JERUSALEM COLLEGE OF ENGINEERING
AN AUTONOMOUS INSTITUTION
Approved by AICTE, New Delhi, Affiliated to Anna University Chennai,
Accredited by NBA, New Delhi and Accredited by NAAC with "A" Grade
Velachery Main Road, Narayanapuram, Pallikaranai, Chennai, Tamil Nadu - 600100.

DEPARTMENT OF INFORMATION TECHNOLOGY

Academic Year 2021-2022 Odd Semester

Degree, Semester & Branch: B.Tech INFORMATION TECHNOLOGY

Subject code & Name : JCS1501 Internet Programming

Name of the Faculty member (s): Dr.K.Sundaramoorthy

Innovative Practice Description

- **Unit / Topic: Unit III / Java Servlet Architecture**

- **Course Outcome:** CO3

- **Topic Learning Outcome:** TLO3

- **Activity Chosen: Learning by Teaching**

- **Justification:**

- Teaching Java Servlet Architecture is justified due to its foundational role in Java EE and web development. Using the Jigsaw method enhances the learning experience by promoting active participation, collaborative learning, and a deeper understanding of complex concepts. This approach prepares students for advanced topics and practical application in the field of web development.

- **Time Allotted for the Activity:** 30 Minutes
- **Details of the Implementation:**

Teaching-Learning Process for Java Servlet Architecture

Overview of Java Servlet Architecture

1. **Servlet Basics:** Introduction to Servlets, life cycle, and their role in web applications.
2. **Servlet Container:** Understanding the servlet container, its functions, and responsibilities.
3. **Request and Response:** Handling HTTP requests and responses.
4. **Session Management:** Techniques for session tracking and state management.
5. **Servlet Configuration:** Deployment descriptor (web.xml) and annotations.
6. **Filters and Listeners:** Their role and implementation.
7. **Security:** Managing security in servlets, authentication, and authorization.

Jigsaw Method Implementation

1. **Divide the Topic:** Break down the topic into key sections.
2. **Create Expert Groups:** Assign each group a specific section to become experts in.

3. **Study and Discuss**: Each group researches their section.
4. **Teach in Jigsaw Groups**: Form new groups with one expert from each section.
5. **Present and Teach**: Members teach their section to the new group.
6. **Synthesize and Discuss**: The group integrates all sections into a comprehensive understanding.

Detailed Steps

1. **Divide the Topic:**
   - **Group A**: Servlet Basics
   - **Group B**: Servlet Container
   - **Group C**: Request and Response
   - **Group D**: Session Management
   - **Group E**: Servlet Configuration
   - **Group F**: Filters and Listeners
   - **Group G**: Security

2. **Create Expert Groups:**
   - Assign students to one of the groups. Each group will become experts in their specific topic.

3. **Study and Discuss:**
   - **Group A (Servlet Basics):**
     - Research the servlet life cycle (init, service, destroy).
     - Study basic servlet classes and interfaces (Servlet, GenericServlet, HttpServlet).
   - **Group B (Servlet Container):**
     - Learn about servlet containers like Tomcat and their responsibilities (loading servlets, managing life cycles).
   - **Group C (Request and Response):**
     - Explore handling HTTP requests (GET, POST) and generating responses.
   - **Group D (Session Management):**
     - Investigate session tracking techniques (cookies, URL rewriting, HttpSession).
   - **Group E (Servlet Configuration):**
     - Study deployment descriptors (web.xml), and configuring servlets using annotations.
   - **Group F (Filters and Listeners):**
     - Learn about implementing filters for request and response modifications, and listeners for event handling.
   - **Group G (Security):**
     - Research managing security (authentication, authorization) in web applications.

4. **Teach in Jigsaw Groups:**
   - Form new groups with at least one member from each expert group.
   - Each expert presents their section to the new group.

5. **Present and Teach:**
   - **Group A Member**: Explains servlet basics and lifecycle.
   - **Group B Member**: Describes the role and functions of the servlet container.
   - **Group C Member**: Demonstrates how to handle HTTP requests and responses.
   - **Group D Member**: Discusses session management techniques.
   - **Group E Member**: Explains servlet configuration using web.xml and annotations.
   - **Group F Member**: Details the implementation of filters and listeners.
   - **Group G Member**: Discusses security management in servlets.

6. **Synthesize and Discuss:**
   - After all presentations, the group discusses and integrates the knowledge.
   - They collaboratively work on a sample servlet project incorporating all aspects.
   - Address questions and clarify doubts, ensuring comprehensive understanding.

Example Activities

1. **Servlet Basics** (Group A):
   - Create a simple servlet and deploy it on a servlet container.
   - Demonstrate the servlet lifecycle methods in action.
2. **Servlet Container** (Group B):
   - Set up a servlet container like Apache Tomcat.
   - Show how the container loads and manages servlets.
3. **Request and Response** (Group C):
   - Implement servlets that handle different HTTP methods (GET, POST).
   - Show how to read request parameters and generate responses.
4. **Session Management** (Group D):
   - Implement session tracking using cookies and HttpSession.
   - Demonstrate maintaining state across multiple requests.
5. **Servlet Configuration** (Group E):
   - Configure servlets using web.xml and annotations.
   - Demonstrate URL mapping and initialization parameters.
6. **Filters and Listeners** (Group F):
   - Create and apply filters to modify request and response.
   - Implement listeners to handle events like session creation and destruction.
7. **Security** (Group G):
   - Set up authentication and authorization using declarative security in web.xml.
   - Demonstrate securing servlets using annotations.

Conclusion

Using the Jigsaw method to teach Java Servlet Architecture ensures that students actively engage with the material, work collaboratively, and take responsibility for their learning. This approach not only deepens their understanding but also enhances their ability to apply the concepts in practical scenarios.

- **CO – PO / PSO mapping:**

CO	PO1	PO2	PO3	PO9	PO10	PO12
CO2	2	1	1	1	1	1

- **PO / PSO mapped:**
  (1 – Low   2 – Moderate   3 – High)

Innovative practice	PO1	PO2	PO3	PO9	PO10	PO12
Justification for correlation	It makes the student to learn beyond the class room delivery and helps to explore a lot	Students will be able to design an attractive webpage using Background and Borders according to the problem	Students will be able to provide solutions to the complex problem by dividing into sub problems using function concept	As the student is taking the class, her/his individuality can be improved. It leads to peer-to-peer learning	Students communication skill will be improved as they are facing the audience and teaching the concepts	The teaching and self learning skill earned through this activity helps the students in knowing and solving various problems

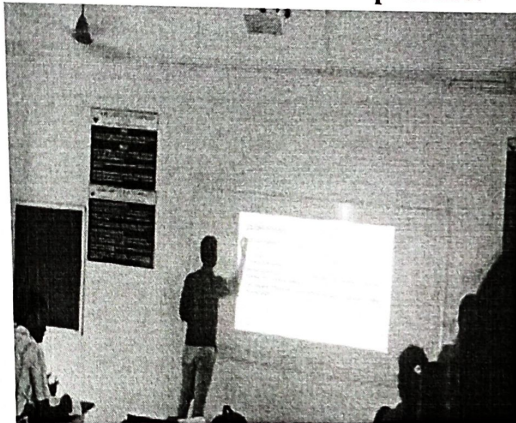- **Images / Screenshot of the practice:**

Fig 1: Learning by teaching activity

- **Reflective Critique:**
  - ❖ *Feedback of practice from students and other stakeholders:*
    - ○ Easy to understand the topic as it was taught by their classmate.
    - ○ Very comfortable to ask doubts while teaching.
    - ○ The student who took the class said it helps in improving self learning skills.
  - ❖ *Benefit of the practice:*
    - ○ As the student involves in teaching the new topic, it improves the technical knowledge, confidence, communication.
    - ○ Peer to peer learning activity makes the students to get good wrapo
    - ○ The students can share their gained knowledge.
  - ❖ *Challenges faced in implementation:*
    - ○ As the activity involves only one student, unable to persuade all students to engage in self learning.
    - ○ As it involves oral communication, unable to test the writing capacity of the students
    - ○ Team activity and team assessment was difficult.

- References:
  - https://en.wikipedia.org/wiki/Learning_by_teaching
  - https://digest.bps.org.uk/2018/05/04/learning-by-teaching-others-is-extremely-effective-a-new-study-tested-a-key-reason-why/
  - https://vikaspedia.in/education/teachers-corner/teaching-and-learning

Signature of Faculty Member

HOD

Dr. K. SUNDARAMOORTHY
Professor & HOD
Department of Information Technology
Jerusalem College of Engineering (Autonomous)
Pallikkaranai, Chennai-600 100.