COURSE SYLLABUS						
Course Title	**Course Code**	**Semester**	**Course Hour/Week**		**Credit**	**ECTS**
Materials, Production and Processes	INDD211	1	**Theory** 2	**Practice** 2	3	3
Course Type	**Compulsory Courses**	**Department Elective**	**Faculty Elective**	**University Elective**	**CoHE (YÖK) Compulsory**	**Other**
	x					
Level of Course	**Associate Degree (Short Cycle)**		**Undergraduate (First Cycle)**		**Graduate / Doctoral (Second / Third Cycle)**	
			x			

Language of Instruction	English

Course Instructor(s)	Asst. Prof. Dr. Burçin SALTIK	E-mail: burcin.saltik@arucad.edu.tr Office: FM-OFF02
Course Objectives	Concepts of industry, materials, products. Affecting the growth and development of this recipe, the context and environment, professional terminology, preferences and selection criteria, promotion and evaluation of industrial materials: metals, polymers, composites, wood, glass, ceramics. Professional terminology, preferences and selection criteria, manufacturing techniques and methods, relationships with industrial materials, formatting effects on the relations between the characteristics of mass manufacturing and production.	
Course Learning Outcomes	**Students To Do:** **Teaching Methods** **Evaluation Methods** Remembering: Identify and describe basic visual elements and principles of graphic representation. Emphasis on process oriented exercises and continuous feedback. Workshop, Class discussions, sketching. Establish a relationship between visual quality and structural stability. Understanding: Explain the relationship between sketching, isometric and perspective composition, and communication in design. Demonstrations and Visual Lectures: Introduction to freehand, technical, and compositional	

	techniques Class discussions, weekly classwork's and homeworks's assignments. Explore how materials and the details of design are connected. Applying: Apply freehand drawing techniques to represent design ideas accurately and expressively. Weekly Practice, Assignment documentation and observation drawing. In class composition drawing and classwork's and homeworks's assignments. To comprehend the science of manufacturing, its diverse grounds and the process of manufacturing. Analyzing: Evaluate and improve drawings through consideration of scale, proportion, and visual balance. Encourage reflective learning and collaborative improvement. Peer critiques, instructor feedback sessions. To produce technical descriptions and drawings for design product manufacturing. Evaluating: Critically assess presentation methods and justify visual communication choices.One over one consultations; Individual progress guidance and targeted feedback. To estimate the cost & time of the product production. Creating: Prepare for the midterm and final written exams.
Course Content	The first half of this course is designed to provide an understanding of materials, their properties and their manufacture as a core element of the design process, and to encourage a passion for the exploration and manipulation of materials and manufacturing in the context of design. The course, then follows to provide a foundation to the production processes from the scale of small objects to certain larger scales. Manufacturing processes are explained in depth with full technical descriptions; analyses of the typical applications, design opportunities, and considerations each process offers; and information on cost, duration, and environmental impact.

COURSE OUTLINE/SCHEDULE			
Week	**Topic**	**Implementation (theory/practice)**	**Required Reading, Preliminary preparation**
1	Introduction to materials, products, manufacturing. Manufacturing systems. Basic terminology.	T-P	See the required books.
2	Fundamentals of materials: Their behavior and manufacturing properties. Structure of metals.	T-P	See the required books.

3	Mechanical behavior and manufacturing properties of materials.	T-P	See the required books.
4	Production, general properties and applications for: Metal alloys, ferrous and nonferrous metals.	T-P	See the required books.
5	Production, general properties and applications for: Polymers (thermoplastics, thermosets, elastomers)	T-P	See the required books.-
6	Production, General properties and applications for: Ceramics.	T-P	See the required books.
7	Production, General properties and applications for: Composites.	T-P	See the required books.
8	Production, General properties and applications for: Glass and Midterm.	T-P	See the required books.
9	Feedbacks and production, general properties and applications for: Wood.	T-P	See the required books.
10	Manufacturing processes: Metal casting processes, design, materials and economics.	T-P	See the required books.
11	Manufacturing processes: Forming and shaping processes; Forging, extrusion, injection molding, thermoforming.	T-P	See the required books.
12	Manufacturing processes: Ceramics, glass and wood.	T-P	See the required books.

13	Material removal processes, equipment joining processes and equipment.	T-P	See the required books.
14	Design requirements for sustainable design, and green design.	T-P	See the required books.
15	Quality assurance, testing, inspection and standards.	T-P	See the required books.
16	**FINAL EXAM**		

Required Course Material(s) / Reading(s)/ Text Book(s)	• Groover, P. M. (2017). *Groover's principles of modern manufacturing: materials, processes, and systems*, Call Number: TS183. G65 2017 • Lesko, C. (2008). *Industrial design : materials and manufacturing guide*, Call Number: TS171.4.L472008 • Rich, N., Malik, F. T. (2020). *International standards for design and manufacturing :Quality management and international best practice*, Call Number: TS155.8 .R53 202
Recommended Course Material(s)/ Reading(s) /Other	• Fiell, C., & Fiell, P. (2021). *Industrial design A–Z*. TASCHEN. ISBN: 978-3836522175 • Kalpakjian, S., & Schmid, S. R. (2010). *Manufacturing engineering and technology (3rd ed.).* Prentice Hall. ISBN: 978-9810681449 • Lefteri, C. (2007). *Making it: Manufacturing techniques for product design.* Laurence King Publishing. ISBN: 978-1856695060 • Lefteri, C. (2014). *Materials for design*. Laurence King Publishing. ISBN: 978-1780673448 • Moritz, H., & Rüdiger, K. (2012). *Digital processes: Planning, designing, production*. De Gruyter. ISBN: 978-3034607254 • Rebecca, P. (2015). *The sustainable design book*. Laurence King Publishing. ISBN: 978-1780674735 • Seider, W. D., Seader, J. D., & Lewin, D. R. (2003). *Product and process design principles: Synthesis, analysis, and evaluation*. Wiley. ISBN: 978-1119355243

	• Thompson, R. (2007). *Manufacturing processes for design professionals*. Thames & Hudson. ISBN: 978-0500513750

ASSESSMENT		
Learning Activities	**NUMBER**	**WEIGHT in %**
Mid-Term	1	40
Quiz		
Assignment		
Project		
Field Study		
Presentation / Seminar		
Studio Practice		
Other		
Contribution of Final Examination/Final Project/ Dissertation to the Final Grade	1	60
TOTAL	2	100

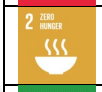
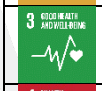
CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME LEARNING OUTCOMES							
No	**PROGRAMME LEARNING OUTCOMES**	Level of Contribution (1-lowest/ 5-highest)				
		1	2	3	4	5
1	Understand knowledge of industrial design principles, design methodologies, history, aesthetics, form & function and product development processes.					x
2	Explain the properties of materials, manufacturing technologies, and production methods used in industrial product design					x

3	Understand ergonomics, and user-centered design concepts in product development				x	
4	Understand sustainability principles, environmental impacts, and life-cycle considerations in industrial design			x		
5	Analyze design problems, user needs, and market requirements to develop appropriate product design solutions.			x		
6	Generate creative product concepts using sketching, ideation techniques, and visual exploration methods.			x		
7	Develop product designs using digital tools, 3D modeling, and rendering software					x
8	Develop prototypes or models to evaluate product functionality, usability, and aesthetics.				x	
9	Communicate design ideas effectively through sketches, technical drawings, models, and professional presentations.				x	
10	Work effectively in multidisciplinary teams during product design and development processes.				x	
11	Manage design projects considering production constraints, market needs, and economic feasibility.			x		
12	Demonstrate professional responsibility, ethical awareness, and commitment to sustainable design practices.				x	

ECTS / STUDENT WORKLOAD				
ACTIVITIES	**NUMBER**	**UNIT**	**HOUR**	**TOTAL (WORKLOAD)**
Course Teaching Hour (X weeks * total course hours)	15	1	4	60
Mid-Term Preliminary Preparation and self-study	1	1	10	10
Project				
Quiz				
Assignment				
Final Examination/ Final Project/ Dissertation	1	1	12	12

TOTAL WORKLOAD				82
TOTAL WORKLOAD / 25				3,28
ECTS				3

ETHICAL RULES WITH REGARD TO THE COURSE
Plagiarism Disclaimer Detected and undetected plagiarism is a serious offense at any time and it could have devastating effects on your degree result and future professional lives. Plagiarism is easy to avoid if you make sure to identify and acknowledge your sources thoroughly and do not copy directly from visual examples, designs, or notes that have in turn been taken word for word from your sources.

	SDG 1: No Poverty	
	SDG 2: Zero Hunger	
	SDG 3: Good Health and Well-Being	
	SDG 4: Quality Education	x
	SDG 5: Gender Equality	x
	SDG 6: Clean Water and Sanitation	x
	SDG 7: Affordable and Clean Energy	x
	SDG 8: Decent Work and Economic Growth	x
	SDG 9: Industry, Innovation and Infrastructure	x
	SDG 10: Reduced Inequalities	x
	SDG 11: Sustainable Cities and Communities	x
	SDG 12: Responsible Consumption and Production	x

	SDG 13: Climate Action	x
	SDG 14: Life Below Water	
	SDG 15: Life on Land	x
	SDG 16: Peace, Justice and Strong Institutions	
	SDG 17: Partnership for the Goals	

ASSESSMENT DETAILS AND EVALUATION CRITERIA:	
Final grades will be determined based on the course learning activities and the assessment details for the final examination or project, as outlined below, in accordance with the University's Education and Examination Regulations. Students are required to attend at least 70% of the classes. The maximum allowable absenteeism is 30%. Midterm: 40% Final: 60%	
PREPARED BY	Asst. Prof. Dr. Burcin Saltik.
UPDATED	October 2023, September 2024, September 2025.
APPROVED	