1. **Course number and name:** CMSE 322 Software Design
2. **Credits and contact hours, and categorization:** Credits: 4, Contact hours: 6, Engineering Sciences and Design
3. **Course Instructor:** Assoc. Prof. Dr. Duygu Çelik Ertuğrul
4. **Textbook:**

* *Modern Systems Analysis and Design, 8th Edition, Valacich & George ©2017 | Adobe Reader | ISBN-13: 9780134205663.*

**Other supplemental materials:**

* *Stephen Schach, Object-Oriented and Classical Software Engineering. 7th ed., McGraw-Hill, 2007.*

1. **Specific course information**
2. **Catalog description:** The Software Design course discusses the concepts, skills, and techniques that are essential for systems analysts to successfully develop software systems. The course focuses on the role, responsibilities, and mindset of systems analysts and project managers. It also looks at the methods and principles of systems development, including the systems development life cycle (SDLC) tool as a strong conceptual and systematic framework. It involves the initiating and Planning Systems Development Projects, Determining System Requirements, Structuring System Process Requirements (through Data Flow Diagramming (DFDs) Mechanics and Rules), Object-Oriented Analysis and Design (Use Cases, Activity Diagrams, Sequence Diagrams, Business Process Modeling etc.) and Designing (Databases, Forms and Reports, Interfaces and Dialogues and Distributed and Internet Systems) etc. are considered. The students will be supported with sufficient knowledge based on software engineering design and analysis practices by taking this course that provide successfully initialize a project, develop the project and finalize a software project design stage successfully.
3. **Prerequisite:** CMSE 321
4. **Required/elective/selected elective:** Required
5. **Specific goals for the course**
6. **Course outcomes:** On successful completion of the course, students will be able to:
7. understand the role of software design and its major engineering activities within the OO software development process.
8. participate as a team member in design, development, deployment, and maintenance of a medium-to-reasonable large-scale software development project.
9. design OOD models and refine them to reflect implementation details.
10. implement the design models using an object-oriented programming language.
11. understand and apply the software systems development life cycle (SDLC) concepts and methodologies.
12. use various computer-aided software engineering (CASE) tools throughout the project life cycle.
13. understand the project definition and selection process, corporate strategic planning and software systems planning process.
14. design interviews to determine system requirements and develops a plan for conducting a conversation.
15. participate in a Joint Application Design session to determine requirements.
16. understand contemporary approaches in requirements determination.
17. use prototyping during requirements determination.
18. understand the database design process, its outcomes, and the relational database model.
19. apply normalization and the rules for second and third normal form.
20. transform an entity-relationship (E-R) diagram into an equivalent set of well-structured (normalized) relations.
21. merge normalized relations from separate user views into a consolidated set of well-structured relations.
22. understand physical database design concepts including choosing proper storage formats for fields in database tables.
23. translate well-structured relations into efficient database tables.
24. understand four installation strategies: direct, parallel, single-location, and phased installation.
25. list the deliverables for documenting the system and for training and supporting users.
26. convey technical material through oral presentation and interaction with an audience.
27. **Student outcomes listed in Criterion 3**
28. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
29. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
30. an ability to communicate effectively with a range of audiences
31. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
32. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
33. an ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions
34. **Topics covered**

* **Foundations for Systems Development**
  + Chapter 1 – The Systems Development Environment
  + Chapter 2 – The Origins of Software
  + Chapter 3 – Managing the Information Systems
* **Planning**
  + Chapter 4 – Identifying and Selecting Systems Development Projects
  + Chapter 5 – Initiating and Planning Systems Development Projects
* **Analysis**
  + Chapter 6 – Determining System Requirements
  + Chapter 7 – Structuring System Process Requirements
  + Chapter 7 – System Modelling and Designing Modules
  + Chapter 8 – Structuring System Data Requirements
* **Design**
  + Chapter 9 – Designing Databases
  + Chapter 10 – Designing Forms and Reports
  + Chapter 11 – Designing Interfaces and Dialogues
  + Chapter 12 – Designing Distributed and Internet Systems
* **Implementation and Maintenance**
  + Chapter 13 – System Implementation
  + Chapter 14 – Maintaining Information Systems