Semester: 7th			
Paper code: OAE417T	L	T/P	Credits
Subject: Advanced Java Programming	3	0	3

Marking Scheme:
1. Teachers Continuous Evaluation: As per university examination norms from time to time
2. End Term Theory Examination: As per university examination norms from time to time

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: As per university norms

1. There should be 9 questions in the end term examination question paper.
2. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions.
3. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, students may be asked to attempt only 1 question from each unit.
4. The questions are to be framed keeping in view the learning outcomes of course/paper. The standard/ level of the questions to be asked should be at the level of the prescribed textbooks.
5. The requirement of (scientific) calculators/ log-tables/ data-tables may be specified if required.

Course Objectives:

1.	To provide students with a strong foundation in advanced Java programming concepts and their practical applications.
2.	To enable students to design and implement multithreaded applications and handle exceptions effectively.
3.	To equip students with networking and database connectivity skills for building networked applications with database interaction.
4.	To introduce students to GUI development using JavaFX and explore web development concepts with Java Servlets, JSP, and Spring.

Course Outcomes:

CO1	Develop expertise in advanced Java concepts, including multithreading, networking, database connectivity, and GUI development.
CO2	Apply advanced Java knowledge to create real-world applications involving networking, database interaction, and graphical user interfaces.
CO3	Utilize design patterns and principles to solve complex programming challenges and optimize application performance.
CO4	Gain an understanding of web development concepts with an introduction to Java Servlets, JSP, and the Spring Framework.

Course Outcomes (CO) to Programme Outcomes (PO)

Mapping (Scale 1: Low, 2: Medium, 3: High

CO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	1	2	3	3	1	1	-	1	1	-	-	2
CO2	2	2	3	3	1	1	-	1	1	-	-	2
CO3	2	2	3	3	1	1	-	1	2	-	-	2
CO4	2	2	3	3	2	1	1	1	2	-	-	2

Course Overview:
Advanced Java Programming is designed for B.Tech AI, ML, IIoT, and Data Science students to enhance their Java skills, focusing on advanced topics like multithreading, networking, database connectivity, and GUI development. The syllabus covers Java's latest features and applications in real-world scenarios.

UNIT I **[8]**
JDBC Architecture: JDBC Architecture, a Relational Database Overview, Processing SQL Statements with JDBC Establishing a Connection, Connecting with DataSource Objects, Handling SQLExceptions, Retrieving and Modifying Values from Result Sets, Using Prepared Statements, Using Transactions, Using RowSet Objects

UNIT II **[8]**
Generics & Collection Framework APIs: Introduction to Design Patterns: the Factory Design Pattern, the Singleton Design Pattern.

UNIT III **[8]**
Why use Servlets & JSPs: an introduction to web servers & clients, HTML, HTTP Protocol, HTTP GET and POST requests, HTTP responses. Web App Architecture: high-level overview. A ModelView-Controller (MVC) overview and example, life cycle of a servlet, request & response objects, Init Parameters and ServletConfig, JSP init parameters, Context init parameters, attributes and listeners, session management.

UNIT IV **[8]**
Scriptless JSP: Create a simple JSP using "out" and a page directive, JSP expressions, variables, and declarations, implicit objects, The Lifecycle and initialization of a JSP, other directives. Standard actions, Expression Language, The EL implicit objects & EL functions, using JSTL.

Text Books:

1. Dietel & Deitel, Java How to Program, Pearson Education, 10th Ed., 2015.
2. Bryan Basham, Kathy Sierra, Bert Bates, Head First Servlets & JSPs , O'REILLY, 2nd Ed., 2008.

Reference Books:
1. Eric Freeman , Elisabeth Freeman, Kathy Sierra and Bert Bates, Head First Design Patterns, O'REILLY, 1st Ed., 2004.