

## JA1030 – Advanced Java Programming

### Course Synopsis

<b>Duration:</b>	Four (4) days if students require a review of Java basics. If students have significant experience in Java programming, the course can be taught in three (3) days without review.
<b>Audience:</b>	Technical Users, Applications Programmers, and Systems Programmers.
<b>Prerequisites:</b>	Introduction to Java course or equivalent experience with basic Java programming.
<b>Delivery Method:</b>	Instructor led, Hands-on workshops

### Brief Description

This advanced level course provides programmers, having a fundamental understanding of the basics of Java, with additional details regarding some of the more advanced capabilities provided by the Java Programming Language and its associated standard classes and packages. The course focuses on JavaBeans and introspection, exception handling, the collections framework, I/O streams, threads, Java Database Connectivity (JDBC), and basic client/server oriented network programming.

### Course Objectives What You'll Learn

Upon successful completion of this course, the student will be able to:

- Utilize reflection and introspection in Java
- Define and use Java Exception Handling code
- Use the Java Collections framework
- Use Java streams to read and write data
- Create, control, and synchronize threads
- Use the Java Database Connectivity framework
- Describe and use classes in java.net package
- Create client/server programs including a chat room application

### Topics Covered

#### I. *JavaBeans: Fundamentals, Reflection & Introspection*

- Overview
  - Objectives
- JavaBean Requirements
- Determining the Type of an Object
  - Reflection Using the Class Object
  - Methods of the Class Object
  - Introspection
- Customizing BeanInfo
- Equality of Objects – Overriding equals( )
  - Calling the Equals Method
  - Inheritance Implications
- Packaging Beans, Classes, and Anything Else
- Review

## JA1030 – Advanced Java Programming

### II. Error and Exception Handling

- Overview
  - Objectives
- Exception Handling Model
- Exception Handling Framework
- Errors vs. Exceptions
- Throwing an Exception
- Runtime vs. Checked Exceptions
- Defining Exception Classes
- Catching an Exception
- Generating Exceptions
- Handling Exceptions
- Review

### III. The Java Collections Framework

- Overview
  - Objectives
- Simple Array Variables in Java
- Arrays of Objects
- Passing an Entire Array to a Method
- Arrays of Arrays
- Java 2 Collections Framework
- Collections
- Methods of Collection and List
- Using an ArrayList
- Using a LinkedList
- Set and HashSet
- Vector, Enumeration and Stack
- Maps and Map Methods
- Using a HashMap
- equals and hashCode
- Hashtable and Properties
- SortedSet and SortedMap
- Comparable and Comparator
- Generics and Autoboxing
- Generics Examples with Collections
- Enum Types Introduced in Java 5
- Using a Simple Enum
- Enum Types: Constructors & Methods
- Static Imports
- Review

### IV. Input/Output Streams

- Overview
  - Objectives
- Input/Output Stream Model
- Predefined Standard Streams
- Input/Output Stream Methods
- Simple File I/O
- Filtered Streams
- Buffered Streams
- Data Streams
- Formatting Numbers
- Character Streams
- Object Serialization
- Serialization Example
- What Goes Into the ObjectOutputStream?
- Review

### V. Threads

- Overview
  - Objectives
- Definition of a Thread
- Multiprocessing/Multitasking
- Creating Threads
- Useful Thread Class Methods
- Implementing Runnable Interface
- Extending Thread Class
- Sharing Data Among Threads
- Thread States and Thread Priority
- User Thread vs. Daemon Thread
- Coordinating and Controlling Threads
- Thread Control Examples
- Controlling Threads from Applets
- Stopwatch Example
- Why Synchronize Threads
- Unsynchronized Producer–Consumer
- Thread Synchronization Alternatives
- Synchronized Producer–Consumer
- Review

**JA1030 – Advanced Java Programming****Topics  
Covered Continued****VI. Java Database Connectivity (JDBC)**

- Overview
  - Objectives
- Driving to the Database
- JDBC Code Example
- JDBC Framework – Interfaces
- Connection Pooling
- ResultSet Processing
- Database Types and Java Types
- Updatable ResultSets
- SQLException and SQLWarning
- PreparedStatement and CallableStatement
- ResultSetMetaData
- Transaction Processing
- Isolation Level
- SQL Batches
- More to Explore on your own
- Review

**VII. Networking and Sockets**

- Overview
  - Objectives
- URL Format
- java.net Package
- URL Class and its Methods
- URLConnection Class and its Methods
- Interacting with a Servlet
- InetAddress Class
- The Internet
- Protocols
- Servers, Clients, Ports, and Sockets
- Socket Class and its Methods
- ServerSocket Class
- Server and Client Example
- Daemon Server
- Threaded Server
- Review