NYU School of Continuing and Professional Studies

Course Title: Object Oriented Analysis and Design

Course Description:

This course introduces the fundamental concepts of object-oriented analysis (OOA) design (OOD) and programming (OOP).

In this course, the following topics will be covered:

- Introduction to OOA, OOD and OOP.
- Discussion of what makes a language or development method “object -oriented”.
- Evolution of OO methodology and languages
- Comparison of OO and procedural languages
- Benefits and drawbacks of OO
- Introduction to classes: structure and interactions/relationships
- Introduction to objects: structure and interactions/relationships
- Introduction to the main elements of OO: Inheritance, Encapsulation and
- Polymorphism, applications and benefits. Will include a discussion of
- Inheritance vs. Composition.
- OO modeling and notation: benefits and modeling languages (UML)
- OOD: class design guidelines and designing with objects (OO software development process)
- Design patterns
- OO frameworks and advanced concepts
- Refactoring

Throughout the class, examples will be used to supplement presented material. Class discussions will be encouraged to assist students’ understanding.

Course Objectives:

At the completion of this course, the student will be able to apply an object- oriented approach in system development.

Course Prerequisites:

Modern general-purpose high-level language experience (Java, C, C++, Smalltalk, etc.)

Recommended Readings:

- “Object Oriented Analysis and Design with Applications”, Grady Booch, Benjamin/Cummings Publishing Company, Inc., Third Edition, ISBN: 020189551X
- “Fundamentals of Object-Oriented Design in UML”, Meilir Page-Jones, Addison-Wesley, ISBN: 020169946X
- “The Unified Modeling Language User Guide”, Grady Booch, James Rumbaugh, Ivar Jacobson, Addison-Wesley, ISBN: 0321267974
- “ UML Distilled Third Edition”, Martin Fowler, Kendall Scott, Addison-Wesley, ISBN: 0321193687
- “The Object-Oriented Thought Process Third Edition”, Matt Weisfeld, SAMS, ISBN: 0672330164

Required Text

Copies of the text used for class will be issued to all students.

Class Assignments

Weekly homework assignments will be given. Past due assignments without the proper PRIOR arrangements, will be considered late and will be penalized.

Grading

Homework assignments will account for 100% of the final grade.

Session Outline

Session 1:

- Introduction to OOA, OOD and OOP.
- What is a class?
- What is an object?
- Class modeling
- Introduction to modeling notation – UML
- Reading: Chapters 1& 2

Session 2:

- Class selection criteria
- Class structure, relationships and interactions
- Relationship of objects to classes
- UML notation

Session 3:

- Inheritance and polymorphism
- Composition and aggregation vs. inheritance
- UML notation
- Reading: Chapters 3, 4

Session 4:

- Object structure, relationships and interactions
- Interfaces and implementation
- UML notation
- Reading: Chapter 5

Session 5:

- Designing with classes and objects
- Guidelines of good design
- Frameworks and reuse
- UML notation
- Reading: Chapter 6

Session 6:

- UML Structural and Behavioural Diagrams

Session 7:

- Object-oriented architecture formalized
- Components

- Distributed architecture
- UML notation
- Reading: Chapters 8, 9

Session 8:

- Design Patterns and ORM
- Reading: Class handout

Session 9:

- Re-Factoring
- Reading: Class handout

Session 10:

- Class review/summary