EL2745 Principles of Wireless Sensor Networks 7.5 credits

Principer för trådlösa sensornätverk

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 EL2745 valid from Spring 2012

Grading scale

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

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

EL1000 or equivalent including documented proficiency in English corresponding to English B

Language of instruction

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

Intended learning outcomes

The aim of this course is to provide the participants with a basic knowledge of wireless sensor networks (WSN)

After completing the course the student should

- Know the essential communication, control, optimization, and signal processing tools to cope with WSNs
- Know the design of practical WSNs
- Be able to develop a research project on WSNs

Course contents

The focus of the course is on distributed algorithms and protocols for WSNs. The course starts with an introduction on applications, hardware, and network architecture. Then the course presents iterative methods for distributed computation, and shows how these methods can be applied to the design of key aspects of the communication protocol stack and applications. The course also includes a lecture for programming sensors, which may be useful for experimental research projects.

Disposition

Week 1: Introduction (course overview, applications, WSNs node architecture, protocols, operating systems)

Week 2: Iterative Methods for Parallel Computation

Week 3: Radio Power Control

Week 4: MAC, Routing, Duty Cycle

Week 5: IEEE 802.15.4 and RPL

Week 6: Distributed Estimation

Week 7: Distributed Detection

Week 8: Consensus Algorithms

Week 9: Localization and Positioning

Week 10: Course Summary

Course literature

H. Karl and A. Willig, Protocols and Architectures for Wireless Sensor Networks, Wiley, 2005.

Examination

- INL1 - Assignment, 1.0 credits, grading scale: P, F
- INL2 - Assignment, 1.0 credits, grading scale: P, F
- INL3 - Assignment, 1.0 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.

The problems of the exam will contain theoretical parts.

Other requirements for final grade

4.5 points based on written exam and 3 points on homework assignments

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.