Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Elektronische Bauelemente
Code der Lehrveranstaltung	42409
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	ING-INF/01
Sprache	Englisch
Studiengang	Bachelor in Elektrotechnik und Cyber-Physische Systeme
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Prof. Luisa Petti, Luisa.Petti@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/39580 Prof. Dr. Niko Stephan Münzenrieder, Niko.Muenzenrieder@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/42095
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Erstes Semester
Studienjahr/e	2
KP	9
Vorlesungsstunden	54
Laboratoriumsstunden	36
Stunden für individuelles Studium	135
Vorgesehene Sprechzeiten	27
Inhaltsangabe	The topics covered include: • Physics of semiconductor materials (e.g., crystal structure, energy bands, density of states, dopants, electronic transport)

	• Nanotechnology • pn junctions and diodes • MOSFETs • JFETs • Bipolar junction transistors • Optical devices • Sensors
Themen der Lehrveranstaltung	The topics covered include: • Physics of semiconductor materials (e.g., crystal structure, energy bands, density of states, dopants, electronic transport) • Nanotechnology • pn junctions and diodes • MOSFETs • JFETs • Bipolar junction transistors • Optical devices • Sensors
Stichwörter	Electronic Devices Semiconductors Transistors Sensors
Empfohlene Voraussetzungen	Mathematical Analysis I, Mathematical Analysis II, Physics I, Physics II
Propädeutische Lehrveranstaltungen	
Unterrichtsform	Frontal lectures, homework, exercises, and laboratories.
Anwesenheitspflicht	Preferrable. Non-attending students should contact the lecturer at the start of the course to agree on the modalities of the independent study
Spezifische Bildungsziele und erwartete Lernergebnisse	The objective of this course is an understanding of the physics and operation of semiconductor devices. Specifically, understanding of the formation and behaviour of semiconductor contacts, basic knowledge of nanotechnology and microfabrication, understanding of operation and design of MOSFETs, bipolar transistors and JFETs, and understanding of other devices such as, optical devices and sensors.
Spezifisches Bildungsziel und erwartete	Knowledge and understanding 1. Have a solid knowledge of semiconducting materials and

Lernergebnisse (zusätzliche Informationen)	devices 2. Know the concepts of semiconducting carrier transport and of device operation Applying knowledge and understanding 3. Be able to design electronic devices and choose the proper materials for them 4. Be able to properly use physical units Making judgements 5. Be able to think "out-of-the-box" when facing problems and critical issues. Learning skills Develop learning capabilities and autonomous thinking in order to pursue effectively further studies.
Art der Prüfung	The exam will be in in written form. Students will have the choice to take an oral midterm exam to earn a bonus of up to 5 points out of 30 for the final mark. The students might also have the possibility to substitute a part of the final exam with a group project to be carried out during the semester and concluded by an oral presentation
Bewertungskriterien	The assessment criteria will be the accuracy of the answers given in the written examination, with particular attention to the resolution procedure adopted and the formal correctness of the same.
Pflichtliteratur	Blackboard and lecture slides
Weiterführende Literatur	Various textbooks can be used as a reference, for example: · „Semiconductor Physics and Devices", Donald A. Neamen · „Physics of Semiconductor Devices", S. M. Sze and Kwok K. Ng · „Microelectronics", Jacob Millman and Arvin Grabel · „The Art of Electronics", Paul Horowitz and Winfield Hill
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung