2.3.4 Signals and Systems

Signals and Systems

Module Summary
Module code: EEIB340
Module coordinator: Prof. Dr. Manfred Strohrmann
Credits (ECTS): 6 Points
Semester: 3. Semester
Pre-requisites with regard to content: Competencies acquired in lectures Mathematics 1 + 2, Physics and Analog Electronics
Pre-requisites according to the examination regulations: Regarding to the examination regulations no pre-requisites are required
Competencies: Participants will be able to describe and analyze linear, time-invariant systems in the time, Laplace, and frequency domains by • describing signals in the time domain with mathematical functions • applying the Laplace transform to continuous-time signals • reading system properties from impulse responses and transfer functions • determine spectra of energy and power signals • construct and interpret Bode diagrams of linear, time-invariant systems • to develop an interdisciplinary understanding of systems that can be used to capture, control and simulate dynamic systems.
Assessment: Exam, 120 minutes
Usability: This module lays the systems theory foundations for Control Theory as well as Modeling and Simulation. Furthermore, the module is essential for the Lecture Theory of Digital Systems.

Course: Signals and Systems
Module code: EEIB341
Lecturer: Prof. Dr. Manfred Strohrmann
Scope of weekly semester hours (SWS): 4
Semester of delivery: Winter semester
Type/mode: Lecture, Compulsory subject
Language of instruction: English
• Content: • Signals in the time domain, signal algebra, impulse function, correlation function

• Systems in the time domain, differential equation, system properties, impulse response, convolution • Signals in the Laplace domain, Laplace transformation • Systems in the Laplace domain, transfer function, switching on and switching off processes • Spectrum of signals, Fourier series, Fourier transform • Frequency response of systems • Basics of filter design
Recommended reading: • Oppenheim, Alan: Signals, Systems and Inference, Pearson, 2017 • Chaparro, Luis: Signals and Systems using MATLAB, Academic Press, 2018

Course: Signals and Systems Lab
Module code: EEIB342
Lecturer: Prof. Dr. Manfred Strohrmann
Scope of weekly semester hours (SWS): 2
Semester of delivery: Winter semester
Type/mode: Labor, Compulsory subject
Language of instruction: English
Content: •
Recommended reading: • Presentations and Media on Ilias learning platform • Oppenheim, Alan: Signals, Systems and Inference, Pearson, 2017 • Chaparro, Luis: Signals and Systems using MATLAB, Academic Press, 2018