ESOGU Faculty of Art and Design
Industrial Design Department
COURSE INFORMATION FORM

SEMESTER	Spring

COURSE CODE	1411xx	COURSE NAME	Dijital Manufacturing and Materials for Product Design

SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Laboratory	Credit	ECTS	Type	Language
8	2	0	0	2	3	COMPULSORY ( ) ELECTIVE (x)	Turkish

COURSE CATEGORY				
Basic Education	Design	Natural and Applied Science	Social Science	Art
	X	X		

ASSESSMENT CRITERIA			
	Evaluation Type	Quantity	%
MID-TERM	1st Mid-Term	1	40
	2nd Mid-Term		
	Quiz		
	Homework		
	Project		
	Report		
	Others (……)		
FINAL EXAM		1	60

PREREQUIEITE(S)	Student should be able to use a 3D modelling program.
COURSE DESCRIPTION	Digital manufacturing techniques are used both in industrial production and in the design area during prototyping and model making processes. The Digital Manufacturing and Materials for Product Design course covers both subtractive CNC manufacturing techniques and additive 3D printing methods. Information is given about which techniques work with which material and in which area they are used. At the end of thew course the students put what they have learnt into practice by realizing a design project for a 3D printer.
COURSE OBJECTIVES	Providing information about digital manufacturing techniques and the types of materials used, presenting different examples of their usage, the course conveys domain knowledge and the future potential of the fieldnto the students. It also aims to teach the students how exactly their designs should be prepared according to the chosen digital manufacturing field and the used material.
ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION	With today's progress of digitalization, digital manufacturing techniques used in prototyping are now also used in industrial production. If necessary, to produce models and prototypes during the design process, or if necessary, to produce products in the industrial manufacturing process; the industrial designer should know how to prepare his or her designs according to the digital manufacturing techniques and used materials. The Digital Production and Materials for Product Design course contributes to the digital preparation steps of designs.

COURSE OUTCOMES	1. The student knows and can evaluate the differences, advantages and disadvantages, material types and usage areas of digital manufacturing techniques. 2. The students can adjust their product designs according to the used digital manufacturing technique and can prepare the digital files for the designed product.
TEXTBOOK	The 3D Printing Handbook: Technologies, design and applications, *Ben Redwood, Filemon Schöffer, Brian Garret,* 3D Hubs, 2017
OTHER REFERENCES	Functional Design for 3D Printing – 3rd edition: Designing 3D printed things for everyday use, *Clifford Smyth,* 2017
TOOLS AND EQUIPMENTS REQUIRED	The student should have a computer with a 3d modelling program or the opportunity to use one. As slicing application open source Cura program is used.

WEEKLY COURSE SYLLABUS	
WEEK	**TOPICS**
1	Explanation of course content and execution.
2	Classification of production techniques (formative, subtractive, additive) and positioning of digital production techniques.
3	Advantages and disadvantages of subtractive CNC production method, branches and materials using CNC production techniques, CNC laser cutting, what to consider when designing for CNC.
4	Advantages and disadvantages of additive manufacturing methods (3D printing tecniques), process, types of rapid prototyping and which is used for what: Material Extrusion (FFF), VAT Polymerization (SLA/DLP), Powder Bed Fusion – polymer ve metal - (SLS/DMLS/SLM/EBM,) Material Jetting (DOD), Binder Jetting.
5	Material information and printing process details for the FFF 3D printer, showing examples.
6	Makers movement, with The Makers Bill of Rights manifesto positioning against obsolescence, design, produce yourself and share, sharing platforms e. g. thingiverse.
7	Best practices, new developments.
8	**Midterm Exam**
9	Project description, concept development.
10	Working on the project, concept development, design process.
11	Working on the project, design process.
12	Working on the project, design process, digital modelling.
13	Working on the project, digital modelling.
14	Working on the project, digital modelling, printing process.
15	Working on the project, printing process.
16	**Final Exam**

NO	**PROGRAM OUTCOMES**	**Contribution Level**		
		3	**2**	**1**
1	Within cultural, historical and artistic context the ability to integrate theoretical knowledge about production and consumption mechanisms into the design practice;		x	
2	The ability to plan the design process, to choose and use appropriate methods and techniques;	x		
3	The ability to identify design problems and related sub-problems and to produce creative solutions with a critical and dialectical approach;		x	
4	The ability to design in terms of spatial thinking using design principles and elements;		x	
5	The ability to make applications in the interaction of aesthetics and function using design elements and means and to evaluate these applications;		x	
6	The ability to visualize and present using two and three dimensional design tools;		x	
7	The ability to follow and apply technological developments, current design approaches, sustainable production methods, materials and innovations in the field of informatics in design projects;	x		
8	The ability to use field knowledge in industrial design projects by considering the needs and interests of the society and target users within the scope of environmental awareness, professional ethics and the laws;		x	
9	The ability to carry out the design process effectively individually or in a team;		x	
10	The ability to take an active role in discipline-specific or interdisciplinary			x

	studies at the national and international levels.			
1: None. 2: Partial contribution. 3: Complete contribution.				

Instructor(s): Öğr. Gör. Stefanie Aydın

Signature: **Date:**