



# EL2745 Principles of Wireless Sensor Networks 7.5 credits

Principer för trådlösa sensornätverk

This is a translation of the Swedish, legally binding, course syllabus.

## Establishment

Course syllabus for EL2745 valid from Spring 2013

## 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

- Introduction
- WSN programming
- The wireless channel
- Physical layer
- MAC, IEEE 802.15.4
- Routing, RPL
- Distributed detection
- Distributed estimation
- Localization and positioning
- Time synchronization
- WSN control
- Summary

## Course literature

- G. J. Pottie and W.J. Kaiser, “Principles of Embedded Networked Systems Design” Cambridge, 2005
- W. Dargie and C. Poellabauer, “Fundamentals of Wireless Sensor Networks”, Wiley, 2010

## Examination

- INL1 - Assignment, 1.0 credits, grading scale: P, F
- INL2 - Assignment, 1.0 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- INL3 - Assignment, 1.0 credits, grading scale: P, 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.

If the course is discontinued, students may request to be examined during the following two academic years.

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.