SwEng Study Guide v.1

This guide is intended to help SwEng students organize the time spent studying for the course. It summarizes the provided resources and outlines a rough plan on how to use them. The first part of this document is provided by the SwEng staff, while the second is open to students who would like to share their tips.

About software engineering in real life

As a software engineer in real life, you usually get very little guidance: you are given some customer requirements, but are not told how to implement them. Furthermore, you will often have to reuse code that only comes with vague documentation, you will have to learn how to use new frameworks and programming languages on your own, etc. While doing this, you will need to go through documentation, tutorials, videos, and blog posts to learn "just enough" to get your job done. It is impractical to have a deep understanding of everything you use, even if you would like to. In fact, modularity and abstraction are key mechanisms that allow you to use code and frameworks without having to understand them in depth.

In SwEng, one of the primary aims is to prepare you for that mode of working.

There are many resources online (e.g. tutorials, Google, StackOverflow and other forums) that can help you overcome bugs or problems. Use them! Employ your favorite search engine to find solutions whenever your own thinking is not enough. Good software engineers reuse everything they can reuse, and only spend time inventing the things they cannot get "off the shelf." Spending long days reinventing the wheel in order to solve a problem you're facing will make SwEng boring and unproductive, and will demotivate you.

Advice from the SwEng Staff

Rationale behind the structure of SwEng

SwEng is a 4-credit course, which implies an average workload of 8-10 hours per week. Some weeks may be busier, some less busy, but in the end it should average out to 8-10 hours. Do not hesitate to ask questions on Piazza. The SwEng team is always ready to help, and enjoys doing so very much (as long as you are polite and reasonable). We like open forums like this, because other students can benefit from the answers as well. Equally importantly, with most of us being confined at home to various degrees, keeping in active touch with classmates and staff can make things better for everyone.

In the present situation, in-person lectures have been replaced by video lectures. These are mandatory and should be watched before the week's exercise session. We upload them in smaller chunks so that it is easier to find specific notions or concepts.

In order to explore all concepts in sufficient depth, we need 1.5 hours of lecture every week. Unfortunately, it is difficult to concentrate on watching 1.5 hours of lecture videos, so we choose this year to put less detail in the videos and the rest goes in the lecture notes. These are also mandatory, and we expect you to know their contents for the homeworks and the final exam. The reason we make the homeworks and exams open-book is because we don't want you to *memorize* the lecture notes, but rather to *understand* the concepts and then be able to find the details on-demand. For this to work, you must read the lecture notes at least once during the semester. Try to build a mental map of what you can find where in the lecture notes.

In order to deepen your understanding of the material, we put together exercises that help you practice the concepts you have learned during the week. They are not graded, and we do not expect you to solve all of them. In order to help you manage time, we divide the exercise sets into basic, intermediate, and advanced. The basic exercises are there to make sure you assimilate the week's material: if you can solve them, you should be able to get a passing grade on the exam. If you complete the intermediate ones, you should be able to get a good grade on the exam. Advanced exercises go beyond what we test on the exam, and they are there for students who find SwEng too easy and want to get more from the course.

The exercises are always framed in an ideal, simplified context. In contrast, the mini-project is much closer to real-life software engineering, and is meant to both give you a feel for the scale required to build something real and to prepare you for the Software Development Project (SDP) course next semester. In that course you will develop your very own Android app from scratch, in teams of 6 students. The mini-project is not grade. It gets you acquainted with the Android development environment and helps you apply some of the abstract SwEng concepts in a "real-life" application. This project is less guided than the ones you have done previously at EPFL—while we do outline some main steps, you are expected to do independent research. As third-year students, you should be able to work towards a solution by yourselves. Of course, the teaching team is always there to help, but you should always first think about it on your own. Completing this mini-project before you start SDP next semester is crucial, because it covers concepts you will absolutely need in SDP (e.g., unit and UI testing, dependency injection).

Graded homeworks

The three graded homeworks are there to help you solidify your learning, to (self) evaluate your acquisition of what we taught in SwEng, and to prepare you for the exam. The homeworks are in the exact same format, so you will have no surprises during the exam. We expect you to complete them within the limited time-window. As you saw during HW1, which was based on a 3-hour exam given previously in SwEng, it is possible to spend many, many hours to "perfect" a solution. However, you should learn to identify the key parts in an assignment and complete as much of it as possible in the allotted time window.

How to prioritize

1. You must absolutely watch all the weekly video lectures before Friday's exercise session: they explain the week's material and are an essential prerequisite for understanding everything else, and for doing the exercises. If you have any questions, ask on Piazza right away, don't wait until the exercise session.
2. Do a quick read through the lecture notes. If there are concepts you feel less comfortable with, read them more in depth. Don't plan to read the lecture notes start-to-finish in one sitting. They are quite modular, and you can easily read one section today, another section tomorrow, etc. The main thing is for you to know where to find what in the lecture notes.
3. Solve the basic exercises. By putting the week's material into practice, you will learn in a more durable way. The exercises also help you assess your understanding of the material. Try as much as possible to start the exercises before the exercise session, and collect your questions and ask them as soon as possible, either on Piazza or in the exercise session. If you breeze through the basics, go on to the intermediate ones.
4. Compare your solutions to the provided solutions, and aim to understand any mistakes you may have made. This is a good time to read through the lecture notes once again, focusing on the parts of the material you had trouble understanding, or the ones corresponding to exercises you couldn't solve. If this feels easy or boring, do the advanced exercises.
5. Finally, start the week's mini-project. Do not hesitate to collaborate with other students using the different channels available—you learn faster in this way. Also don't feel compelled to do the entire project at a time, you can do it by pieces. You don't absolutely have to do the project to succeed in SwEng, but it will pay off when you take SDP.

Advice from SwEng students

Please use this section to share with your classmates tips & tricks that work well for you or for others. Ideas on how to organize your time for SwEng, or a schedule that is particularly efficient for covering most material quickly, etc.