HE1034 Telecommunication 7.0 credits

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 HE1034 valid from Autumn 2024

Grading scale

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

Education cycle

First cycle

Main field of study

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.

Intended learning outcomes

To obtain fundamental knowledge in order to analyze the wireline and wireless communication channels and their limitations, and be able to apply methods for modulation, coding and error control to optimize information transfer.

After passing the course you should be able to

- Calculate channel capacity with respect to bandwidth, signal power, noise and modulation method
- Calculate link budgets for wireline and wireless links
- Explain and use the main analogue and digital modulation methods
- Explain and perform error detection and error correcting coding and describe some of the methods and their applications
- Explain and use sampling and pulse code modulation for speech coding
- Explain and describe multiplexing methods in wireline and wireless networks
- Explain and describe methods for channel coding
- Describe attenuation, reflection, distortion and interference in transmission medium
- Describe the behavior of electromagnetic waves and set up a link budget
- Describe examples of systems for wireline and wireless communication systems

Course contents

To provide fundamental knowledge about electronic communication

- Channel capacity, signals, noise and attenuation
- Speech encoding, sampling and pulse code modulation
- Analogue and digital modulation
- Multiplexing in wireline and wireless networks with respect to frequency, time, and codes: FDM, OFDM, TDM and spread spectrum.
- Channel coding
- Transmission lines and opto cables
- Error detecting and error correcting codes
- Antennas and wave propagation
- Example of systems for wireline and wireless communication

Examination

- LAB1 - Laboratories, 2.0 credits, grading scale: P, F
- PROA - Project work, 2.0 credits, grading scale: P, F
- TENA - Written exam, 3.0 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

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.