Information Networks

Programme course

6 credits

Informationsnät

TSIN01

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
Information Technology, Computer Science and Engineering, Computer Science

Course level
Second cycle

Advancement level
A1X

Course offered for
- Computer Science and Engineering, M Sc in Engineering
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, M Sc in Engineering
- Computer Science, Master's programme
- Information Technology, M Sc in Engineering
- Computer Science and Software Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Communication Systems, Master's programme

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
Basic knowledge of Probability theory.

Intended learning outcomes

The course aim is to provide understanding of how a packet-oriented information network works and how the choice of technology can affect its performance. The course intends to give good knowledge of the fundamental methods for multiple-access and routing in network communications. After completing the course the student is expected to be able to:

- describe the slotted multiple-access model, as well as the Poisson model for packet arrivals in an information network.
- describe protocols for multiple-access to a shared media.
- give an account of properties of mechanisms in protocols for multiple access to a shared media
- formulate assumptions to model and analyse information networks and discuss how valid these assumptions are.
- perform typical calculations to implement the various algorithms covered in the course.

Course content

Lectures and exercise sessions treat the following topics of Information Networks:

- Layered network architecture and the OSI model.
- Slotted multiple-access models and Markov chains.
- Arrival statistics and the Poisson process.
- ALOHA system (slotted and unslotted) and stabilization.
- Splitting algorithms: tree and FCFS algorithms.
- Performance analysis of multiple-access systems.
- Carrier sensing: CSMA ALOHA, CSMA/CD, and CSMA/CA.
- Packet radio networks and IEEE 802.11 protocols.
- Routing algorithms: minimum-weight spanning trees and shortest-path algorithms.

Teaching and working methods

The course consists of lectures, problem-solving classes and a home assignment.

Examination

LAB2	Assignment report	2 credits	U, G
TEN2	Written examination	4 credits	U, 3, 4, 5

Grades

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

Department

Institutionen för systemteknik

Director of Studies or equivalent
Klas Nordberg

Examiner
Danyo Danev

Course website and other links
http://www.commsys.isy.liu.se/en/student/kurser/TSIN01

Education components
Preliminary scheduled hours: 36 h
Recommended self-study hours: 124 h

Course literature

Additional literature

Books

Dimitri Bertsekas / Robert Gallager, (1992) *Data Networks* second edition
ISBN: ISBN 9780132009164

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.