

# Fast Track to Enterprise JavaBeans 3.0 (EJB 3) and the Java Persistence API (JPA) (4 Days)

**Custom Training Institute**  
 9085 Coyote Springs Road  
 Prescott Valley, AZ 86315  
 (928) 772-3811  
 FAX (928) 441-6444

## Fast Track to Enterprise JavaBeans 3.0 (EJB 3) and the Java Persistence API (JPA)(CTI 321)

*Students will learn the basic concepts and APIs of EJB, stateless, and stateful session beans, as well as more complex topics such as message driven beans and transactions. New technologies such as annotations and Dependency Injection are covered in depth. Students will also learn the Java Persistence API (JPA), including mapping persistent entities, Relationships, and Inheritance, and using the EntityManager.*

Prerequisites: Good familiarity with Java programming. Some familiarity with JDBC and SQL.

Minimum software requirements: Java 5 (J2SE 5.0 SDK.), Java EE App Server ( JBoss App Server) Eclipse IDE.

Minimum hardware requirements: Pentium at 1.5 GHz, 1 Gb RAM; 1 Gb free hard disk space before installation. Internet access.

Microsoft PowerPoint, Adobe Acrobat reader (pdf) on instructor's workstation for presentation purposes.

### Module 1: Introduction

Overview of EJB and Java Persistence API (JPA)  
 Goals of EJB, EJB in the Java EE Architecture  
 EJB 3.0 Overview  
 Session Beans, Persistent Entities, Message-Driven Beans  
*Lab: Server Setup and Introduction*

### Module 2: Session Beans

Session Bean Overview  
 Services Provided, Stateless and Stateful Beans  
 Defining a Session Bean - EJB 3 Annotations  
 The Bean Implementation, Remote and Local Business Interface  
 Packaging and Deployment  
 ejb-jar File, Deployment Descriptors in EJB 3  
 EAR File  
 The EJB Container  
*Lab: Creating a Stateless Session Bean*  
 JNDI Overview  
 Distributed Naming and Lookup Context and InitialContext  
 Using JNDI  
 Writing an EJB 3 Client  
 Client View of a Session Bean  
 PortableRemoteObject and Casting  
 Running the Client  
*Lab: Creating an EJB Client*

### Module 3: Additional Capabilities

Resources and Dependency Injection  
 EJB Referencing Another EJB  
 Referencing Resources, Environment Entries  
 Connection Factories (DataSource and Others)  
*Lab: Using Dependency Injection*  
*Lab: Creating and Using Environment Entries*  
 Session Bean Lifecycle and Interceptors  
 Stateless Session Bean Lifecycle  
 Business Method Interceptors, InvocationContext, Lifecycle  
 Callback Interceptors, Interceptor Classes  
*Lab: Working with Interceptors*  
 Stateful Session Beans  
 Overview  
 Defining, Client Relationship  
 Lifecycle, Activation, Passivation  
*Lab: Stateful Session Beans*  
 Timer Service  
 Overview and Usage

## Fast Track to Enterprise JavaBeans 3.0 (EJB 3) and the Java Persistence API (JPA) (CTI 321) - continued

### Module 4: Message-Driven Beans

- Overview of Messaging Systems
  - Messaging, Loose Coupling
  - Pub/Sub, Point2Point
- Overview of JMS API
  - Overview and Structure
  - ConnectionFactory and Destination
  - JMS Producer and Consumer Client
    - Example
  - JMS Messages
- Message-Driven Beans (MDB)
  - Overview and Goals
  - @MessageDriven and MDB Example
  - Configuring with activationConfig
  - State Diagram and Interceptors

*Lab: Message-Driven Beans*

### Module 5: Transactions and Security

- Overview of Transactions and Transactional Systems
  - ACID, Transaction Managers, Resource Managers
- Transactions in EJB 3
  - Declarative Transaction Management
  - Transaction Attributes and Transactional Scope
  - Transaction Scenarios and Bean-Managed Tx

*Lab: Working with Transactions*

- Security
  - Java EE Security Overview (Role-based)
  - @RolesAllowed, @PermitAll
  - Programmatic Security

*Lab: Integrating EJB and Java EE Security*

### Module 6: Exceptions

- Exception Overview
  - Checked and Unchecked Exceptions
- Exceptions in EJB 3
  - Application Exceptions, System Exceptions
- EJB 3 Best Practices
  - When to Use, Coarse-Grained Business Interfaces, Session Facade, Transaction Guidelines, Clustering

### Module 7: Introduction to Java Persistence API (JPA)

- Overview
  - Persistence Layers, Object-Relational Mapping (ORM), JDBC
  - JPA Overview
- Mapping with JPA
  - Entities and @Entity, Ids and @Id
  - Generated Id Values
  - Basic Mapping Types

*Lab: Mapping an Entity Class*

- EntityManager
  - Persisting to the DB, the EntityManager

### Module 7: Introduction to Java Persistence API (JPA) (Continued)

- Persistence Units and Configuration
- Injecting an EntityManager
- Retrieving Persistent Entities

*Lab: Using the EntityManager to Persist and Find an Entity*

### Module 8: Updates and Queries

- Inserting and Updating
  - Transient, Persistent, Detached, Removed
  - Persisting New Entities, Updating a Persistent Instance

*Lab: Inserting and Updating an Entity*

- Querying and JPQL
  - Object Based Queries, Select Statements, WHERE Clause
  - Named Queries

*Lab: Creating and Using JPQL Queries*

- Versioning and Optimistic Locking
- Overview
  - Detached Entities
  - Creating Versioned Entities

*Lab: Optimistic Locking*

### Module 9: Entity Relationships

- Relationships Overview
  - Object Relationships, Participants, Roles, Directionality, Cardinality
- Relationship Mapping
  - Mapping Overview (1-1, 1-N, N-1, N-N)
  - Unidirectional and Bidirectional
  - Mapping One-One, One-Many
  - Join Columns
  - Relationship Inverses

*Lab: Mapping Entity Relationships*

- Many-Many Relationships
- Lazy and Eager Loading
- Cascading
- Queries Across Relationships (Inner Joins), Outer Joins, Fetch Joins)

*Lab: Querying Across Relationships*

- Inheritance Mapping
  - Entity Inheritance
  - Single Table, Joined (Table per Subclass), Table per Concrete Class
  - Pros and Cons

*Lab: Mapping Inheritance*

### Module 10: Additional JPA Capabilities

- Queries - Projection, Aggregate, Bulk Update/Delete
- Embedded Objects
- EJB 3 and Java SE
- Best Practices
  - Primary Keys, Named Queries, Lazy/Eager Loading, Transactional Semantics, Encapsulation, Report Queries