



COURSE SYLLABUS

Digital Electronics with VHDL, 9 credits

Digitalteknik med VHDL, 9 högskolepoäng

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|---------------|-------------------|----------------------|-------------------------------------------|
| Course Code: | TDVK14 | Education Cycle: | First-cycle level |
| Confirmed by: | Dean Feb 27, 2014 | Disciplinary domain: | Technology (95%) and social sciences (5%) |
| Valid From: | Aug 1, 2014 | Subject group: | DT1 |
| Version: | 1 | Specialised in: | GIF |
| Reg number: | JTH 2014/672-122 | Main field of study: | Computer Engineering |

Intended Learning Outcomes (ILO)

After a successful course, the student shall

Knowledge and understanding

- show familiarity with time critical aspects when constructing digital circuits and find and interpret relevant data in data sheets.
- show familiarity with various circuit technologies for programmable logic and how this may be combined with hard-wired cores, IP building blocks and separate microcontrollers.
- display knowledge of the function of the most common data path building blocks and sequential logic circuits.
- demonstrate comprehension of the difference between asynchronous and synchronous sequential networks and how the latter may be described using Finite State Machines.
- display knowledge of various digital system test- and simulation methods
- show familiarity with the V-model as a development approach.

Skills and abilities

- demonstrate the ability to independently design and verify modest complex digital circuits by use of VHDL.
- demonstrate the ability as a member of a smaller team to design digital systems where a testbench is designed in parallel and used to verify the specification in accordance with the V-model.

Judgement and approach

- demonstrate the ability to choose a suitable circuit technology for implementation of a digital system.

Contents

The course covers digital design and a basic use of the hardware description language VHDL.

The course covers the following topics:

- The hardware description language VHDL
- Circuit technologies (e.g. CPLD, FPGA, ASIC)

- Data path building blocks (e.g. adders, multipliers)
- Sequential logic (e.g. registers, counters)
- Time critical aspects
- Finite State Machines, FSM
- Design verification (testbenches)
- Project work in accordance with the V-model.

Type of instruction

Lectures, laboratory work and project work.

The teaching is conducted in English.

Prerequisites

General entry requirements and completed course Microcontrollers, 6 credits (or the equivalent).

Examination and grades

The course is graded 5,4,3 or Fail.

The final grade for the course is based upon a balanced set of assessments. The final grade will only be issued after satisfactory completion of all assessments.

Registration of examination:

| Name of the Test | Value | Grading |
|------------------|-----------|---------|
| Examination | 4 credits | 5/4/3/U |
| Laboratory work | 3 credits | U/G |
| Project work | 2 credits | 5/4/3/U |

Course literature

Literature

The literature list for the course will be provided one month before the course starts.