# Embedded System Design 7.5 credits E7020E

**Design av inbyggda system**

**Course syllabus admitted: Autumn 2023 Sp 1 -  Present**

DECISION DATE
**2021-02-16**

LULEÅ
TEKNISKA
UNIVERSITET

# Embedded System Design 7.5 credits E7020E

## Design av inbyggda system

## Second cycle, E7020E

| Education level | Grade scale | Subject | Subject group (SCB) |
|---|---|---|---|
| Second cycle | G U 3 4 5 | Inbyggda system | Electrical Engineering |

## Main field of study

Computer Science and Engineering

# Entry requirements

Basic knowledge of imperative programming, digital design and micro computer engineering  (D0009E Introduction to Programming, D0011E Digital Design, D0013E Microcomputer engineering) or electronics with basic amplifiers (E0003E Circuit Thory and E0007E Electronics, alternatively E0013E Fundamentals of Electrical Engineering).

Knowledge in English equivalent to English 6.
Alternative:
Alternative to completed courses can be corresponding knowledge acquired through work within the IT or electronics section.

# Selection

The selection is based on 30-285 credits

# Course Aim

The student should be able to:

- Demonstrate knowledge of the disciplinary foundation of and proven experience in the field of embedded systems as well as insight into current research and development work. This is shown in laboratory and project assignments.

- Demonstrate the ability to identify, formulate and deal with issues autonomously and creatively and to analyse and evaluate technological solutions. This is shown through designing and analyzing embedded systems consisting of both hard- and software.

- Demonstrate the ability to integrate knowledge critically and systematically as well as the ability to model, simulate, predict and evaluate sequences of events even with limited information. This is shown through designing and analyzing embedded systems consisting of both hard- and software.

- Demonstrate the ability to identify the need for further knowledge and undertake ongoing development of his or her skills. This is shown in laboratory and project assignments which require gathering of information and critical evaluation.

- Demonstrate insight into research and development though understanding the possibilities and limitations of embedded systems technology. This is shown through laboratory and project assignments, highlighting the trade-offs between hard- and software.

LULEÅ TEKNISKA UNIVERSITET

# Contents

Focus is on methodology for component based design of embedded systems. The process encompass both shot- and hardware-design, throughout specification to validation (testing) of a final system. This includes hardware requirements and specification, methods for component selection and dimensioning, simulation and functional verification, PCB design/layout, post processing, PCB production, mounting and electrical verification. In parallel the embedded software wil be developed using component based thinking. The course also covers verification and testing, as applied by developing a test-bed and test cases for the embedded system.

# Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.
Instruction consists of lectures, seminars and laboratory work. Lab assignments are reported in writing or by demonstration, and may be associated with a deadline.

# Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. Mandatory lab assignments with differentiated grades.

# Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

# Course offered by

Department of Computer Science, Electrical and Space Engineering

# Modules

| Code | Description | Grade scale | Cr | Status | From period | Title |
|---|---|---|---|---|---|---|
| 0001 | Laboratory report | G U 3 4 5 | 3 | Mandatory | S10 | |
| 0002 | Laboratory work | U G# | 4.5 | Mandatory | S10 | |

# Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

# Last revised

by Jonny Johansson, HUL SRT 2021-02-16

LULEÅ
TEKNISKA
UNIVERSITET

# Syllabus established

by the Department of Computer Science and Electrical Engineering 2008-12-15

LULEÅ
TEKNISKA
UNIVERSITET