

# Embedded Systems Design

Programme course

4 credits

Konstruktion av inbyggda system

TDDI08

Valid from: 2021 Spring semester

**Determined by**

Board of Studies for Computer Science  
and Media Technology

**Date determined**

2020-09-29

## Main field of study

Computer Science and Engineering

## Course level

First cycle

## Advancement level

G2X

## Course offered for

- Bachelor of Science in Computer Engineering
- Bachelor of Science in Engineering Electronics

## Prerequisites

Basic courses in 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.
- Use modern modeling, verification and simulation tools in the context of system-level design.
- 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.
- Describe the complex interactions between hardware architecture and software implementation.
- 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.

## Teaching and working methods

The course consists of a series of lectures, lesson and laboratory exercise.

## Examination

|      |                 |             |            |
|------|-----------------|-------------|------------|
| LAB1 | Laboratory work | 1.5 credits | U, G       |
| TEN1 | Written exam    | 2.5 credits | U, 3, 4, 5 |

## Grades

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

## Other information

### About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is Swedish, the course as a whole or in large parts, is taught in Swedish. Please note that although teaching language is Swedish, parts of the course could be given in English. Examination language is Swedish.
- If teaching language is Swedish/English, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English (depending on teaching language).
- If teaching language is English, the course as a whole is taught in English. Examination language is English.

### Other

The course is conducted in a manner where both men's and women's experience and knowledge are made visible and developed.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

## Department

Institutionen för datavetenskap

## Director of Studies or equivalent

Ola Leifler

## Examiner

Petru Eles

## Course website and other links

<http://www.ida.liu.se/~TDDIo8>

## Education components

Preliminary scheduled hours: 42 h

Recommended self-study hours: 65 h

## Course literature

Peter Marwedel: "Embedded System Design", Springer, 2nd edition, 2011