

Module: Analog Electronics

Level	Bachelor	Short Name	AE II
Responsible Lecturers	Milady, Saeed, Prof.-Dr.-Ing.		
Department, Facility	Electrical Engineering and Computer Science		
Course of Studies	Allgemeine Elektrotechnik, Bachelor		
Compulsory/elective	Compulsory	ECTS Credit Points	5
Semester of Studies	5	Semester Hours per Week	5
Length (semesters)	1	Workload (hours)	150
Frequency	WiSe	Presence Hours	65
Teaching Language	English	Self-Study Hours	85

The following section is filled only if there is **exactly one** module-concluding exam.

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

The previous section is filled only if there is **exactly one** module-concluding exam.

Consideration of Gender and Diversity Issues	<ul style="list-style-type: none"> ✓ Use of gender-neutral language (THL standard) ✓ Target group specific adjustment of didactic methods ✓ Making subject diversity visible (female researchers, cultures etc.)
Applicability	
Remarks	

Lehrveranstaltung: Analog Electronics (Lecture)

(zu Modul: Analog Electronics)

Lehrveranstaltungsart		Lernform	
LV-Name englisch			
Anwesenheitspflicht	nein	ECTS-Leistungspunkte	3
Teilnahmebeschränkung		Semesterwochenstunden	3
Gruppengröße		Arbeitsaufwand in Stunden	90
Lehrsprache	English	Präsenzstunden	45
Studienleistung		Selbststudiumsstunden	45
Dauer SL in Minuten		Bewertungssystem SL	One-third Grades

Der folgende Abschnitt ist nur ausgefüllt, wenn es eine lehrveranstaltungsspezifische Prüfung gibt.

Prüfungsleistung	Portfolio Exam	Prüfsprache	
Dauer PL in Minuten		Bewertungssystem PL	

Lernergebnisse

- The students understand basic circuits of analog electronics and can analyze and design them as well as select and dimension the circuit components.
 - The students are familiar with the real characteristics of operational amplifiers and can take these into account when designing the circuit and selecting components.
 - The students are familiar with the difference between positive and negative feedback and basic circuits that can be built using operational amplifiers
 - The students are familiar with basic concepts of active filters. They are familiar with the design methods for filter transfer functions and can realize them using opamps and passive devices.
 - The students know different basic oscillator circuits and can select and dimension the appropriate basic circuits for different applications.
 - The students know the basics of AD / DA conversion, their parameters and system-theoretical parameters. They know the different converter types.
 - The students are familiar with other typical analogue circuits and their applications.
 - The students can verify their own circuit designs using circuit simulation.

- The students are familiar with different basic circuits for the voltage supply and can select and dimension the suitable basic circuit for different applications.

Teilnahmevoraussetzungen

Der vorige Abschnitt ist nur ausgefüllt, wenn es eine Lehrveranstaltungsspezifische Prüfung gibt.

Lehrinhalte

- Basic analog amplifiers
- Voltage regulators
- Real properties of operational amplifiers (OpAmps)
- Oscillator circuits
- Active filters
- Analog to digital and digital to analog circuits converters
- Other typical analog circuits

Literatur

Sedra, A., et. Al., "Microelectronic Circuits", Oxford.
 Razavi, B., "Fundamentals of Microelectronics", John Wiley & Sons Inc.

Bemerkungen

Module Course: Analog Electronics (Practical Training)

(of Module: Analog Electronics)

Course Type	Practical Training	Form of Learning	Presence
Mandatory Attendance	no	ECTS Credit Points	2
Participation Limit		Semester Hours per Week	2
Group Size	12	Workload (hours)	60
Teaching Language	English	Presence Hours	20
Study Achievements ("Studienleistung", SL)	Practical Training	Self-Study Hours	40
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	<ol style="list-style-type: none"> 1. Current mirrors and differential amplifiers 2. Operational amplifiers 3. Boost-converter with MOSFET 4. Active filters 5. ADC & DAC circuits
Literature	Sedra, A., et. Al., "Microelectronic Circuits", Oxford. Razavi, B., "Fundamentals of Microelectronics", John Wiley & Sons Inc. Internal task descriptions
Remarks	