



# IL2218 Analog Electronics, Advanced Course 7.5 credits

Analog elektronik, fortsättningskurs

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

## Establishment

Course syllabus for IL2218 valid from Autumn 2007

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Electrical Engineering

## Specific prerequisites

Basic course in analog electronics.

## Language of instruction

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

# Intended learning outcomes

The student is after the course able to:

- describe and explain large signal behaviour and small signal models for MOS transistors, evaluate models with simulation
- draw small signal models, calculate gain and input, output impedances of transistor amplifiers, sketch transfer function of amplifiers
- describe and design different kinds of current mirrors
- analyse MOS operational amplifier
- calculate frequency response of integrated amplifiers
- explain the benefits of negative feedback and identify different feedback configurations
- analyse frequency response and appraise stability of feedback amplifiers, design stable amplifiers
- describe different noise sources, use noise models and calculate noise in amplifiers
- describe short channel effects and MOS device models
- use SPICE simulation tools in order to verify and analyse amplifiers.

## Course contents

- Models for MOS integrated circuits active devices
- Single transistor and multiple transistor amplifiers
- Current mirrors, active loads and references
- Operational amplifiers with single ended outputs
- Frequency response of integrated circuits
- Feedback and stability of feedback amplifiers
- Noise

## Course literature

Bezad Razavi, Design of Analog CMOS Integrated Circuits

Upplaga 1, 2000, McGraw Hill

ISBN 0-07-118839

## Examination

- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Course, 3.0 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

- Lab. course (LAB1 3,0 credits)
- Written exam (ANN1; 4,5 credits)

## 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.