EL1010 Automatic Control, General Course 6.0 credits

Reglerteknik, allmän kurs

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

Establishment

On 04/21/2020, the Head of the EECS School has decided to establish this official course syllabus to apply from autumn semester 2020, registration number: J-2020-0535.

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

General entry requirements.

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

- formulate basic theory and definitions of important concepts in general automatic control
- apply analysis and design methods in general automatic control

Course contents

The course covers how feedback influences properties of dynamic system such as stability, speed of response, sensitivity and robustness. The course contains analysis and design of feedback systems with regard to these properties. In particular, the following is studied

- basic concepts and problems: Application examples of automatic control in society, representation of dynamic system, in and output signals, differentia equation models, Laplace transform, transfer functions, block diagrams, step response, poles, zeros, linearisation and state space models
- analysis of feedback systems: stability, root locus, the Nyquist criterion, Nyquist and Bode diagrams, speed of response, error coefficients, sensitivity and robustness
- design of control systems with one input signal and one output signal: specifications, PID-controllers, compensation in the frequency domain, feed-forward control, time delays, state feedback, observers and pole placement
- implementation: choice of sampling time, anti alias filters and discretisation of controllers
- control terminology in Swedish and English.

Examination

- TENA - Exam, 1.0 credits, grading scale: A, B, C, D, E, FX, F
- LABC - Computer Project, 2.0 credits, grading scale: P, F
- LABB - Lab 2, 2.0 credits, grading scale: P, F
- LABA - Lab 1, 1.0 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

LAB1, LAB2, LAB3, TEN1

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.