Blekinge Institute of Technology
Department of Mathematics and Natural Science

Revision: 4
Reg.no: BTH-4.1.1-0557-2018

COURSE SYLLABUS

Signalbehandling

Signal Processing

7.5 credits (7,5 högskolepoäng)

Course code: ET1539
Main field of study: Electrical Engineering
Disciplinary domain: Technology
Education level: First cycle
Specialization: G1F - First cycle, has less than 60 credits in first cycle course/s as entry requirements

Subject area: Electrical Engineering
Language of instruction: English
Applies from: 2018-09-07
Approved: 2018-09-07

1. Decision

This course is established by Dean 2017-11-08. The course syllabus is approved by Head of Department of Applied Signal Processing 2018-09-07 and applies from 2018-09-07.

2. Entry requirements

Admission to the course requires attended course Theory of transforms, 6 credits.

3. Objective and content

3.1 Objective

The course aims at giving the students the theoretical fundamentals within modern digital signal processing and also at providing knowledge and insights into applied signal processing problems. The student will be well prepared for both signal processing within the industry and for continued studies in the subject. The course will mainly provide basic knowledge in signal- and system theory with the intention of providing the necessary mathematical tools for digital signal processing.

3.2 Content

Central items of the course are:

Basic definitions
- Continuous-time signals versus discrete-time signals
- The frequency concept.

Linear time-invariant systems
- Discrete-time signals and systems
- Connections between input- and output signal: convolution, difference equations.

Frequency analysis and transformer
- Fourier series and Fourier transformer of continuous-time and discrete-time signals
- Parseval's relation
- Frequency characteristics of linear time-invariant systems and frequency content of signals.

Sampling and reconstruction
- Sampling of continuous-time signals
- The sampling theorem, folding and reconstruction,
- A/D- and D/A-conversion.

Discrete Fourier transform (DFT)
- Sampling in the frequency plane
- Discrete Fourier transform (DFT),
- Fast Fourier transform (FFT) and its applications.

4. Learning outcomes

The following learning outcomes are examined in the course:

4.1 Knowledge and understanding

On completion of the course, the student will be able to:

- understand and use fundamental signal processing definitions
- understand and use the various characteristics of linear systems
- understand and use Fourier series and the Fourier transform
- understand and use the Discrete Fourier transform
- understand and use the sampling process of continuous-time signals

5. Learning activities

The instruction consists of lectures, laboratory work, and arithmetical exercises. During the arithmetical exercises the exercise supervisor will illustrate how the studied theory should be applied on signal processing problems. The laboratory work assignments are compulsory and will be solved individually or in a group.

6. Assessment and grading

Modes of examinations of the course

Code	Module	Credits	Grade
1810	Written examination[1]	6 credits	AF
1820	Laboratory session 1	0.8 credits	GU
1830	Laboratory session 2	0.7 credits	GU

[1] Determines the final grade for the course, which will only be issued when all components have been approved.

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Fail, supplementation required, F Fail.

If grade FX are given, the student may after consultation with the course coordinator / examiner get an opportunity to within 6 weeks complement to grade E for the specific course element.

The course information for each course revision should include the assessment criteria and make explicit in which modes of examination that the learning outcomes are assessed.

7. Course evaluation

The course evaluation should be carried out in line with BTH:s course evaluation template and process.

8. Restrictions regarding degree

The course can form part of a degree but not together with another course the content of which completely or partly corresponds with the contents of this course.

9. Course literature and other materials of instruction

Proakis, J.G. & Manolakis D.G. (2013). Digital Signal Processing. (4th Edition)Prentice-Hall.
ISBN 9781292025735

10. Additional information

This course replaces the course ET1468