**Software Engineering/Development Using Open Source**

Credits: 4

Pre-requisites: Good proficiency in programming is essential.

Open Source Software (OSS) is one of the major sources of software, even for the commercial world, and the movement continues to impact the IT usage across the world. Associated with OSS are also some commonly used software engineering / development methods using open source tools such as Github for source code control, project management, issue tracking, test driven development, etc. Both the open source software, as well as the practices and tools they use, are now widely used in commercial software world also. With the wide range of available open source modules, it is possible today to develop even very sophisticated applications in a short duration using mostly OSS.

In this course, we will go over the basic software engineering principles and concepts. Then we will study the OSS processes and methods (along with tools for supporting them), a few common architectures to develop software (e.g. microservices), and some commonly used OS frameworks and systems. Flipped-classroom may be used for some of the lectures (i.e. reading will be given and in the lecture we will discuss the reading). It is hoped that some experts will be invited to give guest lectures on open source.

There will be a team project whose goal will be to develop a working prototype of a full-fledged system using OSS modules, while writing minimal code. That is, the project will be more about integrating different OS systems to build an application, and will require learning about the open source systems/components to be used, how to integrate them, etc. Open source processes and tools will be used for managing the project, its source code, testing, etc. Each team will also take up one technical topic, and will make a presentation to the class on the topic, including some details about the open source software on that topic and how to use it. Post conditions of the course:

* Understand the basic software engineering concepts – process, testing, project management, etc
* Have a basic understanding of OSS methods and processes – including source code management, issue tracking, testing, team organization and project management, etc.
* Understand the main categories of OSS, and different types of licensing
* Ability to plan and work in a team to integrate some OSS modules for rapidly building and launching applications, using OS processes and tools
* Understand of key aspects of service oriented and component based SE for building solutions

List of topics (will evolve)

* Software engineering concepts – development process incl. design, coding, testing, etc., and project management process, incl. task assignment, configuration management, release management, etc.
* OSS methods and processes for software project execution and project management
* Common open source tools for projects – e.g. Github, testing tools, etc
* Main categories of OSS, licensing
* Building application using open source processes and components
* A few different Open source frameworks and components that are widely used for building applications - teams will pick up some framework/software and give a tutorial on it to class
* Service oriented computing and microservices

Resources: Mostly reports, websites, and technical notes will be used. Soft copies of these will be provided.

Evaluation (tentative)

* Class presentation on technical topic 20
* Class discussion 10
* End-Sem 20
* Project 50