

**SYLLABUS**

# **Microcomputer engineering 7.5 credits D0013E**

**Mikrodatorteknik**

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

DECISION DATE  
**2021-02-12**

# Microcomputer engineering 7.5 credits D0013E

## Mikrodatorteknik

### First cycle, D0013E

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

### Main field of study

Computer Science and Engineering

## Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and basic programming skills (D0009E Introduction to Programming).

## Selection

The selection is based on 1-165 credits.

## Course Aim

The student should be able to:

- Demonstrate knowledge of the disciplinary foundation of and proven experience in the field of micro-computer engineering as well as insight into current research and development work. This is shown in laboratory and theoretical 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 software for a modern pipelined processor)
- 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 a multi-threaded scheduler.
- 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 through 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.

## Contents

Machine abstraction: The instruction set. Data representations. Machine language and instruction formats. Address spaces, addressing. Operations on data. Instructions for program flow control. Sequential programming of a modern microprocessor. Structures for high-level programming: Data types. The stack, activation records, procedure calls, parameter passing and recursion. The interface to the compiler: Model of a typical modern processor's internal construction. Pipelining (interlocks, stalls, data forwarding, delayed branch). Instruction scheduling and its effect on processor performance. Memory hierarchies, (cache memory). The interface to the operating system: Memory management (virtual memory). The process concept. Process protection and privileges. Context switching. Management of vectored interrupts and exceptions. Direct and DMA in- and output.

## 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 assignments. During the course, home assignments may occur, which will give bonus points at the written exam following directly after the course.

## 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.

Written exam. Mandatory assignments.

## 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.

## Overlap

The course D0013E is equal to D0001R

## Course offered by

Department of Computer Science, Electrical and Space Engineering

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Laboratory work	U G#	3	Mandatory	A07	
0003	Written exam	G U 3 4 5	4.5	Mandatory	A21	

## 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 2021-02-12

## Syllabus established

by the Department of Computer Science and Electrical Engineering 2007-02-28