FIH3609 Analysis and Design of Semiconductor Devices 7.5 credits

Analys och konstruktion av halvledarkomponenter

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

Establishment

Course syllabus for FIH3609 valid from Spring 2020

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

A basic course in semiconductor devices or semiconductor physics.

Language of instruction

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

Intended learning outcomes

The course is about advanced nanometerscaled semiconductor devices for application areas such as very large-scale integrated circuits and for high-speed communications.

After the course, the student should be able to

- analyse the operation of semiconductor devices
- analyse delay times from parasitics
- analyse scaling of MOSFETs
- design a scaled down device from a given device
- discuss semiconductor devices based on research articles

With analyse is meant to derive relations and calculate from equations given in the textbook.

Course contents

This course covers the most important device in silicon: nanometer sized MOSFETs for digital high speed operation. Sections: Historical background of semiconductor devices, technology and device trends, physics of the MOS structure, MOSFET scaling theory, nanometer design, variability, manufacturability, silicon-on-insulator (SOI), FinFET and new techniques such as graphene, carbon nanotubes and nanowires. Apart from the text book, research articles are studied, and the students select one recent article to present in English in a seminar.

Examination

- EXA1 - Examination, 7.5 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.

Homework, Simulation Lab, Seminar presentation and Written exam.

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.