



# MF2144 Safety by Design for Mechatronics 3.0 credits

Designbaserad säkerhet för mekatronik

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

University studies equivalent to at least 180 higher education credits in engineering or natural sciences, and the upper secondary school courses English B or English 6.

## 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. Define and explain the importance of integrating safety into the design process of mechatronic systems
2. Critique different design solutions based on their implications for safety.
3. Identify and analyse potential hazards in domain-specific applications of cyber-physical systems.
4. Apply relevant hazard analysis and risk assessment methods to improve the reliability and maintainability of a system.
5. Design simple mechatronic systems with inbuilt safety features using relevant simulation software.

## Course contents

The course introduces:

- Design-based safety for mechatronics, by providing an overview of safety aspects in mechatronic system design; and clarify the importance of integrating safety into the design process, including examples where safety by design was overlooked.
- Mechatronic system safety fundamentals, such as hazard identification methods and risk assessments; cognitive engineering; fault tolerance and reliability engineering principles; and safety standards in the field.
- Security requirement setting based on the application of domain-specific standards in key application areas.

The course is made up of:

- Lessons in design-based safety for mechatronics, mechatronic system safety fundamentals and requirement specification for safety.
- Laboratory sessions where students apply relevant hazard analysis and risk assessment methods to a mechatronic system, set related requirements, and redesign the system to address these requirements.

## Examination

- INL1 - Hand in assignment 1, 1.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Lab assignment 1, 0.5 credits, grading scale: P, F
- LAB2 - Lab assignment 2, 0.5 credits, grading scale: P, F
- LAB3 - Lab assignment 3, 0.5 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.

## **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.