



# IL2238 Fundamentals of Integrated Electronics 7.5 credits

## Integrerad elektronik

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

The official course syllabus is valid from the autumn semester of 2024 according to the faculty board decision: J-2024-2642.

Decision date: 2024-11-12

## Decision to discontinue this course

The course will be discontinued at the end of the autumn semester 2026 according to the faculty board decision: J-2024-2642.

Decision date: 2024-11-12 The course is given for the last time in the autumn semester 2024. The last opportunity for examination in the course is given in the autumn semester 2026. Contact the examiner to be examined during the discontinuation period.

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Electrical Engineering

## 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, students should be able to:

- develop and use large- and small-signal (low and high frequency) MOSFET models and noise models
- use large- and small-signal and noise analysis, frequency response, stability and frequency compensation methods for basic CMOS analogue integrated circuits
- evaluate which circuit architecture is appropriate for a specific application
- design, simulate and analyze basic CMOS analogue integrated circuits and use professional CAD tools
- write a report and make an oral presentation on designed circuits and their performance in order to
- obtain a good understanding of analogue integrated systems, and basic methods and technologies for designing analogue integrated systems.

## Course contents

The main focus of the course is on the following topics:

- Introduction to integrated electronic systems
- Integration solutions and specific issues for integration
- MOSFET device operation and models (large- and small-signal, low and high frequency)
- Basic analogue building blocks (amplifiers, current sources, voltage references) of an integrated circuit (IC)
- Frequency response
- Noise
- Feedback
- Operational amplifiers (opamps)
- Stability and frequency compensation of operational amplifiers
- Layout techniques

## Examination

- PRO1 - Project, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 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.

## 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.