AALBORG UNIVERSITET

Module description (courses)

Module title, ECTS credits
Danish title: Signalbehandling
English title: Signal processing
5 ECTS
Period: 1 September 2018 – 31 January 2019
Campus: Aalborg

Location
ITC5, EIT5

Module coordinator and secretary
The academic staff member responsible: Søren Krarup Olesen, sko@es.aau.dk
Secretary:

Type and language
Module type: Course module
Language of instruction: English

Objectives
The learning objectives are specified in the Study Curriculum.

Academic content and conjunction with other modules/semesters
The signal processing course will assist students to acquire theoretical, methodological and practical skills in designing analog and digital filters and to do spectral estimation. Within these three main topics students will study:

Analog filters
- Types of filters (Butterworth, Chebyshev etc.)
- Filter characteristics, e.g. group delay
- Frequency- and impedance-scaling
- LP-HP and LP-BP transformation
- Realization of active LP, HP and BP-filters

Digital filtering
- Synthesis of transfer functions (FIR, IIR)
- Analysis (frequency response, signal graphs)
- Realization/implementation-aspects

Spectral estimation
- Discrete Fourier Transform (DFT)
- Time- and frequency-sampling, multiplication in the time- and frequency domains
- Window functions, zero padding, resolution
- Effective algorithms (FFT)

The prerequisites for the course are knowledge on calculus, circuit theory, dynamic systems, Laplace transformations, Z-transformations, Fourier Transformations and Fourier Series. During exercises it is required to be familiar with and have access to Matlab (or similar) for processing and visualizing data.

The course will provide students with competences that are required in the current and/or subsequent project modules and courses on digital signal analysis and processing.

Scope and expected performance
It should be emphasized that the university expects the students to spend 30 hours per ECTS credit points on their studies, corresponding to 900 hours per semester. This corresponds to a study load of approximately 45 hours per week.

This is a 5 ECTS module and the expected workload on students is 150 hours.
The planned lectures comprise:
- 15 lectures followed by exercises (total: 15 x 4 hours)
- 1 exercise session in the laboratory (total: 8 hours)

Students are expected to prepare for each lecture by reading suggested literature. This will be detailed on Moodle. Students should plan to spend time on preparing for the examination. The examination will be held in January and February 2019.

Participants
Semesters attending the module: ITC5, EIT5

Prerequisites for participation
The prerequisites for participation are listed in the Study Curriculum.

Module activities (course sessions etc.)
Information about each teaching activity is available at Moodle. This includes e.g.:

- Type of teaching (lecture, workshop, laboratory work, study trip etc.)
- The title and number of the teaching activity and possibly a brief description of the activity (course introduction)
- Date and time of the activity
- Lecture room
- Lecturer(s)
- Set and recommended readings
- Slides etc.
- Assignments/exercises

Examination
Information on the examination and assessment is given in the Study Curriculum.

Additional information on e.g. requirements for attending the examination, date, permitted tools etc. is available at:

https://www.sict.aau.dk/electronics-and-it/exam-dates/