IL2206 Embedded Systems 7.5 credits

Inbyggda System

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for IL2206 valid from Spring 2019

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Computer Science and Engineering,Electrical Engineering

Specific prerequisites

The course requires

- good knowledge of an imperative programming language corresponding to ID1018 Programming I alternative DD1337 Programming or DD1316 Programming Techniques and C
- good knowledge of computer hardware corresponding to the course IS1200 Computer Hardware Engineering

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After finishing the course the student shall be able to

- explain the special extra-functional that are imposed on embedded systems
- illustrate how microprocessor, memory, peripheral components and buses build an embedded platform and their interaction
- evaluate how architectural and implementation design decisions influence performance and power dissipation
- employ efficient coding techniques for embedded systems
- point out the role of the compiler in the embedded system design process
- explain the basic operation of a real-time operating system
- analyze the schedulability of a periodic task set
- distinguish different communication mechanisms for concurrent tasks
- develop embedded software using a real-time operation system
- estimate if additional hardware can accelerate a system.

Course contents

Embedded systems design process

- Embedded systems design process
- Embedded computing platform: microprocessor, memory hierarchy, busses and peripheral devices
- Implementation alternatives: digital signal processor and
- Design constraints: low power, speed, memory size, real-time behavior
- Design analysis and optimization of embedded software
- Concurrent task model
- Periodic task model and scheduling algorithms
- Real-time operating systems
- Acceleration of a system by means of additional hardware

Course literature

Will be announced at course start.

Examination

- LAB1 - Laboratory Work, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

The grade of the written exam (TEN1) is also the final grade of the course. The lab course must be completed during the study year. If the course is not completed during the study year old laboratories are not counted anymore

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.