

# Computer Hardware - a System on Chip

Programme course

6 credits

Datorteknik - ett datorsystem på ett chip

TSEA44

Valid from: 2017 Spring semester

**Determined by**

Board of Studies for Computer Science  
and Media Technology

**Date determined**

2017-01-25

**Offered for the last time**

Autumn semester 2024

**Replaced by**

TSEA85

## Main field of study

Computer Science and Engineering, Electrical Engineering

## Course level

Second cycle

## Advancement level

A1F

## Course offered for

- Computer Science and Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Electronics Engineering, Master's programme
- Information Technology, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering

## Specific information

The course is not available for exchange students

## Prerequisites

Switching Theory and Logical Design, Computer Hardware and Architecture, Digital Project Laboratory.

## Intended learning outcomes

The course intends to give hands-on experience on the design of an advanced application specific computer system on a chip with regard to performance, response time, testability, cost, interaction between hardware and software.

After a completed course the student shall be able to:

- Integrate a computer of IP blocks to solve a specific problem
- Design and integrate accelerators
- Modify the instruction set of the computer to achieve speed up
- Design hardware to measure the performance of the computer
- Design application software in C/asm
- Implement the design in an FPGA

## Course content

Large SystemVerilog blocks (IP blocks) are treated as components during the design phase. CPUs, interconnects, memories, I/O units are optimized for an application. Modification of a cross compiler for C/C++. Adaptation of OS (Linux) and application software. Simulation. Implementation in FPGA.

## Teaching and working methods

Lectures and laboratory work. During the laboratory work sub blocks of a complete embedded system are designed and tested.

## Examination

PRA1                      Projects                      6 credits                      U, G

Grades are given as 'Fail' or 'Pass'.

## Grades

Two-grade scale, U, G

## Department

Institutionen för systemteknik

## Director of Studies or equivalent

Tomas Svensson

## Examiner

Kent Palmqvist

## Course website and other links

<http://www.da.isy.liu.se/undergrad/>

## Education components

Preliminary scheduled hours: 44 h

Recommended self-study hours: 116 h

## Course literature

### **Additional literature**

#### **Books**

#### **Other**

To be decided

## Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at [http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).