MF2042 Embedded Systems for Mechatronics, I 6.0 credits

Inbyggda system för Mekatronik, I

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 MF2042 valid from Autumn 2011

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

CMAST4, CDEPR4, CFATE4: SG1130/SG1131, SG1140, MF1016, EL1120/EL1000, DD1321/(DD1322+DD1324) or similar

CDATE, TIPUM, TIPDM, CDATE, TAEEM, TEBSM and TFORM with First level course(s) in mechanics, electrical engineering, automatic control and programming

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Language of instruction

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

Intended learning outcomes

After the course You should be able to

1. Provide examples of existing embedded systems based products and describe the special requirements placed in developing such systems.

2. Describe and explain important steps in the design of such systems, including useful abstractions and views, and be able to give examples of dependencies between system functionality and the implementation and trade-offs that the designer has to deal with.

3. Be able to use modern integrated development environments for microcontroller/processor programming and their features for testing and debugging.

4. Describe and be able to explain the basic operation of microcontrollers/microprocessors, their internal features and peripherals. Describe and provide criteria for choosing microcontrollers and/or FPGA based solutions.

5. Be able to develop basic microcontroller programs for mechatronic applications, including the usage of I/O and communication peripherals.

6. Describe, explain and apply basic concepts of concurrent and real-time programming.

7. Describe, explain and apply some of the basic concepts of communication protocols, in particular with reference to the Controller Area Network (CAN).

Course contents

The overall aim of the course is to provide an understanding of the design and implementation of embedded systems in the context of mechatronic products, with emphasis on basic technologies and elements of design.

Disposition

The course includes

- Lectures to provide overview and inspiration.
- Tutorials – where new tools and techniques are introduced through detailed instructions.
- Laboratory exercises where the tools and techniques are used on a set of tasks.
- Each week of the course focuses on a specific theme. The exercises are modularized according to these themes.

Course literature

All course material and literature are available online via the course platform.

Examination

- LAB2 - Laborations, 3.0 credits, grading scale: P, F
- TEN2 - Examination, 3.0 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.

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.