CSCI 716 – Software Design

Textbook: Otero, Carlos e., Software Engineering Design: Theory and Practice, CRC Press, New York, 2012, ISBN: 478-1-4398-5168-5.

- Software Design Fundamentals
    - Software Design Principles
        - Modularization, Abstraction, Encapsulation, Coupling, Cohesion, Separation of Interface and Implementation, Completeness and Sufficiency
    - Practical Design Considerations
        - Design for Minimizing Complexity
        - Design for Change
    - Software Design Strategies
        - Structured Design
        - OO Design
- Unified Modeling Language (UML)
    - Component Diagrams
        - Logical vs Physical Components
    - Class Diagrams
    - Deployment Diagrams
    - Use Case Diagrams
    - Interaction Diagrams
        - Communication and Sequence Diagrams
- Software Architecture Design
    - Key tasks, Problem-solving in architecture design
    - 4 + 1 View model
    - Architectural Styles and Patterns
        - Blackboard, Pipe and Filter, Client-Server, Broker, MVC, Main program and Routine, Layered
- Detailed Design
    - Principles of Detailed Design (**SOLID** – Principles)
        - **S**ingle Responsibility Principles,
        - **O**pen-Close Principle
        - **L**iskov Substitution Principle
        - **I**nterface Segregation Principle
        - **D**ependency Inversion Principle
    - **Design Patterns**
        - **Creational Design Patterns** - Abstract Factory, Factory Method, Builder, Prototype, Singleton
        - **Structured Design Pattern** - Adapter, Composite, Façade
        - **Behavioral Design Pattern** – Iterator, Observer
- Construction Design
    - Flow-based design, State-based Designs, and Table-based Designs,