Distributed Embedded Software and Networks

Programme course

4 credits

Distribuerad inbyggd programvara och nätverk

TDDI07

Valid from: 2017 Spring semester

Determined by
Board of Studies for Computer Science and Media Technology

Date determined
2017-01-25

Main field of study
Computer Science and Engineering, Electrical Engineering

Course level
First cycle

Advancement level
G2X

Course offered for
- Computer Engineering, B Sc in Engineering
- Engineering Electronics
- Computer Science and Engineering, M Sc in Engineering
- Information Technology, 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
Operating systems and introductory networks course.

Intended learning outcomes
After course completion the student should be able to:
• describe and explain applications and their societal impact as well as problems and solutions related to distributed embedded systems
• evaluate, analyse and compare methods for networking, resource management and distributed algorithms
• read and understand relevant scientific literature
• orally present and discuss complex technical solutions
• review and provide constructive feedback to peers
• use sensor networks platforms and tools and to implement and evaluate a small sensor network.

Course content

• Future generation networks: sensor networks, pervasive computing, mobility, internet of things, machine-to-machine communication
• Examples: Disaster management, surveillance, environmental protection, healthcare, transportation, home automation
• Energy management: factors causing energy consumption and optimisation techniques
• Networking: MAC protocols, broadcasting, data collection and routing
• Resource allocation: overload management, energy-aware protocols, bandwidth allocation
• Dependability: fault tolerance, redundancy, security
• Time synchronisation and positioning
• Sensor Networks platforms and tools (e.g. motes + tinyOS). Laboratory work consists of implementing a sensor network that tranfers/processes
the data measured by the sensors.

Teaching and working methods

Basic methods, algorithms and relevant examples are introduced in lectures.
Students read scientific papers, analyse some of them in written form, and review the work of their peers. The papers are also treated in seminars where students present and discuss their strenghts and weaknesses. Laboratory assignments aim to give implementation-related insights and facilitate experimentation with different solutions.

Examination

UPG1	Written assignments	2.5 credits	U, 3, 4, 5
LAB1	Laboratory work	1.5 credits	U, G

Grades

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

Department

Institutionen för datavetenskap

Director of Studies or equivalent

Ahmed Rezine

Examiner

Mikael Asplund

Course website and other links

http://www.ida.liu.se/education/ugrad/courses/tf/TDDI07

Education components

Preliminary scheduled hours: 42 h
Recommended self-study hours: 65 h

Course literature

Additional literature

Books

Verdone, R., Mazzini, G., Dardari, D., & Conti, A, (2008) *Wireless Sensor and Actuator Networks : technologies, analysis and design*

Articles

Other

Aktuella vetenskapliga artiklar

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.