COURSE DESCRIPTION – ACADEMIC YEAR 2024/2025

Course title	**Dispositivi Elettronici**
Course code	42409
Scientific sector	ING-INF/01
Degree	Bachelor in Electronics and Cyberphysical Systems (L-8)
Semester	1
Year	2
Credits	9
Modular	No

Total lecturing hours	54
Total lab hours	36
Attendance	Preferrable. Non-attending students should contact the lecturer at the start of the course to agree on the modalities of the independent study
Prerequisites	Mathematical Analysis I, Mathematical Analysis II, Physics I, Physics II
Course page	Teams

Specific educational objectives	The objective of this course is an understanding of the physics and operation of semiconductor devices. Specifically, understanding of the formation and behavior of metal-semiconductor contacts, basic knowledge of nanotechnology and microfabrication, understanding of operation and design of MOSFETs, bipolar transistor and JFET, and understanding of the operation of memories, optical devices and sensors.

Lecturer	Prof. Paolo Lugli Prof. Luisa Petti
Contact	paolo.lugli@unibz.it luisa.petti@unibz.it
Scientific sector of lecturer	ING/INF-01 – ELECTRONICS
Teaching language	Italian
Office hours	After consultation and agreement with lecturers
Lecturing assistant (if any)	
Contact LA	
Office hours LA	
List of topics	The topics covered include: - Semiconducting materials. - Semiconductor fabrication and characterization techniques. - PN junctions and diodes. - Transistors (MOSFETs; MESFETs; heterojunction transistors) - Memories (DRAM; SRAM; Flash; resistive). - Sensors (physical; chemical; biological sensors). - Photonic devices (LEDs; lasers; photodiodes; solar cells). - Passive electronic components (antennas; batteries). - Internet-of-things and sensor networks.
Teaching format	Frontal lectures, homeworks, exercises, and laboratories.

Learning outcomes	To be defined

Assessment	The exam will be in written form. One part will relate to the lecture topics, one other top the exercises. Students will have the choice to take 2 midterm exams (if negative, the students will have to take the final written exam including all covered topics).
Assessment language	Italian
Evaluation criteria and criteria for awarding marks	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	"Semiconductor Physics and Devices", Donald A. Neamen.
Supplementary readings	"Elettronica di Millman", Jacob Millman, Arvin Grabel, Pierangelo Terreni.