

SYLLABUS

Robust and Energy Efficient Real-Time Systems 7.5 credits D7020E

Robusta och energieffektiva realtidssystem

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2023-02-15**

Robust and Energy Efficient Real-Time Systems 7.5 credits D7020E

Robusta och energieffektiva realtidssystem

Second cycle, D7020E

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Datalogi	Computer Technology

Main field of study

Computer Science and Engineering

Entry requirements

Good knowledge, corresponding to the courses D0009E - Introduction to programming 7.5 credits, D0010E - Object-oriented programming and design 7.5 credits, D0003E - Real-time systems 7.5 credits and D0012E - Algorithms and data structures 7.5 credits.

Good knowledge in English, equivalent to English 6.

Alternative:

Alternatively, equivalent knowledge obtained through work in the IT industry which is proven with a certificate of professional experience.

Selection

The selection is based on 30-285 credits

Course Aim

The student shall be able to:

- Demonstrate the ability to perform model-based design of small footprint (low-powered, low-memory) embedded real-time systems.
- Demonstrate the ability to develop memory safe implementations.
- Apply formal methods for verification of functional and non-functional (e.g. real-time) properties of embedded real-time systems.
- Demonstrate insight into current research and development work in the field of embedded real-time systems, as well as the ability to present this knowledge.
- Demonstrate the ability to understand and work with existing source code and conduct peer-reviews.

Contents

- Embedded real-time systems programming using modern methods and tools.
- Analyses of such systems using symbolic execution.
- Characterization of execution time for tasks and critical sections.
- Schedulability analysis of such systems.
- Internalize theoretical concept by implementing supporting tooling.

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Teaching consists of lectures and laboratory work. Lab assignments are reported in writing or by demonstration, and may be associated with a deadline. Some laboratory work may take the form of homework assignments.

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.

There will be two parts in the exam, Laboratory work and a home exam.

Laboratory work consists of solving simple exercises that give you hands on knowledge of the course topics. The laboratory work can be done in collaboration with other students, but submitted for review individually. Each student will also perform peer reviews on two submissions for each laboratory assignment.

Take home exam consists of a larger practical project work that deals with problem solving, program analysis and tools development. This consists of submitting source code and documentation. Peer review will be involved to review other students work.

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
0003	Take-home examination	G U 3 4 5	3.5	Mandatory	A21	
0007	Laboratory work	U G#	4	Mandatory	A22	

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 Robert Brännström 2023-02-15

Syllabus established

This syllabus was established by the Department of Computer Science and Electrical Engineering May 30, 2008 and is valid from the Autumn semester 2008.