MCA I Semester 2

Subject Name: Advanced Java **Subject Code:** MTCA23201

Type of course: Professional Core Course

Prerequisite (if any):
- Object Oriented Programming Language

List of Courses where this course will be prerequisite:
- Projects involving Web applications

Rationale: After studying this course, students will be able to understand the object oriented principles implemented in Java and the concept of web applications and also how to develop these web applications using Java Web Technologies.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks		Practical Marks		Total
L	T	P	C	TEE	CAT	TEP	CAP	
3	0	0	3	60	40	-	-	100

CAT: Continuous Assessment Theory comprised of CA1 and CA2 **CA1:** Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CAP:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in courses.

Content:

Sr. No.	Content	Teaching Hrs.	Module Weightage
1	**Introduction to Java:** Overview of constructs (for loop, while loop, do-while loop, if, switch), Overview of Data types (primitive and non-primitive including arrays), String class Overview of classes and objects, constructors, encapsulation, abstraction, inheritance and polymorphism, Overview of interfaces	05	11%
2	**Packages, Collection and Generics:** **Packages:** Built-in packages (java.lang and java.util), User defined packages **Collection:**Collection classes (List, Set, Map, ArrayList, HashMap) **Generics:**Generics with respect to collection classes	05	11%
3	**Threads, Multithreading and Synchronization** **Threads:** What are threads? Threads vs. Process Ways of creating a thread, Thread class and thread of execution **Multithreading and Synchronization:** How to create multiple threads, Synchronization between threads using synchronized methods, synchronized blocks	05	11%
4	**AWT&EventHandling** AWT components including Label, TextField and Button, Event Handling framework of Java, ActionListener, WindowListener	03	7%
5	**Java Networking** Networking Basics, Networking Classes and Interfaces, InetAddress - Inet4Address and Inet6Address, TCP/IP Client and Server Sockets, Datagrams	05	11%
6	**Introduction to Web applications and Servlets:** Introduction to Web applications, Introduction to Java Servlets, Servlet Life Cycle, Generic Servlet, HttpServlet, Servlet Interface	04	8%
7	**Request and Response Objects and Session Management** Request and Response objects, Cookies, Why is Session Management required, Different ways of managing session including Cookies, Hidden Form Fields and URL Rewriting, Advantages and disadvantages of all the 3 ways of session management	05	11%

8	**JSP and Java Bean:** JSP Basic Syntax, HTML Text, HTML comments, Template Text, JSP Comment, JSPExpression, JSP Scriptlet, JSP Declaration, JSP Directives (page, include and taglib), JSP Action tags, Predefined Variables, Using Standard Actions Tags<jsp:plugin>, <jsp:forward>, <jsp: include>,Using JavaBeans in JSP pages – <jsp:useBean>, <jsp:getProperty>, <jsp:setProperty>,Sharing Beans, Use of Scopes and their Attributes.	07	16%
9	**MVC and its implementation using Request Dispatcher** What is MVC architecture with respect to Web Applications, Java technologies used to implement MVC architecture including Beans, Implement MVC using RequestDispatcher with the help of Servlets, Beans and JSP	03	7%
10	**Connecting to Relational Database from Java** The Design of JDBC, JDBC Driver Types, SQL, JDBC Configuration, JDBC Objects – Connection, Statement, PreparedStatement, Resultset	03	7%

Suggested Specification table with Marks (Theory):

%Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	20	15	15	15	15

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	JAVA: The Complete Reference	Herbert Schildt	McGraw Hill Education ISBN: 978-1-260-44023-2	2019	11th Edition

2	JAVA: A Beginner's Guide	Herbert Schildt	McGraw Hill Education ISBN: 978-1-260-44021-8	2019	8th Edition
3	Core Java Vol I – Fundamentals	Cay S Horstmann	Prentice Hall ISBN: 978-0-13-417730-4	2016	10th Edition
4	Core Java Vol II – Advanced Features	Cay S Horstmann	Prentice Hall ISBN: 978-0-13-417729-8	2017	10th Edition
5	Core Servlets and Java Server Pages - Volume I	Marty Hall, Larry Brown	Pearson Education ISBN:	2004	2nd Edition
6	Core Servlets and Java Server Pages - Volume 2	Marty Hall, Larry Brown, Yaakov Chaikin	Pearson Education ISBN:	2004	2nd Edition
7	HeadFirst Servlets and JSP	Kathy Sierra	O' Reilly ISBN:	2008	2nd Edition

Course Outcomes:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % Weightage
CO-1	Develop Java desktop applications using all object oriented concepts	11
CO-2	Use the utility classes of Java and different packages	11
CO-3	Create threads in Java and develop multithreaded applications	11
CO-4	Implement event handling in Java applications	07
CO-5	Create network applications using networking API	11
CO-6	Create Java Servlets	08
CO-7	Understand the HTTP protocol's Request and Response objects, Session Management	11

CO-8	Create JSP pages using JSP,JSP Expression language and also able to use Java Beans in JSP pages	**16**
CO-9	Create a web application by implementing the MVC architecture using Java Servlets and JSP pages	**07**
CO-10	Communicate with a relational database from Java application	**07**

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13
CO-1	3	3	3	2	1	1	1	0	0	0	0	0	1
CO-2	3	3	3	2	2	1	1	0	2	0	1	1	0
CO-3	3	3	3	2	1	0	1	0	0	0	0	0	1
CO-4	3	3	3	2	1	0	1	0	0	0	0	0	1
CO-5	3	3	3	2	3	0	1	0	1	0	0	1	0
CO-6	3	3	3	2	1	0	1	0	1	0	0	0	1
CO-7	3	3	3	3	3	2	2	2	2	1	3	3	0
CO-8	3	3	3	3	3	2	2	2	2	1	3	3	1
CO-9	3	3	3	3	3	2	2	2	2	1	3	3	0
CO-10	3	3	3	3	3	2	2	2	2	1	3	3	0
Rationale *													

Rationale*: Explaining why it is matching this particular program outcome

List of Open learning website:

- https://docs.oracle.com/en/java
- https://docs.oracle.com/en/java/javase/11/docs/api/index.html
- https://www.tutorialspoint.com/java/index.htm
- https://tomcat.apache.org/tomcat-5.5-doc/servletapi/
- https://docs.oracle.com/cd/E17802_01/products/products/servlet/2.5/docs/servlet-2_5-mr2/index.html
- https://docs.oracle.com/javaee/5/tutorial/doc/bnajo.html

List of Open Source Software:

- Core Java 9 or later
- Tomcat 9.0.45
- Eclipse 2021-03 or later

Major Equipment Needed: NA