ΜΟΝΑΔΑ ΔΙΑΣΦΑΛΙΣΗΣ ΠΟΙΟΤΗΤΑΣ Α.Π.Θ.

Materials Processing

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 702	**SEMESTER**	7th Semester
COURSE TITLE	**Materials Processing**		
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	Skill development / Scientific area		
PREREQUISITES	Introduction to Materials Science and Engineering; basic Mechanics of Materials.		
TEACHING AND EXAMINATION METHODS			
COURSE OFFERED TO ERASMUS STUDENTS	Yes (taught in English, subject to minimum enrollment).		
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 fundamental principles of materials processing and manufacturing. • Explain basic solidification processes, phase transformations, and microstructural evolution during materials processing. • Identify common processing methods for metals, polymers, ceramics, and composite materials. • Explain how processing routes influence the mechanical, thermal, and functional properties of materials. • Recognize common processing defects and their impact on material performance. • Select appropriate processing methods for simple engineering applications based on material type and desired properties.
General Skills	• Systems thinking in design decisions

	• Data-driven decision making with uncertainty • Project planning and teamwork • Professional reporting and presentations

3. COURSE CONTENT

This course provides a comprehensive introduction to the fundamental principles of materials processing and manufacturing. Topics include solidification, phase transformations, and microstructural evolution during processing, as well as processing methods for metals, polymers, ceramics, and composite materials. The influence of processing routes on mechanical, thermal, and functional properties is examined, with emphasis on process selection, defect formation, and performance optimization in engineering applications.

4. LEARNING & TEACHING METHODS - EVALUATION

Teaching method	Face-to-face.
Use of ICT	Learning management system (e-learning platform) for notes, quizzes and announcements; spreadsheets for simple property charts; basic use of materials databases for information retrieval.
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
Short assignments / quizzes	10
Independent study	70
Exam preparation	16
Final written exam	2
Total	**150**

Student evaluation	Assessment language: English. Methods: written final exam (60%), homework/problem sets and short quizzes (25%), mini-case study/report (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