

Java EE Development Using RAD v7.5.2

Course Code: e755

Description: Students will enter the empowering world of Java EE development using Rational Application Developer v7.5.2 (RAD). After completing this course, students will feel comfortable creating, testing and debugging enterprise applications that conform to the Java EE 5 specification. They will gain experience developing JSPs, custom tags, servlets, servlet filters and JavaBeans using Java EE design patterns and WebSphere best practices. The concepts taught in this course are reinforced by hands-on lab exercises.

Duration: 5 days

Level: Intermediate

Prerequisites: Java programming experience and familiarity with HTML

Detailed Course Description

1. Web and Application Server Concepts

- A. Web Application Design
- B. Model-View-Controller and Multi-Tier Architecture
- C. WebSphere Plugins
- D. URLs, HTTP and SSL
- E. HTTP Requests and Responses
- F. Web Server and Application Server Roles
- G. Request Processing

2. Java EE Architecture Overview

- A. Enterprise Application Overview and Development Cycle
- B. Java EE Architecture and Containers
- C. Applet, Servlet and JSP Overviews
- D. JDBC, JNDI and JTA
- E. EJB, JMS and RMI Over IIOP
- F. JavaMail, JAF, JAAS and JACC
- G. XML and JAXP
- H. New in Java EE 5
- I. Web Services Support: JAX-RPC, SAAJ, Web Services for Java EE and JAXR
- J. Java EE Connector, Management and Deployment
- K. Development Roles and Deployment Descriptors

3. Introduction to Rational Application Developer

- A. Development Tools
- B. What's New
- C. Workspaces and Perspectives
- D. Enabling Roles and Capabilities
- E. Creating Projects and Setting Project Properties
- F. Building Projects
- G. Adding Application Components
- H. Using Editors and Views
- I. View Toolbars and Fast Views
- J. Customizing Perspectives and Creating User Defined Perspectives
- K. Navigating the Workspace and Using Bookmarks
- L. Working with the Tasks and Search Views

- M. Using Working Sets and Local History
- N. Getting Help and Using Cheat Sheets
- O. Tips for Better Performance

4. RAD: Developing Java Applications

- A. Java Perspective Overview and Enhancements
- B. Java Project Settings
- C. Java Editor Features: Folding, Code Assist, Content Assist, Importing
- D. Source Commands and Refactoring
- E. Errors and Warnings
- F. Problems view and Quick Fix
- G. Console
- H. Shortcuts

Lab – RAD: Workbench

5. Servlet Basics

- A. What are Servlets and Why Use Them?
- B. Web Container Responsibilities
- C. HttpServlet
- D. Servlet Lifecycle Methods
- E. Servlet Invocation
- F. Multithreading Issues
- G. Registering Servlets by Name
- H. Handling Requests and Responses
- I. Response Content Methods
- J. Reading a Post
- K. Scope Attributes
- L. Passing Data Between Servlets
- M. What are Filters and Servlet Event Listeners?

6. Servlet Programming

- A. ServletRequest and ServletResponse Interfaces
- B. HttpServletRequest and HttpServletResponse Methods
- C. Retrieving the Request URI
- D. Response Buffering
- E. ServletContext Interface
- F. The RequestDispatcher Interface
- G. Retrieving Context Initialization Parameters
- H. Forwards and Includes

Lab – Hello World Servlet

7. RAD: Web Perspective

- A. Creating Web Projects and Specifying
- B. Project Configurations and Facets
- C. Annotation-based Programming
- D. Web Project Structure and Default Files
- E. Creating Servlets, Filters and Listeners
- F. Using the Properties View
- G. Editing the Web Deployment Descriptor
- H. Defining IBM Extensions and Bindings

8. RAD: Server Perspective

- A. New Features
- B. Test Environments

- C. Server Types and Resources
- D. Defining a Server
- E. Running Applications on a Server
- F. Defining the Target Server
- G. Servers View and Actions
- H. Editing the Server Configuration for WebSphere V6.1 and V7.0
- I. Embedding Deployment Information in an Application
- J. Reloading Resources Running on the Server
- K. WebSphere Administration Command Assist
- L. WebSphere V6 and V7 Profiles
- M. Profile Management Tools

Lab – Retrieving Parameters

9. RAD: Debug Perspective

- A. Debugger Features
- B. Step-by-Step Debug Mode
- C. Step Filtering
- D. Breakpoints
- E. Variables View
- F. Remote Debugging
- G. Debug Perspective Settings
- H. Launch Configuration Settings

10. Application Assembly and Packaging

- A. Java EE Components
- B. Assembly Process
- C. Packaging Checklist
- D. Creating Enterprise Application Projects
- E. Importing Resources
- F. Adding Java EE Modules and Utility JARs
- G. JAR Dependency Editor
- H. Using the Application Editor
- I. Deployment Descriptor Elements (EJB, Web, Connector, Client and Application)
- J. IBM Extensions and Bindings
- K. Exporting Resources

Lab – Creating the Model: JavaBean

Lab – Creating an Enterprise Application

Lab – Creating the Controller: Servlet

11. JSP Basics

- A. What are JavaServer Pages and Why Use Them?
- B. JSP Translation and Execution
- C. JSP Syntax and JSP Elements
- D. Standard Actions: useBean, setProperty, getProperty, include, forward and param
- E. JSP and JavaBean Interaction
- F. Scope Attributes
- G. Calling JSPs from Servlets
- H. Relative URLs

12. RAD: Creating JavaServer Pages

- A. Creating a JSP
- B. Page Designer Toolbars and Views

- C. Using and Customizing the Palette View
- D. Adding Basic HTML Tags, Tables and Form Tags
- E. Inserting JavaBeans and Standard JSP Tags
- F. Defining Styles and Editing Style Sheets
- G. Page Properties
- H. HTML Syntax Validation and Document Cleanup
- I. Scripting Variables
- J. Using Content Assist and the Quick Edit View
- K. Using and Customizing the Snippets View

13. JavaServer Page Programming

- A. JSP Documents
- B. XML Syntax
- C. Standard Actions: jsp:element, jsp:attribute, jsp:body, jsp:text and jsp:output
- D. Directives: Page, Include and Taglib
- E. Scripting Elements: Declarations, Scriptlets and Expressions
- F. Implicit Objects
- G. Error Handling
- H. JSP Configuration
- I. Internationalization

Lab – Creating the View: JSP

Lab – Using the CSS Editor

14. JSP Expression Language

- A. Benefits
- B. Expression Syntax
- C. Variable Resolution
- D. Implicit Objects
- E. Literals and Reserved Words
- F. Using and Declaring Custom Functions
- G. Considerations
- H. Unified EL

Lab – Using the JSP Expression Language

15. JSTL

- A. JSTL Features
- B. Core Actions: Variable Support, Conditional Processing and Iteration
- C. Core Actions: Error Handling, URL Manipulation and Exposing Variables
- D. Understanding Locales and Resource Bundles
- E. Internationalization: Defining the Default and Fallback Localization Contexts
- F. Internationalization: Overriding the Client's Locale and Displaying Localized Messages
- G. Internationalization: Customizing the Time Zone and Formatting Numbers and Dates
- H. XML: Parsing, Transformation and XPath Expressions
- I. SQL Actions: Creating Data Sources and Transactions
- J. SQL Actions: Executing SQL Statements and Specifying Parameters
- K. JSTL Functions: String Manipulation and Collection Support

Lab – Using JSTL

16. JSP Tag Extensions

- A. Tag Extension Features
- B. Tag Types: Simple and Classic
- C. Classic Tag Handlers: Tag, IterationTag and BodyTag

- D. Classic Tag Handler Lifecycles
- E. Convenience Classes: TagSupport and BodyTagSupport
- F. The TryCatchFinally and DynamicAttributes Interfaces
- G. Defining SimpleTag Handlers
- H. Simple Tag Handler Lifecycle
- I. The SimpleTagSupport and TagAdapter Classes
- J. Packaging Tag Libraries and Defining Tag Library Descriptors
- K. Referencing Tag Libraries in the Web Deployment Descriptor
- L. Immediate and Deferred Attributes in JSP 2.1 Tags
- M. Using Custom Tags in a JSP

17. JSP Tag Files

- A. Benefits
- B. Tag File Basics
- C. Scopes and the JspContext
- D. JSP Fragments
- E. Tag File Actions: jsp:invoke and jsp:doBody
- F. Directives: Tag, Attribute and Variable
- G. Variable Attributes and Scope
- H. Implicit Objects

Lab – Custom Tag

18. Design Considerations: Controlling Application Flow

- A. Web Application Design
- B. Controller Servlets
- C. Site Design
- D. Handling Responses and Managing State
- E. Handling Errors and Invalid Transitions
- F. Controlling Page Caching
- G. HTTP Headers
- H. Memento Design

Lab – Defining Error Pages

19. RAD: Data Perspective

- A. Using the Database Explorer
- B. Creating and Connecting to a Database
- C. Creating Data Development and Data Design Projects
- D. Working with Data Diagrams
- E. Adding a Table or View
- F. Adding Keys, Columns, Indexes and Relationships
- G. Generating DDL and Deploying From RAD
- H. SQL Results View

Lab – Creating a Database

20. Java Database Connectivity

- A. JDBC Specification Enhancements
- B. Using the DriverManager
- C. Connection Management
- D. Using & Deploying a Data Source
- E. Getting & Closing Connections
- F. Executing Statements, Prepared Statements and Stored Procedures
- G. Result Sets: Moving the Cursor and Retrieving Data
- H. Error Handling and SQLExceptions

- I. Improving JDBC Efficiency
- J. Transactions

Lab – Creating a DAO

21. JSF Basics

- A. JSF Architecture
- B. JSF Application Components
- C. Development Steps
- D. UI Component Model
- E. Page Development
- F. HTML UI Components and Faces Client Components
- G. Navigation Model, Navigation Rules and Navigation Cases
- H. Binding, Developing and Declaring Backing Beans
- I. Faces Request Life Cycle

22. RAD: Developing JSF Applications

- A. New JSF Features
- B. Faces Projects
- C. Creating a Faces JSP
- D. Input Components and Enhanced Faces Components
- E. Displaying Error Messages
- F. Using the Quick Edit, Properties and Page Data Views
- G. Editing Page Code
- H. Adding Navigation Rules
- I. Defining Validation and Behavior

Lab – Creating Pages with JSF and SDO

23. Web 2.0

- A. AJAX Overview
- B. Advantages and Disadvantages
- C. Using AJAX with Enhanced JSF Components
- D. Adding Panel Components
- E. AJAX Request Types
- F. Configuring Parameters and Specifying Events
- G. Defining Dynamic Behavior

24. Using Cookies and Sessions to Manage Application Data

- A. The HttpSession Interface
- B. Managing Session Data
- C. Session Tracking Mechanisms
- D. Sessions at Runtime: Client & Server
- E. Invalidating a Session
- F. The Serializable Interface
- G. HttpSession Thread Safety and Events
- H. Sending and Retrieving Cookies
- I. Cookie Attributes
- J. Proper Usage of Cookies
- K. Distributable Web Applications

Lab – Cookie Servlet

25. Servlet Event Listeners

- A. Implementing and Deploying Listeners
- B. Implementing the ServletContextListener Interface

- C. The ServletContextAttributeListener Interface
- D. Responding to HttpSessionEvents
- E. The HttpSessionAttributeListener and ServletRequestAttributeListener Interfaces
- F. Session Activation and Binding Listeners
- G. Receiving ServletRequest Notifications
- H. Thread Considerations

Lab – Creating Listeners

26. Filters

- A. The Filter Interface
- B. Filter Deployment and Lifecycle
- C. Performing Filtering Tasks
- D. Filter Chain Invocation
- E. Wrapping Requests and Responses
- F. Accessing the Filter Configuration Object
- G. Implementing the Destroy() Method

Lab – Simple Filter

Lab – Wrapping a Response

27. Deploying to WebSphere

- A. WebSphere Architecture
- B. Web Server Plug-ins
- C. Containers
- D. Virtual Hosts
- E. Application Server Services
- F. Data Access
- G. Default Messaging Provider
- H. Web Services Support
- I. WebSphere Administration Architecture
- J. Cells, Clusters, Nodes and Node Agents
- K. Administrative Console: Logging In, Navigating the Workspace and Saving Changes
- L. Managing Servers, Virtual Hosts, Deployed Applications and Shared Libraries
- M. Application Installation

Appendix A. Java EE Design Patterns

- A. What Are Design Patterns and Why Use Them?
- B. MVC, Composite View, Front Controller, Intercepting Filter and View Helper Patterns
- C. Transfer Object, Session Façade, Business Delegate and Service Locator Patterns
- D. Data Access Object, Fast-Lane Reader and Value List Handler Patterns
- E. Composite Entity and Factory Design Patterns
- F. Putting It All Together

Appendix B. XML Concepts

- A. XML Benefits and Features
- B. Document Structure and Components
- C. Elements and Attributes
- D. Names and Name Tokens
- E. CDATA, Entities and Entity References
- F. XML Validation: DTDs and Schemas
- G. Namespaces
- H. XML Parsers
- I. JAXP, SAX, DOM and JDOM APIs
- J. XSL and XSLT