



MF2121 Mechatronic Capstone course 18.0 credits

Mekatronik högre kurs

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

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

Establishment

The official course syllabus is valid from the spring semester 2025 in accordance with the decision by the Head of the ITM School: M-2023-2061. Date of decision: 2023-10-12

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

Passed at least 50% of the courses MF2030 Mechatronics basic course, MF2095 Programming in C for embedded systems, MF2043 Robust mechatronics and MF2007 Dynamics and motion control or the like courses.

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 should be able to:

1. identify, compare and critically assess aspects of a technical problem to make design decision
2. use professional tools and processes that are necessary for the development of mechatronic products
3. organise, handle, lead and become a part of a technical and complex development project
4. modelling, simulation and visualisation of dynamic products and systems
5. design and production of prototypes
6. apply a basic test process with verification and validation
7. carry out a State-of-the-Art (SOTA) survey on a given technical problem by means of literature searches
8. provide arguments for solutions to mechatronic problems that meet both economic, social and environmental considerations in relation to the specifications of the project

Course contents

The course starts by assigning students to projects based on individual criteria and skills. The project teams normally consist of about 7-10 students. A couple of seminars and workshops are held on subjects (equality, diversity & equal treatment, project work, sustainability, literature search) that are relevant for complex projects in mechatronic development projects in a relatively large development team.

The course focuses on product development of sustainable mechatronic products in large projects. Innovative and intelligent products are created by developing knowledge and skills in mechanics, motion control, robotics, embedded systems, real time programming and distributed systems. The course is based on problem-based learning and on work in larger projects, where the ability to be engaged in professional development while developing cooperation, communication and project management skills are practised.

In the learning environment, team building, teamwork and industrial cooperation are integrated parts. The student teams work in collaboration with representatives from industry to decide the specific factors that govern the product requirements, and its design and realisation. It includes interested parties' (stakeholders') needs, the interested parties' requirements, system requirements, component requirements and validation, verification and testing. During the first period, a State-of-the-Art (SOTA) survey should be carried out, based on literature searches on the specific problem in the project. During remaining time, students work in their respective groups with design, testing and validation. The work is documented in a final technical report. The students do much building work on their own and have full

access to modern machines such as 3D printers, laser cutters, milling machines, waterjet cutting machines and common workshop machines.

Examination

- PRO1 - Project, 1.5 credits, grading scale: A, B, C, D, E, FX, F
- PRO2 - Project, 1.5 credits, grading scale: A, B, C, D, E, FX, F
- PRO3 - Project, 7.5 credits, grading scale: A, B, C, D, E, FX, F
- PRO4 - Project, 7.5 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.

Based on the recommendation from the KTH office of support to students with disabilities, the examiner has the right to agree on adapted forms of examination for students with a documented, permanent disability.

For re-examinations, the examiner has the right to allow other forms of examination for individual students.

The course is assessed based on the performance during the spring and the autumn. The examination items of the spring (PRO1 and PRO2) are strongly connected to seminars and the State-of-the-Art (SOTA) work. PRO1 is the individual performance in the form of individually submitted documents. PRO2 is the joint SOTA report.

PRO3 is based on the individual performance during the autumn semester. A document called RUBRICS are used during the whole course where the student reflects over his/her learning, related to the intended learning outcomes of the course.

PRO4 is the grade for the implementation and reporting of the project during the autumn and is taken into account in the student's final mark.

Other requirements for final grade

All items must be completed

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.