

COURSE OUTLINE

DIGITIZATION AND PROTOTYPING – 3D PRINTING

(1) GENERAL

SCHOOL	TECHNOLOGY		
DEPARTMENT	FORESTRY, WOOD SCIENCES & DESIGN		
LEVEL	POSTGRADUATE		
COURSE CODE	M123	SEMESTER	2 nd
COURSE TITLE	DIGITIZATION AND PROTOTYPING – 3D PRINTING		
ACTIVITIES		WEEKLY HOURS	ECTS
Lectures		2	6
TOTAL		2	6
TYPE OF COURSE	COMPULSORY IN PRODUCT DESIGN EXPERTISE, SELECTION OF SPECIALTIES TECHNOLOGY AND MANUFACTURING & MANAGEMENT AND MARKETING		
PREREQUISITES:	NO		
LANGUAGE OF TEACHING AND EXAMINATION	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO		
WEBPAGES COURS (URL)	https://eclass.uth.gr/courses/FWSD_P_122/		

(2) LEARNING OUTCOMES

Learning Outcomes
<p>The purpose of the course is to understand the different 3D printing technologies as well as the interactive human-machine interface systems in the design of new products, with the aim of giving postgraduate students a comprehensive understanding of how modern means of printing and designing new products are used in a modern industrial environment with prototyping, optimizing the design and development process of new products.</p> <p>Upon successful completion of the course, the student will be able to:</p> <ul style="list-style-type: none"> • Knows the different 3d printing technologies • Knows the operation and use of an inject binder technology 3D printer and an FDM technology printer • Creates prototype models of objects using silicone molds • Utilizes different 3d printing technologies in specific applications • Creates electronic sketches • Designs new products using an interactive design device • Creates the original production mold
General Skills

(3) COURSE CONTENT

<p>In the theoretical part of the course the student is taught and learns about:</p> <ul style="list-style-type: none"> • Introduction to 3D printing. • 3d printing technologies. Preparing 3D model for printing, model printing.

- **3d printing parameters.** Printing problems and how to solve them.
- **Printing parameters on an inject binder printer, printing.** Printing parameters on an FDM printer, printing.
- **3d scanning technologies, types of scanners, applications.**
- **Scanning objects with 3d scanners, creating a digital model.**
- **Designing an Electronic Sketch.**
- **Creation of a 3d model from the electronic sketch.**
- **Prototyping, using Vacuum Casting technology.**
- **Creating a mold from the 3d model.**

In the 1st lesson, the first assignment is given that the students should implement, the duration of the assignment is 15 days, a similar procedure is followed for the following assignments. The relevant directions are given, while material and instructions are posted on the e-class. Students are graded for the total performance in the assignments they undertake with a total grade of 40% of the final grade.

(4) TEACHING AND LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD.	In class and remotely	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	<ul style="list-style-type: none"> • Use of PC, ppt slides, projector • Use of laboratory devices such as 3d printers, 3d scanners of the laboratory • Support of the learning process through the e-class electronic platform 	
MANAGEMENT OF TEACHING	Activity	Semester Workload
	Lectures	26
	Small individual practice tasks	20
	Final Assignment	60
	Independent Study	44
	Course Total (25 workload hours per credit unit)	150
STUDENT EVALUATION	I. Written final exam (60%) which includes: - Short answer questions from all the material in the book - Examination on laboratory equipment II. Presentation of Individual Works (40%).	

(5) RECOMMENDED-BIBLIOGRAPHY

- Suggested Bibliography:

- Alan Pipes, Drawing for Designers, Laurence King Publishers
- Τεχνολογίες Προσθετικής Κατασκευής, Ian Gibson, David Rosen, Brent Stucker
- Chris Lefteri, Making It: Manufacturing Techniques for Product Design, Laurence King Publishers
- Joan Horvath, Mastering 3D Printing (Technology in Action)

- Christian Hatzfeld, engineering haptic Devices, Springer
- Malika Auvray, Haptics: Neuroscience, Devices, Modeling, and Applications, Springer
- Christopher Barnatt, 3D Printing: Second Edition
- Christopher Barnatt, 3D Printing: The Next Industrial Revolution

- *Related scientific journals:*

- 3D Printing and Additive Manufacturing
- Rapid Prototyping Journal
- International Journal of CAD/CAM
- International journal of rapid manufacturing
- RTejournal (Rapid Technology Electronic Journal)
- Virtual and Physical Prototypin