Linnæus University

Jnr: 2020/15-3.1.2.2

Course syllabus

Faculty of Technology
Department of Physics and Electrical Engineering

1DT005 Digitalteknik, 7,5 högskolepoäng
Logic Circuit Design, 7.5 credits

Main field of study
Computer Engineering

Subject Group
Computer Science

Level of classification
First Level

Progression
G1N

Date of Ratification
Approved 2013-12-18
Revised 2019-12-05 by Faculty of Technology. Assessment methods and literature list are revised.
The course syllabus is valid from spring semester 2020

Prerequisites
General entry requirements and Mathematics 3c, Physics 2 or Mathematics D, Physics B (Field-specific entry requirements 8/A8).

Objectives

After completing the course the student should:

- be able to use the discrete mathematics in digital technology
- be familiar with digital technology fundamental circuits
- have knowledge of systematic methods of analysis and synthesis of combinatorial circuits and sequential circuits
- have the ability to handle computer-based synthesis tools
- have some knowledge of synthesis tools for VHDL (VHDL = Very High Speed Integrated Circuit Hardware Description Language.)
- have laboratory skills.

Content

The course covers the following topics:
Logic circuits and digital basic functions:

- number system and codes
- gates
- Boolean algebra
- latches and flip-flops

Combinational logic:

- Boolean functions
- truth tables
- minimization methods, Karnaugh maps
- racing, gambling
- adders, decoders, multiplexers (MUX), demultiplexers (DEMUX)
- synthesis with VHDL

Sequential Circuits:

- synchronous and asynchronous counters, registers
- state diagram, next state tables, transition tables
- Moore and Mealy state machines, state encoding
- synthesis and analysis of sequential circuits
- synthesis with VHDL

Type of Instruction

Lectures, assignments and concept related laboratory work. The laboratory work is mandatory. Mandatory preparatory assignments may occur for the laboration work.

Examination

The course is assessed with the grades U, 3, 4 or 5.
Assessment of student performance is made through written test and/or oral examinations and/or presentation of mandatory assignments.

Students who do not pass the regular examination will be offered retrials close to the regular examination.

Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

Required Reading and Additional Study Material

Required reading
Per Carlson och Staffan Johansson. Digitalteknik (2016), Studentlitteratur. ISBN 9789144093727. Sidor 612.