Linnæus University

Course syllabus

Faculty Board of Science and Engineering
School of Computer Science, Physics and Mathematics

1ED021 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 by the Board of the School of Computer Science, Physics and Mathematics 2009-08-11

Revised 2011-05-13. Revision made for English translation of the syllabus.

The course syllabus is valid from autumn semester 2011

Prerequisites
General entry requirements and Mathematics D, Physics B or Mathematics 3c, Physics 2.

Expected learning outcomes
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.
On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts. 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

A written course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The course evaluation will be filed at the department.

Other

Upon request, a Swedish University degree will be issued upon successful completion of the full demands for that degree.
On request, a Swedish University course certificate will be awarded upon successful completion of the course.

Required Reading and Additional Study Material

Required reading

Carlsson,P & Johansson,S, *Digitalteknik*, Liber, 2003. Pages 600. (600)
DFM, *Laboration booklet*, current year. Pages app. 60.