

MK106 - Ausgewählte Kapitel der Signalverarbeitung

MK106 - Advanced Digital Signal Processing

General information	
Module Code	MK106
Unique Identifier	AdvDigSignal-01-MA-M
Module Leader(s)	Prof. Dr. Badri-Höher, Sabah (sabah.badri-hoeher@haw-kiel.de)
Lecturer(s)	Prof. Dr. Badri-Höher, Sabah (sabah.badri-hoeher@haw-kiel.de)
Offered in Semester	Wintersemester 2025/26
Module duration	1 Semester
Occurrence frequency	Regular
Module occurrence	In der Regel im Wintersemester
Language	Englisch
Recommended for international students	Yes
Can be attended with different study programme	No

Curricular relevance (according to examination regulations)
Study Subject: M.Eng. - MET - Elektrische Technologien (PO 2017, V3) Study Specialization: Kommunikationstechnik und Embedded Systems Module type: Verpfl. Wahlmodul, PVO §3 Semester: 1, 2
Study Subject: M.Sc. - MCS - Computer Science (PO 2023, V1) Module type: Wahlmodul Semester: 1, 2
Study Subject: M.Sc. - MIE - Information Engineering (PO 2022, V3) Module type: Wahlmodul Semester: 1, 2, 3

Qualification outcome
<i>Areas of Competence: Knowledge and Understanding; Use, application and generation of knowledge; Communication and cooperation; Scientific self-understanding / professionalism.</i>
Students who successfully complete this course will have a deep knowledge in the field of digital signal processing and their application in different areas.
The students obtain specialized deep knowledge in the field of signal processing matched to the master level in the area of electrical and information engineering. The students are capable to apply statistical methods of DSP in different areas, they are capable to explain important basic concepts of digital filter and their implementation by utilizing DSPs. Upon a successful completion of this course, students acquire skills to understand modern sampling techniques based on compressed sensing.
The course covers elements of a classical interactive on-line lecture/exercise, as well as team-working based on the handling of scientific papers and lab. The students learn to solve problems bot independently as well as team-oriented.

Content information	
Content	Numerical methods of signal processing. Digital filter, multirate systems, decimation and interpolation, polyphase channels, filter banks, modulated filterbanks. Working with high power DSP's . Fixed point arithmetic. Influence of quantization noise, noise shaping. Analysis of different filter structures with respect to quantization effects. Sampling of analog signals. Compressed sensing
Literature	- Mitra: Digital Signal Processing, McGraw-Hill. - J.G. Proakis, D.G. Manolakis: Digital Signal Processing: Principles, Algorithms, and Applications, Prentice Hall. - Stearn/David: Signal Processing Algorithms, Prentice-Hall.

Teaching formats of the courses	
Teaching format	SWS
Übung	1
Seminar	2
Labor	1

Workload	
Number of SWS	4 SWS
Credits	5,00 Credits
Contact hours	48 Hours
Self study	102 Hours

Module Examination	
Examination prerequisites according to exam regulations	None
MK106 - Laborprüfung	Method of Examination: Laborprüfung Weighting: 0% wird angerechnet gem. § 11 Absatz 2 PVO: Yes Graded: No Remark: Die in WS24/25 bestehende Teilprüfung "Übung" wird bei nicht abgeschlossener Modulprüfung auf die neue Teilprüfung "Laborprüfung" angerechnet.
MK106 - Präsentation	Method of Examination: Präsentation Duration: 20 Minutes Weighting: 30% wird angerechnet gem. § 11 Absatz 2 PVO: No Graded: Yes
MK106 - Klausur	Method of Examination: Klausur Duration: 90 Minutes Weighting: 70% wird angerechnet gem. § 11 Absatz 2 PVO: No Graded: Yes