MF2522 Systems Engineering 6.0 credits

Systemkonstruktion

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

The official course syllabus is valid from the autumn semester 2025, according to the decision by the Faculty Board: M-2024-0018. Date of decision: 2024-10-14.

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

A Bachelor of Technology degree in Mechanical Engineering or the equivalent.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After passing the course, the student shall be able to:

1. Describe and explain the basic principles, concepts, processes, methods and applications of systems engineering

2. with a holistic approach, creatively, critically and systematically integrate knowledge from previous subject areas to analyse, assess and manage complex systems

3. evaluate models for the planning and design of technical systems

4. design, in collaboration and dialogue with different groups, a technical system based on a master model and a given system definition

5. make judgements taking into account relevant scientific, societal and ecological aspects when choosing technical solutions

6. orally and in writing, in dialogue with different groups, clearly account for and discuss one's own engineering conclusions, and the knowledge and the arguments that these are based on

Course contents

This course offers an in-depth introduction to system design, with a particular focus on applications in machine design.
Systems engineering is a multidisciplinary approach that integrates different engineering disciplines to ensure that complex systems fulfil all technical and operational requirements throughout their life cycle.
The main purpose of the course is to introduce technical complexity and uncertainty and to balance desired and undesired effects when developing a system.
Students will have to apply theoretical knowledge in a more practical holistic perspective.
The aim of the course is to equip students with the skills and tools required to lead and participate in the development and management of complex systems.
The course is project-based and is based on the analysis and redesign of an existing technical system.

The course covers the following:

- A stage-gate process and the V-model supporting the project

- Product and life cycle management, international standards and support tools

- The active environment and environmental impacts

- Stakeholder and requirements management (customer, business, legal and societal requirements)

- System architecture

- Integration of systems and components, interfaces between components using design structure matrix based analysis to identify module candidates

- Manufacturing, assembly, service and maintenance aspects

- RAMS supported by FTA and FMEA analysis methods

- Risk and threat assessment

- System verification and validation

Examination

- PRO1 - Project assignment, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

The project tasks to be presented are compulsory.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.