Signals, Information and Communication

Programme course

4 credits

Signaler, information och kommunikation

TSKS10

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

First cycle

Advancement level

G2X

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
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Mathematics

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 working knowledge of the Fourier transform and linear systems. Probability theory.

Intended learning outcomes

- Understand and be able to conduct calculations on sampling in the time domain, dimensionality, I/Q representation, sampled systems and noise
- Understand and be able to conduct basic calculations on simple stochastic models of information
- Describe the fundamental limits on compression and transmission of signals and information, conduct simple calculations that relate to these limits, and understand how these limits relate to the physical reality
- Show engineering understanding of the fundamental limits of transmission of signals and information over unreliable channels (e.g., radio) and conduct simple calculations relating to these
- Describe and show engineering understanding of some basic principles for information storage and transmission techniques used in practice
- Using adequate terminology, well structured and in a logically coherent manner, be able to describe the relation between different concepts in the course

Course content

Sampling in the time domain. Representation of time- and band-limited signals, dimensionality of signals. Narrowband signals and I/Q representation. Sampled systems. Introduction to noise. Examples of signals in electrical engineering applications, especially communications and navigation systems. Modeling of physical channels (cables, radio). Fundamental limits for transmission and storage of information, entropy, capacity. Introduction to techniques for compression and error protection.

Teaching and working methods

Lectures, tutorials, written exam and a computer laboratory exercise. The computer laboratory exercise is to be documented individually in the form of a written report.

Examination

| LAB1 | Computer based laboratory work | 1 credits | U, G |
| TEN1 | Written examination | 3 credits | U, 3, 4, 5 |

Grades

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

Other information

Supplementary courses: Subsequent courses in areas such as signal and image processing, communications, electronics, automatic control, and more.

Department

Institutionen för systemteknik

Director of Studies or equivalent

Klas Nordberg

Examiner

Erik G. Larsson

Course website and other links

http://www.commsys.isy.liu.se/sv/student/kurser/TSKS10

Education components

Preliminary scheduled hours: 40 h
Recommended self-study hours: 67 h

Course literature

E. G. Larsson, "Signals, Information and Communications".

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.