IE1204 Digital Design 7.5 credits

Digital design

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

Establishment

Course syllabus for IE1204 valid from Spring 2019

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Completed upper secondary education including documented proficiency in Swedish corresponding to Swedish B and English corresponding to English A. For students who received/will receive their final school grades after 31 December 2009, there is an additional entry requirement for mathematics as follows: documented proficiency in mathematics corresponding to Mathematics A. And the specific requirements of mathematics, physics and chemistry corresponding to Mathematics D, Physics B and Chemistry A.

Language of instruction

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

Intended learning outcomes

After completed course the student shall be able to

- use boolean algebra to describe and optimise logic functions

- draw and interpret schematics with symbols for logic gates and standard digital components

- analyse small combinational and sequential logic circuits and determine their functionality

- design small combinational and sequential logic circuits which implement a given function

- implement small combinational and sequential logic circuits with standard components and be able to find wrong connections

- use tools for simulation of combinational and sequential digital circuits

- determine the functionality of small digital circuits that are described using a hardware description language

- give the functionality of simple CMOS-schematics by a boolean equation

- understand how the physical properties affect the timing characteristics of digital circuits

Course contents

Number System and Codes. Binary Arithmetic. Booolean algebra and Booolean functions. Logic operations. Logic gates. Optimisation methods. Combinational function blocks. Digital arithmetic. Design of combinational circuits. Latches and Flips-Flops. Counters. Sequential circuits. Finite state diagrams. Finite state machine of Mealy and Moore type. Asynchronous sequential circuits. Design of synchronous and asynchronous sequential circuits. Programmable logic. Introduction to VHDL. Memory. Fundamental MOS-technology.

Examination

- TENA - Written Exam, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- LABA - Laboratory Work, 3.5 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.

Other requirements for final grade

For the final grade all examination parts (exam and laboratory course) have to be passed.

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.