MF2531 Advanced Machine Design Project, Part 2 12.0 credits

Avancerat Maskinkonstruktionsprojekt, del 2

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-2025-2584. Date of decision: 2025-10-08.

Grading scale

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

After completing the course, students should be able to

1. Plan and participate in the development of integrated mechanical products by relating requirements, function, and technical solutions in a holistic manner.
2. Design and detail components and subsystems in complex mechanical products from concept to prototype by applying advanced design methods and reflecting on the development process.
3. Analyze and formulate relevant load cases for components and systems, e.g., by linking load conditions to material selection, design principles, and standard components.
4. Design and analyze components and subsystems in complex products by weighing functional, structural, and manufacturing aspects.
5. Apply model-based design principles for simulation, verification, and detailed design, and reflect on how these affect the product development process.
6. Select materials and manufacturing processes by relating technical requirements to the environment, economy, and production technology.
7. Integrate principles of environmentally friendly design into product development by analyzing life cycle perspectives and reflecting on the role of sustainability in engineering work.

Course contents

The course is applied in nature, which means that previous knowledge from areas such as mechanics, strength of materials, electrical engineering, product development, and design is applied in practical work within the framework of the current project.

Common activities in project work include:

- Project-based tasks including project management and follow-up of project plans.
- Engineering calculations and analyses: load and stress analyses, fatigue and fracture analyses, dynamic analyses, etc.
- Material selection with regard to strength, weight, cost, manufacturability, durability, and other factors according to project requirements.
- Systematic application of model-based design methods and tools for analysis, simulation, and verification of components and systems.
- Identification and procurement of standard components such as bearings, fasteners, motors, sensors, etc.
- Specification of tolerances to ensure function and assembly.
- Preparation of manufacturing documentation, including technical drawings.
- Manufacturing/prototype development and testing.
- Application of principles for environmentally friendly design and reflection on the environmental impact of the product.

Examination

- INL1 - Hand-in assignment , 3.0 credits, grading scale: P, F
- PRO1 - Project 1, 3.0 credits, grading scale: P, F

- PRO2 - Project 2, 6.0 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.

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.