IL2242 Analog Integrated Circuits 7.5 credits

Analoga integrerade kretsar

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: J-2024-2268. Date of decision: 2024-10-08

Grading scale

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

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

Knowledge in analog electronics covering 4,5 higher education credits, equivalent to completed course IE1202/IE1207.

Knowledge of integrated circuits covering 3 higher education credits, corresponding to completed course IL2241 or completed module LAB1 in IL2241.

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

- explain how noise, signal power and bandwidth relate to amplifier performance
- use the asymptotic model to synthesise amplifiers with feedback
- apply different techniques to minimize noise and distortion
- apply bandwidth optimisation and frequency compensation based on phantom zeros
- implement rest-point setting circuits using current and voltage sources
- apply analog layout techniques for physical implementation
- use Electronic Design Automation (EDA) tools for the design, verification and characterisation of simple integrated circuits
- write design documentation.

Course contents

The course is an introduction to analog integrated circuits. The course focuses on negative feedback amplifiers which are central building blocks in analog, digital and radio frequency circuits. Synthesis of amplifiers based on the asymptotic model is introduced. In detail, component modelling, low noise and low distortion design, bandwidth and frequency compensation, rest point setting and analog layout are studied. The course includes practical amplifier design from specification to physical verification, using the latest EDA tools.

Examination

- LAB1 - Laboratory work, 3.0 credits, grading scale: P, F
- TENS - Written exam, 4.5 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.

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.