

## **Course 411: Object-Oriented Analysis & Design using UML (5 days)**

### **Course Description...**

Regardless of the software development approach, from the classic waterfall to extreme programming (XP), all of the experts agree that quality software development requires both analysis and design. The Unified Modeling Language (UML) provides a common, standard notation for recording both analysis models and design artifacts. This course delves into the processes of both object-oriented analysis and object-oriented design using UML as the notation language.

### **Learning Objectives...**

- Demonstrate the importance of modeling in the software development life cycle
- Become conversant with the UML notation and symbols
- Understand the object-oriented approach to analyzing and designing systems and software solutions
- Employ the UML notation to create effective and efficient system designs

### **Who should attend...**

Software developers, system architects, analysts, designers, and anyone interested in understanding the UML as applied to object-oriented analysis and design of systems.

### **Prerequisites...**

A good understanding of object-oriented technologies and a basic understanding of analysis and design.

**See next page for a detailed course outline...**



## Course Outline...

### Unit 1: Analysis, Design, Modeling

#### Systems and Software Quality

#### Software engineering

- Life cycle properties

#### Analysis and Design

- Structured v. Object Approach

#### Modeling

- Modeling problem and solution
- Modeling perspectives

### Unit 2: The Object-Oriented Paradigm

#### Basic Concepts

- Classes and objects
- Characteristic of objects
- Relationships
- Methods

#### Object-oriented Analysis

#### Object-oriented Design

#### Processes and Approaches to OOA&D

- Unified Process
- Rational Unified Process
- Agile approaches
- Other approaches

### Unit 3: Basic Unified Modeling Language

#### Overview

#### Basic Concepts

- Classifiers
- Well-Formedness Rules

#### Basic Notation

- Classes and objects
- Characteristic of objects
- Relationships and Methods
- Other Notation

#### UML Diagrams

### Unit 4: Domain Modeling

#### The Information Model

#### Structural Modeling

- Objects, attributes and associations
- Links and messages

#### Information Modeling in the UML

- Basic Constructs
- Relationships
- Stereotypes
- Packages



## Unit 5: Use Case and the Behavior Model

### Use Case Model

- Use cases in the Life Cycle

### Use Case Diagram

### Use Case Description

- Main Success Scenario
- Alternate Paths
- Preconditions and post conditions
- Exception paths

### Use Case Extensions

- Use Case relationships
  - Generalization
  - The <<extends>> relationship
  - The <<includes>> relationship
  - Extension points

### Packages

## Unit 6: The Analysis Phase

### Modeling Process

- Architectural views
- Use case realizations

### Sequence Diagrams

- Application of the Sequence Diagram
- Sequence Diagram notation and syntax

### Collaboration Diagrams

- Communication diagrams
- Application of the communication Diagram
- Communication Diagram notation and syntax

### State Machines

- Application of the State Machine
- State Machine notation and syntax

### Activity Diagrams

- Application of the Activity Diagram
- Activity Diagram notation and syntax

## Unit 7: Design Phase

### Moving to Code

- Internal Component Definition
- Design for Reuse

### Design Class Diagrams

- Operations
- Methods

### Designing Quality into Modules

- Iterating the Design
- Refactoring
- Design best practices
  - Cohesion
  - Complexity
  - Coupling
  - Congruence



## **Unit 8: Physical Design**

### **UML Implementation Diagrams**

#### **Component diagram**

- Application of the Component Diagram
- Component Diagram notation and syntax

#### **Deployment diagram**

- Application of the Deployment Diagram
- Deployment Diagram notation and syntax

## **Unit 9: Patterns**

### **The Pattern Concept**

- Benefits of patterns

### **Common Design Patterns**

- Useful analysis patterns
- Useful design patterns

## **Unit 10: The Bottom Line**

### **A Development Process**

### **Where to go for more information**

*Please contact your ROI representative to discuss course tailoring!!!*