# System Design and Methodology

Programme course

6 credits

Systemkonstruktion och metodik

TDTS07

Valid from: 2017 Spring semester

**Determined by**
Board of Studies for Computer Science
and Media Technology

**Date determined**
2017-01-25

## Main field of study

Information Technology, Computer Science and Engineering, Electrical Engineering

## Course level

Second cycle

## Advancement level

A1X

## Course offered for

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

## Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

## Prerequisites

Computer Hardware and Basic Computer Architectures, Programming

# Intended learning outcomes

The aim of the course is to address the particular problems concerning the design of complex embedded systems. Modern design methodologies are presented with an emphasis on early design phases, such as modeling, verification and system-level synthesis, not covered by traditional methods. After completing the course, the students should be able to:

- Apply modern system-level methods and tools for the design of real-time embedded systems.
- Understand and use modern modeling, verification and simulation tools in the context of system-level design.
- Apply various modeling approaches, with a deep understanding of the practical and theoretical implications.
- Analyze the particular features of the application and select the most appropriate modeling approach.
- Evaluate the implications of system level design decisions, regarding system architecture, task scheduling and mapping, on the final system performance, cost, and power consumption.
- Understand the complex interactions between hardware architecture and software implementation.
- Formally verify a system model.
- Perform design space exploration using a system-level simulation environment.

# Course content

Embedded systems and their design, Design flow, Specification and modeling of embedded systems, Simulation and estimation, Architectures for embedded systems,Mapping and scheduling, Power related issues at the system level.

# Teaching and working methods

The course consists of a series of lectures, lessons and laboratory exercises, as well as the elaboration and presentation of a report.

# Examination

| | | | |
|---|---|---|---|
| LAB1 | Laboratory work | 3.5 credits | U, G |
| TEN2 | Written examination | 2.5 credits | U, 3, 4, 5 |

# Grades

Four-grade scale, LiU, U, 3, 4, 5

# Department

Institutionen för datavetenskap

## Director of Studies or equivalent
Ahmed Rezine

## Examiner
Petru Eles

## Education components
Preliminary scheduled hours: 48 h
Recommended self-study hours: 112 h

## Course literature
Peter Marwedel: "Embedded System Design", Springer, 2nd edition, 2011.

# 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.