The Unified Modeling Language has become the de facto international standard for modeling and specifying software systems. Ongoing upgrades of the standard from version 1.X to version 2.X adds several new diagram types: composite structure diagrams, timing diagrams, and interaction overview diagrams. UML 2.X also significantly enhances class diagrams, sequence diagrams, state machine diagrams, and activity diagrams. With these enhancements UML robustly supports component-based development, architectural specifications, and advanced behavioral modeling techniques essential to today’s complex, distributed systems. This course updates the experienced modeler’s knowledge of UML syntax and semantics by highlighting the key UML 2.X enhancements.

Objectives:
- Learn the significant UML 2.X enhancements to use case, activity, class, component, sequence, and state machine diagrams
- Learn the syntax and semantics of new UML 2.X diagram types: composite structure, interaction, and timing diagrams

Audience:
This course is designed for the systems analysts, architects, designers, developers, and testers who are directly responsible for developing object-oriented systems. This course is also of benefit to technical leads and software quality assurance personnel who oversee development of object-oriented systems and require an understanding of the artifacts being produced.

Prerequisites:
Prior UML modeling and software development experience.

Duration:
2 days
Outline:

1. Introduction
   - Overview of UML 1.X diagrams
   - UML 2.X goals
   - Overview of UML 2.X enhancements

2. Use Case Diagram Enhancements
   - Review of UML 1.X syntax
   - UML 2.X enhancements
     - Association multiplicities
     - Extension conditions

3. Activity Diagram Enhancements
   - Review of UML 1.X syntax
   - UML 2.X enhancements
     - Accept event
     - Accept time event
     - Send signal
     - Activity edges
     - Activity internals: input & output pins, parameters, pre & post conditions
     - Multi-dimensional & hierarchical Partitions
     - Expansion regions
     - Exception handlers
   - Lab: Develop an enhanced activity diagram

4. Class and Component Diagram Enhancements
   - Review of UML 1.X syntax
   - UML 2.X enhancements
     - Parts
     - Ports
     - Connectors
     - Navigable ends
     - Components redefined
     - Provided interfaces
     - Required interfaces
   - Lab: Develop an enhanced component diagram

5. Sequence Diagram Enhancements
   - Review of UML 1.X syntax
   - UML 2.X enhancements
     - Loop fragments
     - Alternative (alt), option (opt), break & parallel (par) fragments and continuations
     - Interaction use (ref) fragments, decomposed lifelines & gates
     - Critical region fragments
     - Negative (neg), assertion (assert), strict, ignore, and consider interaction operators
     - Part decomposition
   - Lab: Develop an enhanced component diagram

6. State Machine Diagram Enhancements
   - Review of UML 1.X syntax
   - UML 2.X enhancements
     - Submachine states
     - Submachine & composite state entry & exit points
     - Terminate pseudo state
     - State machine generalization & specialization through extension
     - Protocol state machines
   - Lab: Develop an enhanced state machine diagram

7. Intro to Composite Structure Diagrams
   - Diagram intent
   - Syntax and semantics
     - Parts, ports, & connectors
     - Collaborations

8. Intro to Interaction Overview Diagrams
   - Diagram intent
   - Syntax and semantics
     - Reuse of Activity diagram syntax
     - Inline interactions
     - Interaction use references

9. Intro to Timing Diagrams
   - Diagram intent
   - Syntax and semantics
     - State or condition timelines
     - General value lifelines
     - States, conditions, messages, & events
     - Timing rulers, time observations & constraints, duration constraints