

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


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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

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**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 <sup>1</sup>	3.5 credits	5/4/3/U
Assignment	4 credits	G/U

<sup>1</sup>Determines 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.