Offered by
ICT Engineering

IT-EOS1

1.0

Embedded Operating Systems

ECTS
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Prerequisites
Basic understanding of Programming, computer architecture and electronics. Practical experience with computer networking is an advantage.

- IT-CAL1
- IT-ELE1
- IT-SDJ1

Main purpose
Demands for computing power in embedded systems are increasing. At the same time, a shorter development time is required to be competitive. This calls for a way to reuse off-the-shelf components in a quick and easy way to build advanced applications. In this course, students will learn to use powerful open source components to build advanced embedded systems.

Knowledge
Having completed this course, students should have understanding of:

- Advantages and disadvantages of Linux as operating system in embedded systems.
- I/O structure in Linux.
- Electronic interfaces for digital and analogue signals

Skills

- Use basic features of Linux
- Configure the operating system and utilities to tailor the system's needs
- Write C/C++ programs to control sensors and actuators
- Cross-compile programs to run in an embedded system.

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

- Determine which kind of embedded systems the Linux operating system is suitable for
- Identify tools needed for developing embedded systems
- Interface sensors and actuators in software as well as hardware
- Configure communication between development- and target system
- Control the target system, using Linux commands and utilities
- Build simple Linux based embedded systems.

Topics
Embedded Linux. 32-bit Microcontrollers. Teamwork and project management.

Teaching methods and study activities
Estimated workload is approximately 137 hours.
Mix between theory and practical exercises. Students will work in groups on developing a simple embedded system based on a 32-bit hardware platform with Linux as operating system.

Each group must deposit 300 DKK for loan of necessary equipment.

Resources
Derek Molloy: Exploring BeagleBone – Tools and Techniques for Building with Embedded Linux. BeagleBone Black circuit board.

Evaluation
Internal examination.
The evaluation of the course is based on mandatory course work (50%) and the oral exam (50%) at the end of the course. Only students with approved course work will be allowed to attend the exam.

Examination
The exam is oral and it takes 20 minutes per student. The exam is in two parts. First part is a presentation and discussion of selected parts of the course work. Second part is drawn question from the theory of the course.

Grading criteria
Grading:

Grading is according to the 7-point grading scale.

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 the just acceptable level of comprehension of the required competences.

Additional information

Responsible
Erland Ketil Larsen

Valid from
1.2.2016

Course type
ICT Engineering;6. semester;Compulsory for the specialization Embedded Engineering;Electives;