

COURSE SYLLABUS

Developing AI-Enabled Systems, 7.5 credits*Utveckling av AI-system, 7.5 högskolepoäng*

Course Code:	T2UAAT	Education Cycle:	Second-cycle level
Confirmed:	Sep 01, 2025	Disciplinary domain:	Technology
Valid From:	Aug 31, 2026	Subject group:	Computer Technology
		Specialised in:	A1F Second cycle, has second-cycle course/s as entry requirements
		Main field of study:	Computer Science

Intended Learning Outcomes (ILO)

On completion of the course the student shall:

Knowledge and understanding

- display knowledge of fundamental principles of software engineering and how they apply to AI/ML-enabled systems.
- display knowledge of the lifecycle process and engineering practices of developing AI/ML-enabled systems, including data collection, model development, testing, deployment, and monitoring.
- demonstrate comprehension of basic design processes, decisions and patterns of AI/ML-enabled systems including definition of software architecture, infrastructure, algorithms, and data, to satisfy requirements.

Skills and abilities

- demonstrate the ability to apply software engineering practices to develop and manage AI/ML-enabled applications, including basic requirements engineering, design, testing and maintenance.
- demonstrate the ability to utilize version control systems (such as Git) for collaborative development and ensuring reproducibility in AI/ML projects.
- demonstrate the ability in continuous integration (CI) and testing of AI/ML projects using the latest technologies

Judgement and approach

- demonstrate the ability to proficiently evaluate and select appropriate software engineering practices for different stages of the lifecycle of AI/ML-enabled systems.
- demonstrate the ability to critically reflect on the practical implications of AI system design and their deployment.

Content

This course introduces the principles and practices of software engineering with a focus on AI/ML-enabled systems. It covers the lifecycle of AI systems—from data collection and model development to continuous integration. It also includes a basic overview of deployment and monitoring—while emphasizing the unique challenges that arise in AI system development. Students will gain hands-on experience on using the common technologies (such as for example Python, Pandas and Git) to build, manage, and maintain AI/ML-enabled systems. By the end of the course, students will be equipped to apply software engineering practices to AI projects and ensure the quality, security, and scalability of AI/ML-enabled systems.

The course includes the following elements, all within the context of AI/ML-enabled systems:

- Software Engineering Practices and Processes

- Design Decisions
- Version Control and Collaboration with Version Control Systems (e.g.: Git).
- Testing and Continuous Integration (CI)
- Integrating AI/ML Model into a Larger System
- Managing Dependencies and Environments

Type of instruction

The teaching mainly consists of lectures, assignments, and workshops.

Language of instruction is English.

Entry requirements

Passed courses at least 90 credits within the major subject computer engineering, computer science, informatics, information systems or information technology, including a minimum of 15 credits in mathematics and at least 30 credits in programming/software development, or alternatively passed courses at least 150 credits from the programme Computer Science and Engineering, and taken Python Programming for AI, 7.5 credits.

Examination and grades

The course is graded 5, 4, 3 or U.

Registration of examination:

Name of the Test	Value	Grading
Examination ¹	3.5 credits	5/4/3/U
Assignment	4 credits	G/U

¹Determines the final grade of the course, which is issued only when all course units have been passed.

Course literature

Please note that changes may be made to the reading list up until eight weeks before the start of the course.

Kästner, C. (2025). Machine learning in production: from models to products. MIT Press, <https://mlip-cmu.github.io/book/>.

Huyen, C. (2024). AI Engineering: Building Applications with Foundation Models. O'Reilly Media, Incorporated.

Bass, L., Lu, Q., Weber, I., & Zhu, L. (2025). Engineering AI systems: architecture and DevOps essentials. Addison-Wesley Professional.

Chip, H. (2022). Designing machine learning systems: An iterative process for production-ready applications.