Wireless Sensor Networks

Programme course

6 credits

Trådlösa sensornätverk

TNE090

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical
Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study

Electrical Engineering

Course level

Second cycle

Advancement level

A1X

Course offered for

- Electronics Design Engineering, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

C-programming, basic electronic circuit theory.

Intended learning outcomes

This course intends to provide knowledge of wireless sensor network communication. Especially two protocols are introduced in detail: IEEE802.15.4 and ZigBee. This course also presents hands-on experience of designing wireless sensor network remote monitoring and control system.

•Show the system requirements when designing a wireless sensor network
•Explain the hardware architectures of different devices included in the wireless sensor network
•Wireless remote monitoring and control system design
•Software design using state machine
•Study the "Media Access Control" layer based on IEEE 802.15.4 standard
•Explain the message frame format utilized in the ZigBee network
•Introduce the Application layer of ZigBee protocol
•Show the ZigBee protocol management procedure by explaining the "ZigBee device object" component
•Explain the "Ad hoc On-Demand Distance Vector (AODV)" routing algorithm utilized in wireless network message routing.

Course content

- Wireless sensor network system design
- Study of 802,15,4 standard
- Study of ZigBee protocol
- Software design basic principle
- State machine aid software design
- AODV algorithm
- Wireless device hardware architecture
- CSMA-CA algorithm

Teaching and working methods

Lectures, labs and project work. Labs and project work are mandatory and will be presented orally and in writing.

Examination

LAB1	Laboratory work	3 credits	U, G
PRA1	Project work with oral and written report	3 credits	U, 3, 4, 5

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

Adriana Serban

Examiner

Qin-Zhong Ye

Course website and other links

http://www2.itn.liu.se/utbildning/kurs/

Education components

Preliminary scheduled hours: 31 h
Recommended self-study hours: 129 h

Course literature

Drew Gislason, ZigBee Wireless Networking, Newnes 2008, ISBN-10:
0750685972, ISBN-13: 978-0750685979.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.