



IL2241 Introduction to Integrated Circuits 7.5 credits

Introduktion till 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-2024-2267. 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 of digital circuits covering 3 higher education credits, equivalent to completed course IE1204/IE1205/IL2246.

Knowledge of electromagnetism covering 7.5 higher education credits, corresponding to completed course IF1330/EI1110/IE1206 or knowledge of analogue electronics covering 4.5 higher education credits, corresponding to completed course IL2246.

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

- describe the operation, fabrication and scaling of CMOS technology
- explain and estimate the influence of electrical couplings on delay and power consumption in CMOS technology
- explain how complex integrated circuits are designed
- design standard cells, such as logic gates and flip-flops.
- describe how memories are designed and compare their performance
- use Electronic Design Automation (EDA) tools for the design, verification and characterisation of simple integrated circuits
- describe the impact of fabrication and use of integrated circuits on sustainable development objectives.

Course contents

The course is an introduction to modern integrated circuits. It covers basic topics common to analogue and digital integrated circuits built with CMOS technology. The performance and function of basic circuits and their electrical connections are studied. System architecture is introduced followed by hierarchical design, circuit simulation, physical implementation and verification. The course aims to make students acquainted with industrial 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.