

Modul: Signals and Systems

Niveau	Bachelor	Stundenplankürzel	
Modulname englisch			
Modulverantwortliche	Prof. Dr. Djahanyar Chahabadi, Prof. Dr. Lothar Vogt		
Fachbereich	Electrical Engineering and Computer Science		
Studiengang	Electrical Engineering - Communication Systems, Bachelor		
Verpflichtungsgrad		ECTS-Leistungspunkte	5
Fachsemester	3	Semesterwochenstunden	4
Dauer in Semestern	1	Arbeitsaufwand in Stunden	150
Angebotshäufigkeit	WiSe	Präsenzstunden	60
Lehrsprache	English	Selbststudiumsstunden	90

Der folgende Abschnitt ist nur ausgefüllt, wenn es **genau eine** modulabschließende Prüfung gibt.

Prüfungsleistung	Written Exam	Prüfungsprache	English
Dauer PL in Minuten	120	Bewertungssystem PL	One-third Grades
Lernergebnisse			
Teilnahmevoraussetzungen			

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Berücksichtigung von Gender- und Diversity-Aspekten	<ul style="list-style-type: none"> ✓ Verwendung geschlechtergerechter Sprache (THL-Standard) ✓ Zielgruppengerechte Anpassung der didaktischen Methoden ✓ Sichtbarmachen von Vielfalt im Fach (Forscherinnen, Kulturen etc.)
Verwendbarkeit	Recommended as a prior knowledge of the module Digital Signal Processing
Bemerkungen	

Module Course: Signals and Systems (Lecture)

(of Module: Signals and Systems)

Course Type	Lecture	Form of Learning	Presence
Mandatory Attendance	no	ECTS Credit Points	5
Participation Limit		Semester Hours per Week	4
Group Size		Workload (hours)	150
Teaching Language	English	Presence Hours	60
Study Achievements ("Studienleistung", SL)		Self-Study Hours	90
SL Length (minutes)		SL Grading System	

The following section is filled only if there is a course-specific exam.

Exam Type		Exam Language	
Exam Length (minutes)		Exam Grading System	
Learning Outcomes			
Participation Prerequisites			

The previous section is filled only if there is a course-specific exam.

Contents	<p>1 Introduction</p> <ul style="list-style-type: none"> • Basic Terminology: Message, Signal, Time Function, System, Excitation, Response <p>2 Signals</p> <ul style="list-style-type: none"> • Classification of Signals • Analysing Signals: Fourier Series • Analysing Signals: Fourier Transform • Analysing Signals: Laplace Transform • Sampling • Principles of Modulation <p>3 Systems</p> <ul style="list-style-type: none"> • Classification of Systems • Evaluation of the Response of a Linear Time Invariant System • Convolution • System function of Passive Circuits • Response of a Linear Time Invariant System to Harmonic Signals • Relation between Rise Time and Bandwidth of an ideal Lowpass-Filter • Systems without Distortion • Finding the Transfer Function of a System from the Pol-Zero-Distribution <p>4 Filters</p>
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- Overview of different Filter Typs
- The ideal Lowpass Filter as a starting point
- Butterworth Lowpass Filter (Potenztiefpass)
- Chebyshev Lowpass Filter (Typ I) und (Typ II)
- Elliptic Lowpass Filter
- Bessel Thomson Lowpass Filter
- Aspects of Implementation
- Frequency Transformation

5 Autocorrelation function

- ACF of Energy and Power Signals in the Time Domain
- ACF of Energy and Power Signals in the Frequency Domain
- Parseval's Theorem

Literature

- Simon Haykin, Barry Van Veen, *Signals and Systems*, Second Edition, Wiley, 2003, ISBN 0471-37851-8
- Ziemer, Rodger E., *Signals and Systems: Continuous and Discrete*, Prentice Hall, 4th edition, 1998, ISBN-10 013496456X, ISBN-13 978-0134964560
- Ziemer, Rodger E., *Signals and Systems: Continuous and Discrete*, Maxwell MacMillan International, New York, 1993, ISBN 0-02-431641-5

Remarks