



*Course syllabus*

# Signalbehandling i multimedia Signal Processing in Multimedia

**EITA50, 7,5 credits, G1 (First Cycle)**

**Valid for:** 2023/24

**Faculty:** Faculty of Engineering, LTH

**Decided by:** PLED E

**Date of Decision:** 2023-04-11

## General Information

**Main field:** Technology.

**Compulsory for:** D3

**Elective for:** C4

**Language of instruction:** The course will be given in English on demand

## Aim

We use daily equipments in which the signals are stored and treated digitally. From the basic signal processing used in CD-players to advanced processing used in MP3 coding of music, speech coding in GSM, digital video and image processing. The course gives the basic knowledge in digital signal processing and knowledge of signal properties in the time domain as well as in the frequency domain.

## Learning outcomes

### *Knowledge and understanding*

For a passing grade the student must

- be able to identify applications of digital signal processing and how this is used in modern equipments
- be able to describe digital signals and the properties of digital signals
- be able to describe the relation between the properties in the time domain and in the frequency domain

### *Competences and skills*

For a passing grade the student must

- be able to analyze the signal properties in the time domain and in the frequency domain

- be able to describe the properties of digital circuits

#### *Judgement and approach*

For a passing grade the student must

- be able to handle digital signal methods in practical applications
- be able to read literature as well as treat with standards in this area.

## Contents

The course deals with time discrete signals and systems. Items such as the Fourier Transform, the Discrete Fourier Transform (DFT) and the z-transformed are treated in the course as well as some basic structures for implementation of digital filters. Also, system function and frequency functions are introduced as well as digital filters. Digital processing of analogue signals using A/D and D/A conversion is studied. In the laboratory work, practical applications of digital signal processing such as speech signals processing and biomedical signals processing are treated. Also, the course includes basic filter design using Matlab and digital signal processors (DSP).

## Examination details

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five)

**Assessment:** Examination is by a final test and by a number of sub-tests during the course. A final grade is obtained when the final test, sub-tests, and laboratory exercises are approved.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

#### **Parts**

**Code:** 1901. **Name:** Examination.

**Credits:** 6. **Grading scale:** TH. **Assessment:** Approved Written exam

**Code:** 1902. **Name:** Laboratory Works.

**Credits:** 1,5. **Grading scale:** UG. **Assessment:** Approved Laboratory work.

**Code:** 1903. **Name:** Home Assignments.

**Credits:** 0. **Grading scale:** UG. **Assessment:** Approved home assignments. **Contents:** Two individual, written home assignments. **Further information:** The score is credited to the test result.

## Admission

**Assumed prior knowledge:** FMAA01/FMAA05 One Dimensional Analysis.

**The number of participants is limited to:** No

**The course overlaps following course/s:** ESS040, EITF15, EITF75, ETI265, BMEF25

## Reading list

- Proakis J G, Manolakis D G. : Digital Signal Processing. Principles, Algorithms and Applications. Pearson Education, 2007, ISBN: 0-13-228731-5. The literature mentioned was used last year. Proakis J G, Manolakis D G: Digital Signal Processing. Principles, Algorithms and Applications.
- Pearson Prentice Hall, : 4:e upplagan., ISBN: 0-13-187374-1. Additional material provided by the department.

## Contact and other information

**Course coordinator:** Amir Aminifar, [amir.aminifar@eit.lth.se](mailto:amir.aminifar@eit.lth.se)

**Course homepage:** <http://www.eit.lth.se/course/eita50>

**Further information:** The present course provides essentially the same qualifications as the basic course "EITF75Digital signal processing" for the electrical engineering program, and therefore any of the elective courses in Signal Processing can be followed.