DM1135 Multimedia Systems and Signals 7.5 credits

Multimediasystem och signaler

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

Establishment

The official course syllabus is valid from the autumn semester 2024 in accordance with the decision from the director of first and second cycle education: J-2024-0523.
Decision date: 2024-04-15.

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Knowledge and skills in basic programming, 6 credits, corresponding to completed course DD1337/DD1310-DD1319/DD1321/DD1331/DD100N/ID1018

and also at least one of following:

- knowledge in Linear Algebra, 7,5 credits, corresponding to completed course SF1624/SF1672/SF1684

- knowledge in Calculus in One Variable, 7,5 credits, corresponding to completed course SF1625/SF1673
- knowledge in Calculus in Several Variables, 7,5 hp, corresponding to completed course SF1626/SF1674.

Active participation in a course offering where the final examination is not yet reported in Ladok is considered equivalent to completion of the course.
Registering for a course is counted as active participation.
The term 'final examination' encompasses both the regular examination and the first re-examination.

Language of instruction

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

Intended learning outcomes

Having passed the course, the student should be able to

- account for the basic mathematical properties in digital media signals
- explain and apply frequency domain transforms
- implement and modify digital filters with finite (FIR) and infinite (IIR) impulse response and apply them to media signals
- explain and compare compression algorithms for media signals
- recommend appropriate signal processing methods for different areas of media production
- modify and adapt media applications that use signal processing

in order to

- be able to adapt, integrate and evaluate signal processing methods in media production and application development.

Course contents

The course gives an introduction to signal processing in media technology with a focus on media production and sound and music computing. Examples are provided through existing applications, for example compression of sound and images or manipulation of media content by means of digital filters. The course introduces basic concepts with one-dimensional signals for example speech and music and expands these concepts to multi-dimensional data such as images and video.
Properties for discrete time signals and systems and basic signal manipulations are introduced. These manipulations use finite and infinite impulse response filters. The required signal manipulations are introduced (e g discrete Fourier transform, z-transform), as well as related mathematical operations (e.g convolution, correlation).
The theoretical background will be strongly attuned to practical and laboratory components in lectures and online exercises to relate theory to practical applications in industry.

Examination

- LAB1 - Laboratory work, 4.5 credits, grading scale: P, F
- HEM1 - Take-home assignment, 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.

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

HEM1 also includes an individual oral exam based on the homework.

Transitional regulations

TEN1 is replaced by HEM1.

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.