ΜΟΝΑΔΑ ΔΙΑΣΦΑΛΙΣΗΣ ΠΟΙΟΤΗΤΑΣ Α.Π.Θ.

Optoelectronic and Sensors: Materials and Applications

1. GENERAL			
SCHOOL	Faculty of Sciences in collaboration with Faculty of Engineering, Aristotle University of Thessaloniki		
DEPARTMENT	Materials Science and Engineering		
LEVEL OF STUDIES	ISCED level 7 (5-year Integrated Master's programme) ISCED level 6 (4-year BSc programme)		
COURSE CODE	MSEN 821	**SEMESTER**	8th Semester
COURSE TITLE	**Optoelectronic and Sensors: Materials and Applications**		
TEACHING ACTIVITIES Lectures, tutorials/problem sessions, laboratory/computer exercises (where applicable), case studies and guided self-study.		**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
		4 (3L + 1T)	6
COURSE TYPE	Scientific area / Skill development		
PREREQUISITES			
TEACHING AND EXAMINATION METHODS	Lectures and tutorials; analysis of powder characterization data; final written exam and a short technical report.		
COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE URL	https://elearning.auth.gr/course/view.php?id=xxxxx		

2. LEARNING OUTCOMES	
Learning Outcomes	Upon successful completion of the course, undergraduate students will be able to: • Describe the basic principles of optoelectronic materials and devices. • Explain fundamental light–matter interactions in semiconductors and photonic materials. • Identify the operating principles of photodetectors, light-emitting devices, and optical sensors. • Understand basic mechanisms of signal transduction, sensitivity, and selectivity in optoelectronic sensors. • Recognize common materials characterization and fabrication methods used in optoelectronic devices. • Relate material properties to device performance in applications such as communications, imaging, healthcare, and wearable technologies.
General Skills	• Experimental data interpretation and reporting • Quantitative reasoning on process parameters • Awareness of industrial constraints and quality assurance

	• Independent learning from standards and technical literature

3. COURSE CONTENT
This course provides a comprehensive introduction to the materials, principles, and applications of optoelectronic devices and sensors. Topics include semiconductors, photonic materials, light–matter interactions, and the design and operation of photodetectors, light-emitting devices, and optical sensors. Students explore the mechanisms of signal transduction, sensitivity, and selectivity, as well as methods for material characterization and device fabrication. Emphasis is placed on applications in communications, imaging, environmental monitoring, healthcare, and wearable technologies, highlighting how material properties influence device performance and functionality.

4. LEARNING & TEACHING METHODS - EVALUATION	
Teaching method	Face-to-face.
Use of ICT	ICT will be used in teaching the course, and in communication with students: • teaching of the course with modern distance learning (ZOOM) and asynchronous education tools via elearning platform of AUTH, communication with students via email, ZOOM, and elearning platform of AUTH.
Teaching organization	The supervised and unsupervised workload per activity is indicated below (total workload complies with ECTS standards).

Activity	Workload/semester (hours)
Lectures	39
Tutorials / problem sessions	13
Data analysis / short report	16
Independent study	64
Exam preparation	16
Final written exam	2
Total	**150**

Student evaluation	Assessment language: English. Methods: written final exam (60%), technical report/data-analysis assignment (25%), quizzes/problem sets (15%). Students are informed via the course guide and e-learning announcements.

5. SUGGESTED BIBLIOGRAPHY
EUDOXUS
To be specified in EUDOXUS.
Additional bibliography for study
• Teaching material slides