

***Suggested Teaching Guidelines for
Java Technologies-II (Web Based Java)–PG-DAC February 2018***

Duration: 46 classroom hours + 44 lab hours **(90 hrs)**

Objective: To introduce the student to Java Technologies

Prerequisites: Knowledge of object oriented programming

Evaluation method: Theory exam– 40% weightage
Lab exam – 40% weightage
Internal exam– 20% weightage

List of Books / Other training material

Text Book:

1. Core and Advanced Java, Black Book by Dreamtech Press .

Reference:

1. Java 8 Programming Black Book by Dreamtech Press
2. Core Java : Fundamentals - Volume 1 Gary Cornell, Cay S. Horstmann/ Pearson
3. Programming in Java by Sachin Malhotra, Saurabh Choudhary / Oxford University Press
4. Core Java : Advanced Features - Volume 2 Gary Cornell, Cay S. Horstmann/ Pearson
5. Beginning Java 2 by Ivor Horton; Wrox Publication
6. The Complete Reference Java Eight Edition, Herbert Schidt/ TMH
7. Object-Oriented Analysis and Design with applications by Booch
8. Core Java 8 for Beginners by Sharanam Shah, Vaishali Shah / Shroff Publishers & Distributors
9. Murach's Java Programming 4th edition by Joel Murach / Shroff Publishers & Distributors
10. Advanced Java programming by Uttam K Roy / Oxford University press
11. Sun Certified Enterprise Architect For Java EE Study Guide by Cade, 2nd Edition (Paperback)
12. Programming in Java by Sachin Malhotra, Saurabh Choudhary / Oxford University Press
13. **Professional Java EE Design Patterns by Murat Yener, Alex Theedom, Reza Rahman (Paperback)**

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Session 1: Servlets

Lecture

- Servlets : Dynamic Content Generation
- Advantages of Servlets over CGI
- The Servlet interface
- The HttpServlet, HttpServletRequest, HttpServletResponse
- Exception Handling
- Session
- Session Management
- Session Tracking with
 - Cookies
 - HttpSession
- Request Dispatcher

Assignment – Lab:

Implement exception handling in Servlet.

Use Java Servlets technology in designing and implementing an Air Ticket reservation system.

Incorporate Sessions in the Air Ticket reservation system.

Assignment – Reading:

Know more about the HTTP protocol at www.w3c.org

Assignment – Tutorial:

Compare which way of session tracking is better Cookies or HttpSession.

Session 2:

Lecture

- Localization: Basics
- Read and set the locale by using the locale object
- Create and read Properties file
- Build a resource bundle for each locale and load a resource bundle in an application

Session 3: Advanced Java

Lecture

- J2EE Container
- Packaging
- Deployment tools.
- Web application life cycle
- Deploying web applications.
- Web Services Support

Assignment – Lab:

Deploy structured web application.

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Session 4 & 5:**Lecture**

- JSP: Separating UI from Content generation code
- MVC architecture
- Life cycle of a JSP page
- Directives, Implicit and Explicit Objects, Scriptlets, Expressions, Expression Language
- Scope
- JSP Error Page handling
- Session Tracking
- JSP Using JavaBeans
- Custom Actions and Tag Libraries in JSP

Assignment – Lab:

Separate UI code from the controller code in your Air Ticket reservation system by incorporating JSP and Servlets. Complete the implementation of Air-ticket reservation system

Session 6 :**Lecture****JavaBeans**

- JavaBeans Components
- A Button is a Bean
 - Wiring the Application
 - Using a Third-Party Bean
- Writing JavaBeans Components
 - Properties
 - Methods
 - Events
 - Using a BeanInfo
- JavaBeans Component Design Conventions
- Creating and Using a JavaBeans Component
- Setting JavaBeans Component Properties
- Retrieving JavaBeans Component Properties

Assignment – Lab:

1. Creating a Project by Simple Bean code
2. Implement MVC based web application using servlet, JSP, JavaBeans

Session 7: Naming Services**Lecture**

- Getting Started
- The Basics
- Beyond the Basics
- Java Objects and the Directory
- Tips for LDAP Users

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- Building a Service Provider

Session 8 & 9:

Lecture

- Java Annotations : Purpose, Basics, Annotation Elements
- Built-in Annotations
- Java Custom Annotations
- Type Annotations and Pluggable Type Systems
- **Transaction** :Container-Managed Transactions, Bean-Managed Transactions, Transaction Timeouts Databases, Transactions in Web Components
- Transaction Management example

Assignment – Lab:

Develop Courier Tracking system implementing annotation.

Session 10 & 11 :

Lecture

- Design Patterns in Java: Overview, Usage, Types of Design Patterns
- Creational: Factory, Abstract Factory, Singleton, Builder, Prototype
- Structural: Adapter, Composite, Proxy, Flyweight, Facade, Bridge, Decorator
- Behavioral: Template method, Mediator, Chain of Responsibility, Observer, Strategy, Command, State, Visitor, Interpreter, Iterator, Memento
- MVC Pattern, Data Access Object Pattern
- Front Controller Pattern
- Service Locator Pattern
- Transfer Object Pattern

Assignment – Lab:

Develop candidate examination system implementing above design pattern.

Session 12 & 13:

Lecture

- Apache Maven: Overview, Environment Setup, Ant vs Maven
- POM, Build Life Cycle, Build Profiles
- Maven Repository
- Create, Build and Test Project & Build Automation
- Manage Dependencies, Deployment Automation

Assignment – Lab:

Configure Apache Maven in web application.

Develop a web application using Apache Maven.

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Session 14 & 15:

Lecture

- Hibernate Framework
 - Introduction to Hibernate Framework
 - Architecture
- Hibernate in IDE
 - Creating web application using Hibernate API
 - Life-cycle of Hibernate Entities
- HB with annotation example
- Hibernate Mappings and Relationships
- Inheritance, Collection and Component Mapping
- HQL , HCQL
- Introduction to Struts 2 Architecture
- Building web pages using Struts 2 ,Servlet and Hibernate

Assignment – Lab:

Develop a web application (Online Bookshop) using Hibernate Persistence

Study Hibernate architecture from www.hibernate.org/docs

Session 16 :

Lecture

- Introduction to JSF 2.0
- Discussion on benefits of JSF
- JSF UI component model
- JSF Architecture
- Life cycle of a JSF
- First application of JSF
- Introduce basic JSF Tags
- Various Navigation methods
- How to use JSF using AJAX
- JSF Event Handling

Assignment – Lab

- Create simple JSF applications for practice.
- Create a test JSF application to test all navigation

Session 17 & 18 :

Lecture

- Overview of Spring4 Architecture.
- AOP Overview
- Spring Modules Overview
- Spring MVC architecture
- Understanding Spring 4 annotations

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- Spring Application
- Spring in IDE
- Spring in Eclipse
- Dependency Injection

Assignment Reading

Understand key features of Spring Architecture & design simple Java application to test dependency injection.

Session 19 & 20:**Lecture**

- What is IoC(Inversion of Control)
- IOC container
- Dependency Injection
- Spring AOP
- AOP Concepts
- Spring JdbcTemplate
- Spring ORM
- Spring MVC
- Spring MVC Tiles
- Request Response
- Deployment of web application using Spring MVC Form with CRUD, Pagination, File Upload example using multiple controllers
- Integration of Spring MVC with Hibernate
- Spring Boot Basics

Assignment – Lab

Design & deploy online stock trading system using spring MVC module
Modify earlier assignment to support persistence via Hibernate

Session 21 & 22:**Lecture**

- Building REST services with Spring
- Introduction to web services
- SOAP web service introduction
- RESTful web service introduction
- SOAP web service example in java using eclipse
- JAX-WS web service deployment on tomcat
- Create RESTful web service in java(JAX-RS)
- RESTful web service JAXRS json example
- RESTful web service JAXRS CRUD example
- AngularJS RESTful web service JAXRS CRUD example
- RESTful Web Services (JAX-RS) @QueryParam Example
- JAX-RS @MatrixParam Example

Assignment – Lab

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Design & deploy online stock trading system using spring MVC module

Modify earlier assignment to support persistence via Hibernate

Session 23:

Lecture

- Testing in Spring
- Unit Testing of Spring MVC Controllers: REST API
- Integration Testing of Spring MVC Applications: REST API
- Spring REST Web Service and Content Negotiation
- Unit Testing Spring MVC Controllers with REST Assured

Assignment – Lab

Design & test Spring Application.