Syllabus

Descrizione corso

Titolo insegnamento	Dispositivi Elettronici
Codice insegnamento	42409
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	ING-INF/01
Lingua	Inglese
Corso di Studio	Corso di laurea in Ingegneria Elettronica e dei Sistemi ciberfisici
Altri Corsi di Studio (mutuati)	
Docenti	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
Assistente	
Semestre	Primo semestre
Anno/i di corso	2
CFU	9
Ore didattica frontale	54
Ore di laboratorio	36
Ore di studio individuale	135
Ore di ricevimento previste	27
Sintesi contenuti	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
Argomenti dell'insegnamento	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
Parole chiave	Electronic Devices Semiconductors Transistors Sensors
Prerequisiti	Mathematical Analysis I, Mathematical Analysis II, Physics I, Physics II
Insegnamenti propedeutici	
Modalità di insegnamento	Frontal lectures, homework, exercises, and laboratories.
Obbligo di frequenza	Preferrable. Non-attending students should contact the lecturer at the start of the course to agree on the modalities of the independent study
Obiettivi formativi specifici e risultati di apprendimento attesi	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.
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	Knowledge and understanding 1. Have a solid knowledge of semiconducting materials and 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.
Modalità di esame	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
Criteri di valutazione	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.
Bibliografia obbligatoria	Blackboard and lecture slides
Bibliografia facoltativa	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
Altre informazioni	
Obiettivi di Sviluppo Sostenibile (SDGs)	Istruzione di qualità