



Engineering Faculty
Computer Engineering Department

Syllabus

COURSE INFORMATION

Academic Year / Semester		2025 – 2026 / Spring
Course Code, Name, Credits (T-A-C)		LCEN353 Software Requirement Analysis (3-0-3) (Software Requirements Engineering)
Lecture and Lab Schedules	Theoretical	3
	Lab	Weekly flip-learning class activities
Course Type		Compulsory
Prerequisite		Computer Programming,

ACADEMIC PERSONAL

Title / First and Last Name	Prof. Dr. Haluk Gümüşkaya
Room and Phone	338 /
E-Mail Address / Web Page	E-mail: halukgumuskaya@arel.edu.tr and haluk@gumuskaya.com Course Web Page: Google Classroom
Office Hours and Assistant	TBA

COURSE DESCRIPTION

This course introduces modern Software Engineering Requirements principles, methodologies, and tools used in contemporary large-scale systems using Plan-and-Document and Agile Methods, BDD/TDD testing strategies, and AI-assisted software requirements and product development. The following selected topics are presented in the course:

Software Development Processes: Plan-and-Document, Agile, Continuous Delivery, Software Engineering Management, Software Engineering Models and Methods, Requirements Engineering-Fundamentals, Requirements Elicitation, Requirements Analysis, Requirements Specification, Requirements Validation, Requirements Management using Tools, Agile Requirements Development-BDD and User Stories, Project: Developing software requirements specification for a software system with a project team.

The course integrates Generative AI, LLM-powered requirements development and coding assistants, and modern CI/CD workflows into software lifecycle management.

COURSE OBJECTIVES

By the end of the course, students will be able to: ... Look at the objectives given in **01.1-Course Overview.pdf** document.

COURSE TEXTBOOK AND OTHER MATERIALS

Main Textbook	No single textbook and other resource are strictly followed. We will excessively use many references, online materials. I prepare my own lecture slides and other materials from several good resources. The following book's some parts will be used: <i>Object-Oriented Software Engineering: Conquering Complex and Changing Systems, Using UML, Patterns, and Java</i>, 3rd Edition, B. Brügge, A. H. Dutoit, Prentice-Hall, 2010.
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	2. <i>Engineering Software as a Service: An Agile Approach Using Cloud Computing</i>, Armando Fox, David Patterson, Strawberry Canyon LLC, 2020. 3. <i>Guide to the Software Engineering Body of Knowledge (SWEBOOK v4.0)</i>, Washizaki, H. (Ed.), IEEE Computer Society, 2024.
Tools	

WEEKLY LECTURE SCHEDULE (Tentative, and updated weekly)

This table shows the list of all the lectures, weekly activities, and materials, which will be updated as the class progresses.

There are 3 types of materials:

Lectures: It was covered in class, and you are responsible for the material.

[offclass]: It was not covered in class, but you are responsible for the material.

[optional]: It was not covered in class, and you are not responsible for the material.

W/D	Lectures	Weekly Activities
1 18/02	01-Course Overview and Introduction 01.1-Course Overview Getting to Know Each Other, Why this Course?, Requirements and Assumptions, Course Description and Objectives, Course Activities and Grading, Lectures and Activities Schedule, Course Project, Course Web Site, Course Materials and References, Software Platforms and Tools, Policies and Regulations	
2 25/02	01.2-Introduction to Software Engineering Today Some Big Changes and Software Engineering Disasters, Software Engineering: Important Characteristics, Main Paradigms in Software Development, Technology Trends: SaaS, SOA, Cloud Computing, Beautiful vs. Legacy Code, Software Quality Assurance: Testing, Productivity: Conciseness, Synthesis, Reuse, and Tools	
3 04/03	2-Software Development Processes 02.1-Software Development Processes-I Introduction to Software Engineering Process, Requirements Execution and Project Results, How to Improve Project Results: Adding Process, Plan and Document Processes	[offclass] 02.1-Software Development Processes-I Process Improvement and Certification: CMMI, Process Improvement and Certification: SPICE, “Getting a Certification” Mentality and Building a Professional Culture [offclass] Paper reading assignment Ar-Ge Merkezleri için ISO/IEC 15504 SPICE temelli Süreç Modelinin ve Yönetim Yazılımının Geliştirilmesi https://www.researchgate.net/publication/399428325_Ar-Ge_Merkezleri_icin_ISOIEC_15504_SPICE_temelli_Surec_Modelinin_ve_Yonetim_Yaziliminin_Gelistirilmesi



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4 11/03	02.2-Software Development Processes-II Agile Processes, How to Combine Plan and Document and Agile Processes	[offclass] 02.2-Software Development Processes-II Introduction to DevOps and Continuous Delivery, What is DevOps?, Software Delivery: Traditional and Continuous, Common Elements of Continuous Integration, Adding Quality to the “Project Management Triangle”, Continuous Delivery Maturity Assessment, Continuous Delivery Success Stories
5 18/03	03-Software Engineering Management Project Management Concepts, Project Organization Concepts, Project Communication Concepts, Classical Project Management, Agile Project Management, Agile Design and Code Reviews?	
6 25/03	04-Software Engineering Models and Methods: Visual Modeling with UML What is Modeling?, What is UML?, UML First Pass, Use Case Diagrams, Class Diagrams, Sequence Diagrams, State Machine Diagrams, Activity Diagrams, Component Diagrams, Deployment Diagrams, Package Diagrams, Using the UML in Context	Getting Started on the Course Project: Project Proposal [offclass] Paper and technical report reading assignment [1] H. Gümüşkaya, G. Akyol, “An Integrated Cloud-Based Software Development Process and Framework for SaaS Projects”, Technical Report, https://doi.org/10.13140/RG.2.2.30666.22722 . [2] G. Akyol, H. Gümüşkaya, “Çevik Yazılım Geliştirmede BDD/TDD Yöntemlerinin ve Yazılım Kalite Araçlarının Kullanılması: Bir Yazılım Mühendisliği Dersindeki Tecrübe”, 10. Ulusal Yazılım Mühendisliği Sempozyumu, Çanakkale, CEUR-WS, Vol-1721, Ekim 24-26, Sayfa: 219-230, 2016. https://www.researchgate.net/publication/399266181_Cevik_Yazilim_Gelistirmede_BDDTDD_Yontemlerinin_ve_Yazilim_Kalite_Araclarinin_Kullanilmasi_Bir_Yazilim_Muhendisligi_Dersinde_ki_Tecrube
7 1/04	05-Requirements Engineering-Fundamentals Requirements Engineering Defined, Requirements Development and Management, Business Analyst, Principles of Requirements Engineering, Classifying Requirements, Playing by the Rules, Shared Understanding, Requirements Prioritization, Requirements Challenges	Project Progress Meeting-0 HW1: UML Certification and Developing a Mini UML Project
8 08/04	06-Requirements Development and Management 06.1-Requirements Elicitation Requirements Elicitation and Analysis Concepts, Textual Specification of Elicited Requirements and Traceability Establishment Requirement Elicitation Steps, Requirement Elicitation using Scenarios, Requirement	Project Progress Meeting-1 (2nd and 3rd hours): 1. Finalize project teams and project proposals 2. HW1: UML Check



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	Elicitation using Use Cases: Functional Modeling, Requirement Elicitation using User Stories, SPICE Process for Requirements Elicitation	HW2: <i>Develop the first Requirements, Use Cases, User Interface Mockups (Team HW assignment)</i>
9 15/04	Midterm Exams Week (15/11 – 23/11) No exam, but work on HW2 and the lecture notes on Requirements Development	
10 22/04	Project Progress Meeting-2: HW3 Evaluation HW3: Getting started with READ	HW4: Development and Improvement of READ <i>Improve first Requirements, Use Cases, User Interface Mockups, develop Analysis Models</i> [offclass] 06.2-Requirements Analysis [offclass] 06.3-Requirements Specification and Validation [offclass] 06.4-Requirements Development and Management Using Tools
11 29/04	Project Progress Meeting-3: HW4 Evaluation HW4: Development and Improvement of READ	TBD
12 06/05	07-SaaS Application Architecture-Modern Cloud-Native Systems	Project Progress Meeting-4
13 13/05	08-Agile SaaS Application Development using BDD and TDD 08.1-Modern Software Quality Engineering for SaaS Systems	Project Progress Meeting-5 [offclass] 08.2-Modern Agile Requirements Engineering
14 20/05	08.3-Agile SaaS Application Development using BDD and TDD	Project Progress Meeting-6
15 27/05	Kurban Bayramı Tatili (Eid al-Adha Holiday)	
16 03/06	Project Progress Meeting-7: Project Demonstrations	
	Final Exams Week Final Makeup Exams Week	



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GRADING

Practical Part: %50 (mostly team work):

- **%30: Homework** (including Flip-Learning Weekly Activities and individual and team assignments)
- **%35: Project** (actually %30)

Theoretical Part: %35: (individual work)

- %: Midterm Exam (no
- **%35: Final Grade**

Final Grade: %75 Written Final Exam Grade + %25 Project Grade