Syllabus

Course Description

Course Title	Electronic Devices
Course Code	42409
Course Title Additional	
Scientific-Disciplinary Sector	IINF-01/A
Language	English
Degree Course	Bachelor in Electronics and Cyber-Physical Systems Engineering
Other Degree Courses (Loaned)	
Lecturers	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
Teaching Assistant	
Semester	First semester
Course Year/s	2
CP	9
Teaching Hours	54
Lab Hours	36
Individual Study Hours	135
Planned Office Hours	27
Contents Summary	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
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Keywords	Electronic Devices Semiconductors Transistors Sensors
Recommended Prerequisites	Mathematical Analysis I, Mathematical Analysis II, Physics I, Physics II
Propaedeutic Courses	
Teaching Format	Frontal lectures, homework, exercises, and laboratories.
Mandatory Attendance	Preferrable. Non-attending students should contact the lecturer at the start of the course to agree on the modalities of the independent study
Specific Educational Objectives and Learning Outcomes	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.
Specific Educational Objectives and Learning Outcomes (additional 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.
Assessment	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
Evaluation Criteria	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.
Required Readings	Blackboard and lecture slides
Supplementary Readings	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
Further Information	
Sustainable Development Goals (SDGs)	Quality education