IL2205 Applied Signal Processing 7.5 credits

Tillämpad signalbehandling

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

Establishment

Course syllabus for IL2205 valid from Autumn 2009

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

Language of instruction

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

Intended learning outcomes

After the course the student should be able to
- Design and implement building blocks for communication systems.
- Describe different number representations.
- Design and implement FIR, IIR and multi-rate filters.
- Design and implement DFTs and FFTs.
- Analyze the algorithms, propose solutions for and estimate HW/SW resources needed for the following applications:

- Adaptive filters

- Modulation

- Demodulation

- Audio signal proccessing

- Video signal processing

Course contents

Overview of wireless communication systems.
Overview of Digital Signal Processing, DSP and FPGA

Basic Computer Arithmetic
- Number representation
- Adders, multiplier and dividers
- Cordic
Digital Filter Design
- FIR filters
- IIR filters
Multirate Signal Processing
- Interpolation
- Decimation
- CIC filters
- Filter banks
Fourier Transforms
- DFT and FFT algorithms
Advanced Topics
- Error control
- Modulation and demodulation
Adaptive Filters
- Wiener filters
- LMS
- RLS
Applications
- Audio
- Video

Course literature

Real-Time Digital Signal Processing,
S.M.Kuo, B.H. Lee and W. Tian

Second Edition, John Wiley & Sons Ltd, 2006
ISBN: 0-470-01495-4

Digital Signal Processing with Field Programmable Gate Arrays,
U. Meyer-Baese
Second/third Edition, Springer, 2004/2008
 ISBN: 3-540-21119-5

Lecture notes on Wireless Communication Systems and additional material.

Examination

- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 3.0 credits, grading scale: P, 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.

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

Grading scale: A/B/C/D/E/Fx/F

Other requirements for final grade

Lab course: 3 ECTS
Written Exam: 4.5 ECTS

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.