

EC530: Software Engineering Principles

Introduction

First, it is going to be fun learning new things!

Second, the class is designed to bring the basic concepts of software engineering together and practice them in real life examples. We will focus on studying different concepts that the students have taken in different classes or were not exposed to that are necessary for their careers in one place. The class follows the flipped classroom model. Outside the classroom, students:

- Study concepts, read assigned papers and tutorials.
- Work on homeworks, which is equivalent to what other classes consider as projects.

During the Class

Homeworks will be individual projects. There will also be team projects. Example of individual projects we used in the past:

1. Develop a RESTful system that produces videos out of a twitter feed.
2. Develop Mobile application that monitors COVID-19 geographically and can run on Android and iOS at the same time,
3. Develop a simulated scalable high availability health monitoring system while simulating I/O systems using software,

Homeworks will change yearly to follow the latest industry and research trends. The concepts are the same.

Class will involve

- There will be quizzes to go over the concepts learned.
- Open discussions about the topics
- Architecture analysis of concepts

It is hands-on class. The students are expected to learn many programming skills by themselves. This includes different languages that may be necessary in the class.

Topics we will cover

- Development Process
 - Quality (Continuous Build, Continuous Integration, Testing and Debugging)
 - Testing
 - Automation

- Architecture
 - Tiered Architecture
 - Modular Architecture
 - Microservices
- APIs
 - API design including data flow, control, status.
 - Entity and Procedure based
 - RESTful
- Synchronous/Asynchronous interfaces. This includes working examples using processes and threads.
- Data Models
- Databases
 - Relational
 - Document
 - Graph based
- Release and Packaging including containers
- Messaging Systems including Peer to Peer Systems

Prerequisite

EC602 or equivalent (e.g., EC327)

Students are expected to be familiar with concepts learned in EC601, EC602, and EC327 before attending the class.

In summary

The students will work on multi-layer Tiered architectures, multi-process and thread systems.

Class focuses on developing product quality software. The class builds on EC601 and EC602.

In the class, we will focus on software development principles and techniques including agile development, continuous integration, build and delivery. We will focus on modular design concepts, product quality (testing framework, unit testing), debugging, concurrency, data flow, and API design. We will use state-of-art open source projects to learn and master different skills

This class is designed where students prepare before class and work on the principles during the class. The class also includes a project that is assigned at the beginning and discussed every other week in the class.

[Spring 2025 Class Plan](#)