MF2512 Model-based Engineering Design 3.0 credits

Modellbaserad maskinkonstruktion

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

Establishment

The official course syllabus is valid from the autumn semester 2026 as decided by the Faculty Board decision HS-2025-2582. Date of decision: 2025-10-08.

Grading scale

P, F

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

Bachelor of Science degree in mechanical engineering or equivalent.

MF2521 Advanced Machine Design Project, Part 1 or equivalent.

Intended learning outcomes

Upon completion of the course, students should be able to

1. Use calculation and simulation tools to analyze and solve technical design problems, including static, dynamic, and thermal behavior.
2. Develop and evaluate mechanical designs using computer-aided design (CAD) and computer-aided engineering (CAE) workflows, integrating geometry, motion, and performance.
3. Explain the principles of sensors and data acquisition systems, and apply this knowledge to select appropriate instrumentation for technical measurements and system monitoring.

Course contents

Den här kursen introducerar studenter på första året av masterprogrammet till centrala datorbaserade verktyg och metoder som används genom hela programmet i maskinkonstruktion. Kursen ger en praktisk grund i modellbaserad konstruktion, med fokus på digitala verktyg för analys, simulering, konstruktion och mätning.

Introduktion till modellbaserad konstruktion som ingenjörsmetodik

Programmering och problemlösning i MATLAB

3D-modellering och designutvärdering med SolidEdge

Finita elementmodeller FEM av mekaniska system i Ansys

Simulering av dynamiska system med multikroppssimulering MBS

Principer för sensorer och datainsamlingssystem i ingenjörssammanhang

Examination

- INL1 - Hand in assignment, 3.0 credits, grading scale: P, 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

- Attendance at lectures is mandatory (minimum 80%).'
- All exercises (8 in total) are individual assignments and must be approved in order to complete the course.

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.