

CMPE 312 Software Engineering

Department: Computer Engineering

Instructor Information

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Program Name: Computer Engineering

Program Code: 25

Course Code

CMPE 312

Credits

4

Year/Semester

2022-2023 Spring

Required Course Elective Course

Prerequisite(s):

CMPE211 - Object Oriented Programming

Catalog Description

The software life cycle and the phases in software development: Project scheduling, feasibility study, analysis, specification, design, implementation, testing, quality assurance, documentation, maintenance. Management issues: Planning, organization, control. Also included are formal specification techniques, structured programming, modular system design and other current issues.

Aims & Objectives

Teaching the basic concepts of software engineering with specific emphasis on the practical issues involved in software project management through the use of a one-semester design project.

The students will work in teams on projects of interest to industry and will be involved in analysis of requirements, architecture and design, implementation, testing & validation, project management, software process, software maintenance, and software re-engineering.

Course Web Page

<https://staff.emu.edu.tr/felixbabalola/en/teaching/cmpe312>

Textbook(s)

- Ian Sommerville, Engineering Software Products: An Introduction to Modern Software Engineering, ISBN-10: 013521064X • ISBN-13: 9780135210642 ©2020 • Pearson • Paper, 352 pp, Published 18 Feb 2019
- Ian Sommerville, Software Engineering 10e, Global Edition, 2016.
- Shari Lawrence Pfleeger, Joanne M. Atlee, Software Engineering: Theory and Practice, 4/E ISBN-10: 0136061699 • ISBN-13: 9780136061694 ©2010 • Pearson • Cloth, 800 pp, Modern Systems Analysis and Design, 8th Edition, Valacich & George ©2017 | Adobe Reader | ISBN-13: 9780134205663, <https://www.vitalsource.com/educators/textbooks?term=9780134205663>
- Project Management: Process, Technology and Practice, Ganesh Vaidyanathan, Indiana University, South Bend, ISBN-10: 0132807181 • ISBN-13: 9780132807180 ©2013.

Indicative Basic Reading List:

- Software Engineering 10th ed., Ian Sommerville, April 2015.
- Stephen Schach, Object-Oriented and Classical Software Engineering. 7th Edn, McGraw-Hill, 2007.

Topics Covered and Class Schedule (4 hours of lectures per week)

- Week 1** Introduction – Discussion about course content, certain software projects examples and student term assignment.
- Week 2** What is Computer Software? Software Engineering and Software types.
- Week 3** Software Development Life Cycle (SDLC) and Processes
- Week 4** Determining System Requirements and Requirement Engineering
- Week 5** Project Management Activities
- Week 6** Project Planning and Scheduling
- Project planning using Gantt charts and network diagrams
 - Work Breakdown Structure (WBS)
 - Scheduling Diagrams: Gantt chart and Network diagrams
 - Estimating Resources, Creating a Resource Plan (COCOMO)
 - Project Stakeholders
 - Setting a Baseline Project Plan
 - Program Evaluation Review Technique (PERT)
 - Critical Path Scheduling
 - Crashing
- Week 7** ***Assignment Stage 1: %10 (Submission of Project Planning & Management / Proposal Report) will be in this week during lab hour**
- Architectural Design
- Week 8,9** **MIDTERMS**
- Week 10** System Modelling and Designing Modules
- Object-Oriented Analysis and Design: Use Cases
 - Object-Oriented Analysis and Design: Activity Diagrams
 - Object-Oriented Analysis and Design: Sequence Diagrams
 - Object-Oriented Analysis and Design: Business Process Modeling
- *Assignment Stage 2: %15 (Intermediate Presentation and SRS Intermediate Report Submission) will be in this week during lecture hour**
- Week 11** Testing
- Week 12** Software Quality Assurance
- Week 13** Software Configuration Management
Concluding remarks
- Week 14** ***Assignment Stage 3: %15 (Final Report + Demonstration of Program+ Presentation) will be in this week during lecture hour.**

Lab Schedule

- Weeks 3-4** Discussing Project Proposal Documentation, Preparing Gantt Chart and Project Feasibility via MS Project Tool, Preparing Organization Chart. Demonstration of the Modelio and Visual Paradigm tools for UML designing and project management.
- Weeks 5-6** Discussing Specification of Requirements of Student Projects, Choosing a proper Software Process Model and Design Software Specification Document.
- Weeks 6-7** Activities for supporting students in order to be success during their intermediate presentations. To do this, perform discussions about analysis of requirements, architecture & design of system, construction & implementation stages, and project management through PM tools (Visual Paradigm, IBM Rational Rose, MS project 2013, IBM Rational Pro, SketcUp 3D and Mockflow interface design, etc.).
- Weeks 8-9** Meeting with each team to help them in construction & implementation stage.

Weeks 11-12 Discussing testing/maintenance activities of projects, controlling testing activities for their project, supporting them for their term project for final presentations.

Course Learning Outcomes

On successful completion of this course, all students will have developed **knowledge** and **understanding** of:

- Software engineering
Software life cycle, effort, time and cost estimation, requirements specification, modular design, testing
- Project management and planning

On successful completion of this course, all students will have developed **their skills in**:

- computer programming
- database design
- project management

On successful completion of this course, all students will have developed their **appreciation** of, and respect for **values and attitudes** to:

- software engineering projects

| | Method | No | Percentage |
|-------------------|-------------------|--------------|------------|
| Assessment | Midterm Exam(s) | 1 | 25% |
| | Final Examination | 1 | 35% |
| | Attendance | - | 0% |
| | Assignment | 1 (2 phases) | 30% |
| | Lab (Proposal) | 1 | 10% |

Attendance grade: No grade will be given. However, compulsory for weekly design studio meetings.

Policy on makeups: For eligibility to take a makeup exam, the student should bring a doctor's report within 3 working days of the missed exam.

Policy on the NG grade: If you miss two exams with no valid excuse, you will be given the NG grade.

Policy on missed labs: There will be no makeup for missed labs. If you cannot attend a lab for some reason, you should contact the assistant *beforehand* so that you can present your work in advance.

Relationship of the course to Student Outcomes:

1. Ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. 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
3. 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
4. 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
5. Ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
6. Ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Prepared by: Dr. Felix Babalola

Date Prepared: 23 February 2023