

Course

SMP - Signalprocessing using Matlab/Python and Microprocessors

Version: 2 | Last Change: 11.09.2019 21:45 | Draft: 0 | Status: vom verantwortlichen Dozent freigegeben

^ General information

Long name	Signalprocessing using Matlab/Python and Microprocessors
Approving CModule	SMP_BaET , SMP_BaTIN
Responsible	Prof. Dr. Harald Elders-Boll Professor Fakultät IME
Level	Bachelor
Semester in the year	winter semester
Duration	Semester
Hours in self-study	78
ECTS	5
Professors	Prof. Dr. Harald Elders-Boll Professor Fakultät IME Prof. Dr. Uwe Dettmar Professor Fakultät IME Prof. Dr.-Ing. Christoph Pörschmann Professor Fakultät IME
Requirements	Basic procedural programming skills Basic knowledge of digital signal processing: Sampling Theorem, Digital Filter, Fourier Transform
Language	German and English
Separate final exam	Yes

Final exam

Details

In their projects students implement given methods for digital signal processing in small teams and thereby show their ability to develop signal processing applications for various purposes.

For the final grade the project work, the project results, the final project presentation and the written project report are evaluated and scored according to different criteria and the final grade is derived from the total score.

Minimum standard

50% of the maximum achievable total score.

Exam Type

In their projects students implement given methods for digital signal processing in small teams and thereby show their ability to develop signal processing applications for various purposes.

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^ Lecture

Learning goals

Knowledge

Principles of Digital Signal Processing:

Sampling and Reconstruction

Digital Filters

DFT and FFT

Fast FFT-based Convolution

Spectral Analysis

Signal Generation

Real-time Signal Processing:

Interrupt and Polling

Block-based Signal Processing

Skills

Apply fundamentals of digital signal processing:

Understanding of and ability to explain the fundamental principles of digital signal processing

Ability to compare and evaluate different digital filter types and different implementations

Implementation of real-time DSP:

Ability to explain the general problem of real-time DSP

Ability to name aspects influencing the processing speed

Understanding of and ability to explain the fundamental methods of real-time digital signal processing

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	1
Tutorial (voluntary)	0

Separate exam

none

^ Practical training

Learning goals

Skills

Implementation of fundamental methods and procedures for signal processing in Python/Matlab and on microprozessors.

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	2
Tutorial (voluntary)	0

Separate exam

none

^ Project

Learning goals

Skills

Implementation Python/Matlab:

Program, debug and optimize algorithm in Python Matlab.

Implementierung on microprocessor:

Port algorithm to target micorprocessor platform

Familiarity with development environment

Optimize algorithm for target platform

Solve complex tasks in team work:

Plan simple projects

Keep agreements and deadlines

Schedule and carry out reviews

Implementation of DSP algorithm on microprocessor platform:

Understand given methods for digital signal processing

Obtain required references for given methods

Translate mathematical methods to program code

Test, verify, and optimize program code

Presentation of results:

Presentation of project results

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Project	1
Tutorial (voluntary)	0

Separate exam

none