



**LUNDS UNIVERSITET**  
Lunds Tekniska Högskola

*Course syllabus*

# Realtidssystem Real-Time Systems

**EDAF85, 7,5 credits, G2 (First Cycle)**

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED C/D

Date of Decision: 2023-04-18

## General Information

Compulsory for: IDA3

Language of instruction: The course will be given in Swedish

## Aim

The aim of the course is to give an overview of different programming techniques available for solving problems occurring when computers are interfaced with external hardware.

## Learning outcomes

*Knowledge and understanding*

For a passing grade the student must

- be able to describe different methods to guarantee mutual exclusion
- be able to analyse possible occurrence of deadlock in a given system
- be able to describe different scheduling methods
- be able to analyse a system with respect to timing requirements.

*Competences and skills*

For a passing grade the student must

- be able to structure a given real-time problem and to implement its solution in Java
- be able to make use of threads in programming of real-time systems
- be able to utilize semaphores, monitors and mailboxes in real-time programming problems.

## Contents

- Examples of real-time systems
- Basic concepts: concurrent processes, synchronization and communication, indivisible operations, mutual exclusion
- Semaphores, monitors, message passing
- Analysis of deadlock
- Input and output, interrupt handling
- Timing, priorities, periodic processes
- A survey of scheduling techniques.

## Examination details

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)

**Assessment:** There will be (normally) a written examination which consists of assignments of exploratory nature and programming/design problems. The final grade of the course is based on the result of the written exam. In order to qualify for the exam, the students must have passed the compulsory parts of the course, i.e., laboratory exercises, including oral presentation of lab projects.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

### Parts

**Code:** 0117. **Name:** Written Examination in Real-Time Systems.

**Credits:** 4,5. **Grading scale:** TH. **Assessment:** Written examination. To qualify for the exam, the laboratory work must be completed. The final grade of the course is based on the result of the written exam.

**Code:** 0217. **Name:** Laboratory Work.

**Credits:** 3. **Grading scale:** UG. **Assessment:** For a passing grade the laboratory work must be completed. A laboratory exercise is completed, when both parts (design and implementation) have been reviewed and accepted by the course teacher. **Contents:** The laboratory exercises (labs) comprises a theoretical part (program design) and a practical part (implementation of the designed program).

## Admission

### Admission requirements:

- EDAA10 Computer Programming in Java and completed compulsory course items or a passing grade on the written exam in EDA690 or EDAA30

**The number of participants is limited to:** No

**The course overlaps following course/s:** EDA040, EDA698, EDAF55, EDAP10

## Reading list

- Will be announced later.

## Contact and other information

**Course coordinator:** Univ. lektor Roger Henriksson, roger.henriksson@cs.lth.se

**Course homepage:** <http://cs.lth.se/edaf85>

**Further information:** This course is given at Campus Helsingborg. Compulsory labs and respective preparing exercises must be conducted / reported on the time and place specified in the beginning of the course. Anyone who fails without good reason can not

expect to report more than one lab / exercise on a subsequent occasion. Those who despite reasonable preparation and attendance were unable to finish an exercise / lab, will be allowed to submit their solutions for approval at the next scheduled occasion. For the last compulsory lab / exercise in these cases an extra occasion will be scheduled. Those who are ill or have other valid reasons to be away from compulsory education shall promptly contact the course coordinator and communicate this and to agree on reporting the lab / exercise at a later date. Those who are away from a large number of occasions, however, even in these cases will be referred to the next course occasion. The course is given in Swedish, while the course material including the written exam is provided in English. Students have a right to answer the exam questions in Swedish.