

Modul – No.	783		Mandatory
Module name	Signals and Controls		
Module coordinator	Prof. Dr.-Ing. Matthias Viehmann		
Title	Signals and Controls		
Title of examination	Signals and Controls		
Semester	1		
Course Type	Language	Lecture including exercises	English
SWS/ ECTS/ Workload	3/1/0	5	150
Requirements for attendance	None		

1. Learning Outcomes, Content and Priorities

Content

The course includes signal types and the fundamentals of sensors, the signal conditioning and the signal processing. Furthermore digital controller will be investigated in simulation and application. The priorities are:

- Signal types, Sensor examples,
- Signal conditioning (amplifiers, filter circuits),
- Analog digital converter, digital analog converter,
- Digital signal processing,
- Digital filter,
- Fast Fourier Transformation (FFT),
- Digital controller,
- Simulation of control loops.

Objectives

Upon completion of this course, students should be able to:

- show experience and enhancement of the following key skills - Independent learning problem solving, expand knowledge independently and instrumentation and control system design skills,
- analyze and evaluate data,
- select a suitable transducer and associated system for given measurement application,
- analyze continuous- and discrete-time signals and design simple linear continuous and discrete systems,
- analyze and design a closed loop control system via system modelling, performance analysis and controller design and synthesis,
- calculate suitable controller settings for a given problem.

Recommended Literature:

- Engelberg, S.: Digital Signal Processing. Language: English. ISBN: 1848001185. Springer-Verlag GmbH
- Franco, S.: Design with Operational Amplifiers and Analog Integrated Circuits. New York: The McGraw-Hill Companies, 4. Edition, 2015
- Viehmann, M.: Operationsverstärker – Grundlagen, Schaltungen, Anwendungen. 2., überarbeitete und erweiterte Auflage. München: Hanser, 2020

2. Methods of instructions

Lecture with integrated exercises

3. Requirements for attendance

No course specific requirements.

4. Usability of this module

The module is offered as mandatory course in the master study course „Computer Engineering for IoT Systems“ as well as elective course in other master courses of the Engineering Department.

5. Requirements for assessment

Assessment is performed either as written examination (90 minutes). Students need to pass the module examination, which encompasses all contents of the lecture.

6. ECTS credits

5 ECTS credits

7. Frequency of offer

Every summer term

8. Work load

150 h of total work load, from:

- 45 h of presence at lectures/exercises
- 55 h of self-study
- 50 h of preparation for examination

9. Duration of module

1 semester

