

**Course Title: Object-Oriented Analysis and Design with UML**

**Duration: 32 hours**

This four-day program covers the concepts and best practices of software development using object-oriented analysis and design. It includes an overview of the software development life cycle, a detailed coverage of the Unified Modeling Language (UML), and case studies to understand and apply the practices of analysis and design with the object technology.

### **Program Objectives**

Some of the key topics covered in the program include:

- Activities in object-oriented analysis
- Creating object-oriented architectures and designs
- SOLID principles for object-oriented design
- Some of the UML diagrams
- Introduction to design patterns

### **Audience**

This program is intended for experienced software professionals who are involved in systems design, or are preparing for playing the role of designers.

The participants are expected to fulfill the following prerequisites:

- Programming experience in any object-oriented programming language ( like C++) for at least two years.
- Basic understanding of the OO concepts, such as classes, objects, inheritance, polymorphism, etc

## Course Outline

### Module 1: Overview of Requirements

- Introduction to UML
- Actors and use cases
- Use case diagrams
- Use case specifications

### Module 2: Domain Modeling

- Identifying conceptual classes
- Class diagrams
- Association and aggregation relationships
- Association classes
- Generalization relationships

### Module 3: Architecture Envisioning

- Identifying architectural qualities for a system
- Identifying strategies for achieving architectural qualities

### Module 4: Identifying Classes and Responsibilities

- Low coupling and high cohesion
- Single Responsibility Principle
- Entity classes
- Boundary classes
- Model-View Separation Principle
- Data store classes
- The Mediator design pattern
- Controller classes

### Module 5: Use Case Realization

- Distributing use case behaviour to objects
- Sequence diagrams
- Communication diagrams
- Interaction frames

### Module 6: Class Design

- Basics of class design
- Designing attributes
- Designing operations

### Module 7: Working with Databases

- Mapping classes to tables
- Designing and implementing data store classes

#### **Module 8: Designing Classes for Object Relationships**

- Representing association relationships in classes
- Law of Demeter
- Composition relationships
- Dependency relationships
- Object diagrams

#### **Module 9: Some Other Object-Oriented Principles**

- Open-Closed Principle
- Liskov Substitution Principle
- Design by Contract Principle
- Interface Segregation Principle
- Dependency Inversion Principle

#### **Module 10: Introduction to Design Patterns**

- Adapter pattern
- Proxy pattern

#### **Module 11: Other Diagrams in UML**

- Component diagrams
- Deployment diagrams