Software engineering

Summary
This course teaches the basics of modern software development: designing software, working in a team, writing good code, shipping software, and evolving software. It emphasizes building software that meets high standards of quality, reliability, security, and manageability.

Content
Writing software
• Modularity
• Interfaces
• Software architecture

Getting software right
• Requirements
• Testing
• Verification
• Debugging
• Security
• Performance

Shipping software
• Development processes
• DevOps
• Software evolution

Continuous and independent learning is essential to being a good software engineer because, unlike mathematics or physics, the field changes fast. This course prepares students to become lifelong auto-didacts who build upon the foundation of immutable principles that govern good software engineering.

Keywords
design patterns, fault tolerance, software testing, code analysis, software verification, security, performance, usability, refactoring, agile development methods, version control systems, continuous integration

Learning Prerequisites
Required courses
Students who do not master the material taught in the prerequisite courses prior to starting CS-305 typically do not manage to pass this course.

Important concepts to start the course
Students are required to have good programming skills in an object-oriented language (e.g., Java).

Learning Outcomes
By the end of the course, the student must be able to:
• Design software that is reliable, secure, user-friendly, and performs well
• Implement sophisticated designs and algorithms
• Specify requirements for software systems
• Develop code that is maintainable
• Organize a team to execute a medium-sized software project
• Assess / Evaluate design and implementation alternatives

Teaching methods
• Combination of online and in-class lectures
• Online textbook
• Homework exercises

Expected student activities
• Attend and actively participate in lectures
• Read and understand assigned materials
• Complete homework exercises independently

Assessment methods
• 20% based on online quizzes and homeworks (during the semester)
• 80% based on a final exam (during the exam session)

Supervision
Office hours Yes
Assistants Yes
Forum Yes

Resources
Virtual desktop infrastructure (VDI)
No

Bibliography
Please see the course website for the latest information and up-to-date bibliography

Ressources en bibliothèque

Websites
• https://sweng.epfl.ch