Offered by
ICT Engineering

IT-HWP1

1.0

Hardware Oriented programming

ECTS
5

Prerequisites

- IT-CAL1
- IT-SDJ1

Main purpose
The purpose of the course is:

- To provide the student knowledge about the technical details of an industrial microcontroller used for embedded systems from a programmer's point of view.
- To qualify the student to implement simple low level drivers for various hardware devices.
- To qualify the student to implement low-level software for an embedded system in C.
- To qualify the student to do Unit testing of embedded C

Knowledge

Skills

Competences
Having completed this course, students should be able to:

- have knowledge to read datasheets for electronics components
- understand the architecture of micro-controllers
- master IO-Ports
- master Interrupts
- master Timers
- master Analog input/output
- understand how to divide the software into logical abstraction layers
- be able to implement software for micro-controllers in C
- understand how to design and implement simple device drivers
- to exemplify the above topics in small applications.

Topics

- Architecture of industrial micro-controllers.
- Memory and IO-systems.
- Basic peripherals.
- Interfacing to the analogue world.
- Interrupts and exceptions.
- Developing software for embedded systems.
- Programming device drivers.
- Unit testing of embedded C

Teaching methods and study activities

Required workload for students is estimated to 137 hours. ~2/3 of the workload is self-study by the student.
Activities change between theory, tasks, programming exercises and mini projects.

During the semester 4-5 compulsory assignments will be given. The result of these assignments will lead to 25% of the final assessment grade for the student.

Each group must deposit 600 DKK for loan of necessary equipment.

Resources
Muhammad Ali Mazidi, Sarmad Naimi & Sepehr Naimi: The AVR microcontroller and embedded system.

Copies from various books and notes.

Evaluation
Internal examination.
Final grade based 25% on tuition activities selected as compulsory by the teacher carried out within the set deadlines and approved, and 75% from the oral examination.

Examination
The exam is oral and it takes 20 minutes per student. The exam is in two parts. First part is a presentation and questions related to the solution to an assignment made in the course. Second part is a drawn question related to the course subjects.

Grading criteria
Mark 12:
Awarded to students who have shown excellent comprehension of the above-mentioned competences. A few minor errors and shortfalls are acceptable.

Mark 02:
Awarded to students for a just acceptable level of comprehension of the required competences. According to the 7-point grading scale. comprehension of the required competences.

Additional information

Responsible
Ib Havn

Valid from
1.2.2015

Course type
ICT Engineering;Compulsory Course for all ICT Engineering;7. semester;Compulsory for the specialization Embedded Engineering;Electives;

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