



# IE1204 Digital Design 7.5 credits

## Digital design

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

## Establishment

The official course syllabus is valid from the autumn semester 2022 in accordance with the decision from the head of school: J-2022-0554. Decision date: 24/03/2022

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

**General entry requirements and 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 passing the course, the student shall be able to

- convert between the decimal, binary, octal and hexadecimal number systems
- calculate addition, subtraction, multiplication and division binary
- use boolean algebra to describe and optimise logical functions
- draw and interpret timetables with the symbols for logical gates and digital standard components
- state the functionality for simple CMOS-circuit timetables
- determine the function of simple combinatorial and sequential logic circuits through analysis
- design simple combinatorial and sequential logic circuits that implement a given function
- implement and troubleshoot combinatorial and sequential logic circuits with standard circuits
- use simulation tools to simulate combinatorial and sequential logic circuits.

## Course contents

Number system and codes. Binary arithmetic. Boolean algebra and boolean functions. Logical operations. Gate logic. Basic CMOS technology. Combinatorial function blocks. Construction of combinatorial circuits. Latches and flip-flops Counter. Synchronous sequential circuits. State diagram. State machines of Mealy type and Moore type. Construction of synchronous sequential circuits. Programmable logic (FPGA). Semiconductor memories.

## 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.

## 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.