

# CS 521: Object-Oriented Analysis and Design

## Objectives

Each successful student will:

- Demonstrate knowledge of structural and behavioral modeling techniques.
- Demonstrate knowledge of a model-based software development methodology.
- Application of the methodology and the modeling techniques in a significant software design project.
- Demonstrate knowledge of design patterns and their application in a software design project.
- Demonstrate knowledge of Design and Testing Process Improvement Models.

## Prerequisites

- CS 425.

## Syllabus

- Introduction to the Design Process Improvement Model
  - Six-Level Improvement Process
- UML Structural Modeling Techniques
  - Basic Building Blocks -- objects and classes
  - Structural Composition Techniques
  - Design Scaling Issues
- UML Behavioral Modeling Techniques
  - Use Case Diagrams
  - Interaction Diagrams
  - Event State Diagrams
  - Action Matrices
  - Business Lifecycle Diagrams
  - Activity Diagrams
  - Collaboration Diagrams
  - Rule Specification Techniques
  - Behavioral Model-Based Reference Architecture for Component Specification
- Design Standards
  - Architectural Patterns
  - Design Patterns
  - Program Patterns
  - Behavioral Design Units
  - Component-Based Specification Techniques
- DPIM - Level One
  - Requirements Analysis Techniques
  - Ad Hoc Approach to Design
- DPIM - Levels Two, Three and Four
  - Design Methodology Deployment
  - Design Quality Control Properties and Analysis Techniques
    - Automatic Convertability
    - Traceability
    - Standardizability (Design Units/Reusable Patterns)
    - Modularity
    - Changeability (Change Management)
    - Scalability of Design
    - Reliability
- DPIM - Levels Five and Six
  - Design Process Management and Optimization
  - Design Metric Models
  - Testing Maturity Model
  - Extended V-Model
  - Testing Techniques
- Level-by-Level Improvement Case Study

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