Linnæus University

Course syllabus

Faculty Board of Science and Engineering
School of Computer Science, Physics and Mathematics

1ED071 Prylar som pratar - Projektkurs i datorteknik, 7,5 högskolepoäng

Making Things Talk - project course in computer engineering, 7.5 credits

Main field of study
Electrical Engineering

Subject Group
Electrical Engineering

Level of classification
First Level

Progression
G1N

Date of Ratification
Approved by the Board of the School of Computer Science, Physics and Mathematics 2009-08-11

Revised 2010-08-04. Revision of prerequisites and course evaluation.

The course syllabus is valid from spring semester 2011

Prerequisites
General entry requirements and Mathematics B, Physics A or Mathematics 2a / 2b / 2c, Physics 1b1 / 1a.

Expected learning outcomes

Upon completion of the course, the student should be able to:

- describe how the single chip computer is constructed and works
- describe different memory technologies for single chip computers
- describe how analog to digital converters and digital to analog converters works
- describe how single chip computers communicate with external hardware
- describe how single chip computers can be used to communicate with sensors etc in large systems
- describe the principal of pulse width modulation, PWM
- describe the principal of simple data communication
- describe the principal of USB, Universal Serial Bus
- describe the principal of BlueTooth
- write a small program for the single chip computer Arduino
- modify a given SW-program for Arduino for a specific task
- connect external components to the Arduino module and adapt the SW to the

components
- connect the Arduino module to a wireless communication module, for example ZigBee and adapt the SW for the module
- fulfil a project which includes adaption of SW and HW.

Content
The course comprises the following topics:

- the Arduino platform
- how the single chip computer works
- how Arduino and other single chip computers can be integrated in bigger systems
- different memory technologies for single chip computers
- analog to digital converters and digital to analog converters
- single chip computers Input/Output
- pulse Width Modulation, PWM
- serial data communication, RS232
- USB, Universal Serial Bus
- BlueTooth
- project work.

Type of Instruction
Teaching consists of lectures, laboratory sessions, project work and assignments. Main focus on laboratory sessions and project work.

Examination
The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).
On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

Course Evaluation
A course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

Required Reading and Additional Study Material
Required reading
Hur funkar det?, Kjell & Company, 250 (400) pages.

Recommended reading
Dan O'Sullivan, Tom Igoe, *Physical Computing*, Course Technology Cengage Learning, 2004. Pages 442 (442).
Massimo Banzi, *Getting Started with Arduino*, O'Reilly, 2008. Pages 111 (111).
Tom Igoe, *Making Things Talk*, O'Reilly, 2007. Pages 60 (340).