Digital Communications 7.5 credits S7007E

Digital kommunikation

Course syllabus admitted: Autumn 2010 Sp 1 - Spring 2011 Sp 4

DECISION DATE
2010-02-19

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Digital Communications 7.5 credits S7007E

Digital kommunikation

Second cycle, S7007E

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Signalbehandling	Computer Technology

Entry requirements

Calculus, mathematical statistics, stochastic processes, linear algebra, Fourier analysis, ability in Matlab. (M0018M, M0031M, S0001M)
Alternative:
Alternative to completed courses can be corresponding knowledge acquired through work within the IT-sector.

Selection

The selection is based on 30-285 credits

Examiner

Magnus Lundberg Nordenvaad

Course Aim

The student should be able to
- Describe properties of communication systems both in time and frequency
- Describe linear modulation techniques such as PAM, PSK, QAM and FSK in terms of geometry
- Derive optimal receiver for the Gaussian channel
- Derive optimal and linear equalizers for the dispersive channel
- Analyze and simulate the performance (in terms of bitrate, bit error probabilities, and bandwidth).

Contents

The course treat the following topics:
- Concepts such as bit rate, bandwidth, and bit error probabilitiy
- Linear modulation (PAM, QAM, PSK, FSK)
- Geometrical representation
- Signaling over the additive Gaussian noise (AWGN) channel
- Optimal receivers and error analysis for the AWGN Channel
- Signaling over dispersive channels
- Receivers and equalizers for the dispersive channel (both linear and non-linear)

To be able to simulate digital communications systems is very important in todays designs. The laborations, where the students themselves build simulation chains, is therefore a central part the course.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.
Lectures, problem solving sessions, and take home labs.

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Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. Normally examined by a written exam with marks U,3,4,5, and approved labs. Oral examination can be used.

Remarks

The course will not be given every year.

Literature. Valid from Autumn 2008 Sp 1

Digital Transmisstion Engineering, John B. Anderson, Wiley Interscience, ISBN13 978-0-471-69464-9

Course offered by

Department of Computer Science, Electrical and Space Engineering

Items/credits

Number	Type	Credits	Grade
0001	Written exam	6	G U 3 4 5
0002	Laboratory work	1.5	U G#

Study guidance

http://www.ltu.se/csee/utbildning/kurser/GU?l=en

Last revised

by the Department of Computer Science and Electrical Engineering 2010-02-19

Syllabus established

by the Department of Computer Science and Electrical Engineering 2007-12-17

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