



# 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 2008

## 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

- Describe different number representations.
- Design and implement building blocks in FPGA.
- Design and implement FIR, IIR and multirate 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 processing
- Video signal processing

## Course contents

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  
Upplaga: Second Edition Förlag: John Wiley & Sons Ltd  
År: 2006 ISBN: 0-470-01495-4

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

## 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.