



MF2007 Dynamics and Motion Control 9.0 credits

Dynamik och rörelsestyrning

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

Course syllabus for MF2007 valid from Autumn 2008

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

The course builds upon knowledge and experiences as provided by the Intermediate thesis project in Mechatronics, MF106x, MF107X or MF109X. .

The course also requires knowledge and experience corresponding to basic courses in control theory (e.g. Automatic Control, Basic Course, (EL1000), programming (e.g. DD1322 Applied Programming and Computer Science, Part 1, 4 credits, and DD1324 Applied Programming and Computer Science, Part 2, 2 credits) and electronics.

Language of instruction

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

Intended learning outcomes

At the end of this course, the student should be able to:

- Specify overall performance requirements for a motion control system.
- Understand the implication, and master the selection, of actuator and sensor components.
- Derive dynamic models of typical mechatronic applications.
- Find the correct parameters of dynamic models using experimental methods.
- Do dynamic analysis of the model in both frequency and time domain.
- Design model based feedback and model following control, i.e., servo control, both in continuous and discrete time .
- Do simulations of application and control system models in continuous and discrete time for the purpose of verification, performance analysis and further development
- Implement and structure the controller software for microprocessor implementation.
- Understand implementation restrictions due to sensor and actuator limitations and microprocessor resources such as computing speed, fixed vs. floating point arithmetic and memory.
- Design and use both digital and analogue filters.

Course contents

The course includes lectures to provide overview and inspiration, and laboratory work in which the participants work on a project. The project is modularized and parts of it are to be finalized each week of the course. The project work is done in groups of up to three to four participants. The course is concluded by oral presentations per group of the project work and by an individual written exam.

Disposition

Period 1
Föreläsningar 26h
Övningar 24h
Räknestuga 12 h

Course literature

To be decided.

Examination

- PRO1 - Project, 6.0 credits, grading scale: P, F
- TEN1 - Written 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.

Other requirements for final grade

Completed hands-in part of the project. Oral presentation of the project (PRO1; 6 cr). Written exam (TEN1; 3cr).

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.