CSCI 716 – Software Design


- 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)
    - Single Responsibility Principles,
    - Open-Close Principle
    - Liskov Substitution Principle
    - Interface Segregation Principle
    - Dependency 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,