# HE1018 Data- and Telecommunication 7.5 credits

## Data- och telekommunikation

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

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

## Establishment

Course syllabus for HE1018 valid from Autumn 2007

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

First cycle

## Main field of study

Electrical Engineering,Technology

## Specific prerequisites

Good knowledge in mathematics, electric circuits, and electronics.

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

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# Intended learning outcomes

To provide fundamental knowledge about electronic communication

After passing the course you should be able to

- Explain important concepts and terminology within the communication field
- Describe the basic components in a communication system
- Analyse signals in the domain of time and frequency
- Explain the difference between digital and analogue signals
- Describe the function of protocols for Local Area Network (LAN) communication
- Prepare a LAN for TCP/IP communication
- Calculate the data rate in a data channel
- Apply the theory about coding and modulation in a communication system
- Describe in what way damping and interference influence the signal in a transmission media
- Describe the appearance of electromagnetic waves and perform a link budget calculation

# Course contents

- Signals in the domain of time and frequency
- Fourier series and analysis of the square wave signal.
- Influence on the signal:
  network for limitation of bandwidth, damping, sampling and PCM converting
- Analogue modulation: amplitude-, frequency- and phase modulation.
- Methods for digital modulation: ASK,FSK,PSK,BPSK,QPSK,QAM.
- Data transmission: Bandwidth, media of transmission.
- Data rate versus modulation rate and bandwidth versus pulse width.
- Transmission systems
- Antennas and wave propagation
- Applications: Wired and wireless systems. (noise, requirement of bandwidth, error detecting and correcting codes)
- Fundamentals of data communication, standards and the OSI-model
- Local Area Network: Ethernet and network devices

# Course literature

Wallander, Per, 17 lektioner i TELEKOMMUNIKATION, Perant AB, ISBN 91-86296-10-8
Kihl, Maria, Datorkommunikation, En inledande översikt, Studentlitteratur, ISBN 9789144008172

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# Examination

• LAB1 - Laboratory Work, 2.5 credits, grading scale: P, F
• TEN1 - Examination, 5.0 credits, grading scale: A, B, C, D, E, FX, 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.

# Other requirements for final grade

Passed written exam (TEN1; 5 cr.), grading A-F
Passed practical exercises (LAB1; 2.5 cr.), grading P/F
The final grade is based on the written exam. Grading A-F.

# 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.