Valid from 2024.HS

Module description: Electrical Engineering and Semiconductors 2

Module Code	t.BA.EU.ELHL2.12HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	IEFE
Module Coordinator	Andreas Heinzelmann
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.
Module Characteristic	Type 3b 2 lecture lessons per semester week and class+ 4 lab bi-weekly lessons per semester and half-class
Module Description	Working on from the ELHL1 module, students acquire a more in-depth knowledge of electronics. This includes an understanding of important analog electronic components such as diodes, transistors and operational amplifiers, as well as the basic function of switching power supplies.
Module Content	**Lecture:** • - Introduction to semiconductor physics • - Properties of different diode types, applications and dimensioning • - Functionality of bipolar and field effect transistors as well as IGBTs • - Analysis and design of applications with switches, such as clocked step-down and step-up converters with the associated control and protection circuits • - Ideal operational amplifiers with negative feedback, as comparator and as Schmitt Trigger • - Use of a simulation and EDA tool **Internship:** • - for each of the above points practical experiments will take place • - an electronic circuit serves are used as exemplary application of the above topics
Prerequisite Knowledge	Modul ELHL1

Learning Objectives (Competences)

Students...	Competencies	Taxonomies
know and understand how elementary semiconductor components work (PN junction, diodes and transistors).	F	K1, K2
are familiar with the standard structure of electronic assemblies and know the processor steps for creating an assembly with an EDA tool (Electronic Design Automation).	F	K1, K2
know applications with electronic switches and can explain how they work.	F	K1, K2
will be able to analyze and design circuits with diodes, transistors and ideal operational amplifiers analytically and with a simulation tool.	F	K3

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Performance Assessment

End-of-module exam	Assessment	Length (min.)	Weighting	Form
written exam	Grade	90	60	acc. to module agreement

Performance assessment during the semester	Assessment	Length (min.)	Weighting	Form
project work *Design, construction, commissioning and test of an electronic device*	Grade		25	acc. to module agreement
written exam	Grade	45	15	acc. to module agreement

Classroom Attendance Requirement

None

Learning material

- Hering, E. (2021). Elektronik für Ingenieure und Naturwissenschaftler. Springer Verlag. ISBN 9783662626979.
- Tietze, U. (2019). Halbleiter-Schaltungstechnik. Springer Verlag. ISBN 9783642310256.
- Reinhold, W. (2023). Elektronische Schaltungstechnik: Grundlagen der Analogelektronik mit Aufgaben und Lösungen . Leipzig: Hanser Fachbuchverlag . ISBN 9783446477827.

Comments