Gyanmanjari
Innovative University

Subject: Advanced Object-Oriented Programming-DETCE14211

Type of course: Minor Stream

Prerequisite: Basic Knowledge of JAVA and HTML

Rationale:

This course offers a comprehensive exploration of web-based Java programming, covering essential concepts and practical techniques. Students delve into technologies like JDBC and Hibernate for seamless database integration, server-side tools for robust Java applications, and web services for cross-platform communication. The course emphasizes client-service architecture's importance in web-based applications, addressing limitations of basic Java with advanced tools. Servlets is introduced for creating dynamic web applications. Web socket programming facilitates real-time communication between web clients and servers, providing a scalable alternative to HTTP. In summary, this course equips students with a strong foundation in web-based Java programming, empowering them to develop sophisticated applications and enable seamless internet communication.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
3	0	2	4	60	30	10	20	30	150

Legends: CI-ClassRoom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Sr. No	Course Content	Hrs.	% Weightage
1	**Exception Handling & Multithreading:** Types of errors, exceptions, try...catch statement, multiple catch blocks, throw and throws keywords, finally clause, uses of exceptions, user defined exceptions. Concept of Multithreading, creating thread, extending Thread class, implementing Runnable interface, life cycle of a thread, Thread priority, Thread exception handling in threads	07	15%
2	**File Handling** Explain basics of streams, stream classes, creation, reading and writing files in context to file handling. **Network Programming with Java:** Network Programming With java.net Package- Inet Address class, URL class, URL Connection class. Establishing two-way communication between Server and Client - TCP/IP client sockets, TCP/IP server sockets.	07	15%
3	**Java Database Connectivity (JDBC)** Describe the basics of JDBC and its connectivity. The JDBC API. The Statement Interface, Prepared Statement, Callable Statement, the Result Set Interface, Transaction processing – commit, rollback, save point Explain different types of JDBC drivers and their advantages and disadvantages. database operations like creating tables, operations using SQL CRUD operation.	11	25%
4	**Hibernate:** Overview of Hibernate, Hibernate Architecture, Hibernate Mapping Types, Hibernate O/R Mapping, Hibernate Annotation Hibernate Query Language	09	20%
5	**Servlets:** Introduction to Servlets, Life Cycle of Servlet. Creating, configuring and deploying echo servlet on Tomcat Server Parameters and Attributes – HttpServletRequest Interface, ServletContext and ServletConfig Interface, Request Delegation – Requestdispatcher Interface. Exploring Session Tracking Mechanisms. Connecting and reading database/table records and displaying them using servlet, Advantages and Disadvantages of Servlet.	11	25%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Empowering Code: Unlocking the Potential of Java** Students (Group of two students) are required to design a poster that illustrates the concept of "Code to Connection" using Java programming. This poster should effectively convey how Java code can be utilized to create and establish connections between various systems, devices, and applications, highlighting key principles such as network programming, client-server models, and the integration of different technologies. Upload Final poster on GMIU Web Portal.	10
2	**Make one project using core JAVA(JDBC) with the help CRUD operation** Users can perform CRUD operations on student data, such as adding new students, reading student details, updating student information, and deleting student records. The project utilizes core Java for logic implementation and JDBC (Java Database Connectivity) for database interaction. Upload solution (code) and output (animation screenshot) on GMIU Web Portal.	10
3	**Make one project using web-based java (Servlet HTML/CSS) with the help of CRUD operation.** Users can perform CRUD operations on student data, such as adding new students, reading student details, updating student information, and deleting student records. The project utilizes core Java for logic implementation and Servlet HTML/CSS (Java Database Connectivity) for database interaction with UX and UI. Upload solution (code) and output (animation screenshot) on GMIU Web Portal.	10
	Total	30

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage %	25%	35%	20%	10%	05%	05%

Course Outcome:

After learning the course the students should be able to:	
CO1	Implement thread and learn about how to handle the exception in java.
CO2	Develop Java Application using file Handling, network protocols, socket programming, and related technologies
CO3	Implement basic database operations using JDBC.
CO4	Understand database-driven Java applications using Hibernate ORM framework.
CO5	Learn server-side programs using Servlets.

List of Practical:

Sr. No	Description	Unit No	Hrs.
1	Write a program in Java to develop user defined exceptions for 'Divide by Zero' error.	1	2
2	Write a program that executes two threads. One thread will print the even numbers and another thread will print odd numbers from 1 to 200.	1	2
3	Write a program that reads words from a text file (passed as a command-line argument) and displays all the non-duplicate words in descending order.	2	4
4	Write a client server program where the client sends two numbers and the server responds with a square of them.	2	2
5	Develop a chat application using socket programming.	2	4
6	Develop a program to present a set of choices for users to select a product and display the price of the product.	3	4
7	Develop a simple hibernate Web Application that displays all records stored in a student table having attributes student_id, student_name and student_branch.	4	2
8	a) Write an HTML code to create a login form having one submit button, two textboxes labeled as Login name and Password as respectively. b) Write a Servlet class named as ReadParameter to read these two parameters and display entered parameters values on the page using the doGet() or doPost() method when the user clicked on the submit button.	5	4
9	Create a web form which processes servlet and demonstrates use of cookies and sessions.	5	4
10	Develop a student login application using MVC architecture (HTML & servlet). display whether a student gets Successfully logged in or not.	5	2
		Total	30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

The internal evaluation will be done on the basis of Active Learning Assignment.

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] Java server programming javaee-7 j2ee 1.7), black book , dreamtech press.
[2] J2ee: the complete reference , james edward keogh, mcgraw hill education.
[3] The complete reference jsp 2.0, phil hanna, bpb publication.
[4] Complete reference java 2, herbert schildt, mcgraw hill education
[5] Web technology with advance java, soumadip ghosh, university press.