built-in Exceptions, Creating Custom Exceptions.	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 10	2
	32		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
	33		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		2
12	34	Input/Output - Streams (Byte and Character), Console Input/Output, File Input/Output	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 13	3,4
	35		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		3,4
	36		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		3,4
13	37	Multithreading - Thread-based vs. Process-based Multitasking, Java Thread Model, Creating and Managing Threads	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 11	3,4
	38		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		3,4
	39		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		3,4
14	40	Thread Priorities, Inter-thread Communication, Concurrency - Concurrency Issues (Safety, Liveness, Fairness), Locks and Synchronization,	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 11, 28	3,4
	41		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		3,4
	42		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		3,4

15	43	Thread Pools, Futures and Callable, Fork-Join Parallel Framework – Expert Interaction	Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard	Textbook I Chapter 28	3,4
	44		Syntax, Explanation, sample snippet	PowerPoint Slides / Blackboard		3,4
	45		Expert Interaction – Importance of JAVA and its Insight	PowerPoint Slides / Blackboard		3,4
End Semester Examination						

Text / Reference Books
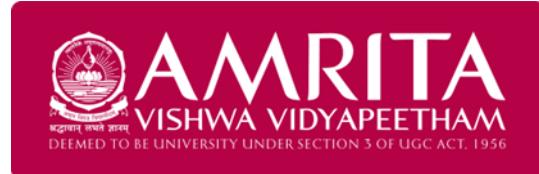
Textbooks / References:

1. Herbert Schildt, Java: The Complete Reference, 13th Edition, McGraw-Hill

Education, 2024

2. Goetz, Brian. Java concurrency in practice. Pearson Education, 2006.

3. Kathy Sierra, Bert Bates & Trisha Gee, Head First Java: A Brain-Friendly Guide,

Third Edition, O'Reilly. 2022

4. Barbara Liskov & John Guttag, Program Development in Java: Abstraction,

Specification and Object-Oriented Design, Addison-Wesley, 2000
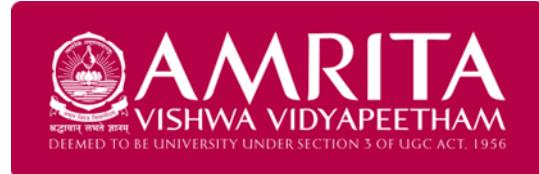
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Lab Experiments:

LAB - section	Experiments	Course Outcome
1	Program using input (DataInputStream) and Output	1,2
2	Program to Implement Data Types, Variables and all kinds of Operators	1,2
3	Program using Arrays with branching and looping.	1,2
4	Program using Polymorphism	1,2
5	A program using Inheritance and Constructor	1,2
6	Program to implement Multiple Inheritance using the concept of Interface.	3
7	Program to implement all the types of Inheritance	3,4
8	Program to implement Abstract Classes and Methods	3,4

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9	Program using Packages with interfaces.	4
10	Program using Threads (Synchronization)	4
	LAB TEST - I	
11	Program to implement Exceptions in JAVA.	4
12	Program to implement Static Class and Members	4
13	Program to implement Protected Members, Final Methods	4
14	Program to implement Built-in Exceptions	4
15	Draft a real-time application with all the above concepts	1,2,3,4

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Internal Assessment Component:

Sl. No.	Component Name	Weightage	CO Mapping	Tentative Date of Completion
1	CT 01	(10) 5	1,3	By the end of 3rd Week
2	Project (Draft)	07	1,2,3,4	By the end of 9th Week
3	Project (Presentation)	08	1,2,3,4	End of the semester
4	Project (Implementation)	10	1,2,3,4	End of the semester
5	Midterm Examination	(50) 20	1,2,3	By the end of 7th Week
6	Lab Test – 1 (along with VIVA)	20	1,2,3,4	By the end of 10th Week

Name & Signatures

1.   Course Teacher:

2.   Class Representatives:

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3.   **Class Advisor:**

4.   **Program Coordinator:**

5.   **Chairperson:**